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Retrospective evaluation of the regional aid framework

Final Report

Prepared by

DIW BERLIN

e.CA economics

SheppardMullin

Competition

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Directorate-General for Competition
E-mail:comp-publications@ec.europa.eu

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Retrospective evaluation of the regional aid framework

Final report

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DIW BERLIN — Tomaso Duso, Joanna Piechucka, Jo Seldeslachts

e.CA economics — Hans W. Friederiszick, Ela Głowicka, Linda Gratz, Paula Mäkelä, Simon Miegielsen

SheppardMullin — Jacques Derenne, Marie Lagrue, Dimitris Vallindas

In collaboration with Ciara Barbu-O'Connor, Julien Blanquart, Brecht Boone, Zachary Herriges, Robert Klotz, Harm van Leeuwen, Sarah Peters and Wiktor Owczarz. Excellent research assistance by Theodor Friederiszick and Yusuf Agus.

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EXECUTIVE SUMMARY

Context and objectives of the study

In January 2019, the European Commission ("Commission") launched the evaluation of its State aid rules that were adopted as part of the State aid Modernisation. The evaluation aims to verify if the rules delivered the desired results to European citizens and businesses at a minimum cost and if they are still fit for purpose. Within this process, the Commission entrusted a consortium of DIW, E.CA Economics and Sheppard Mullin with the retrospective evaluation support study on the EU regional aid framework applicable from 2014 to 2020 ("the RAF 2014"). The RAF 2014 comprises the Guidelines on Regional State Aid ("RAG") and the provisions applicable to regional aid in the General Block Exemption Regulation ("GBER"). The RAF 2014 contains provisions for both investment and operating aid, but the present study focused exclusively on the evaluation of investment aid rules.

The objective of this study is to provide the Commission with an independent evidence-based assessment of the implementation of the RAF 2014 and its effects on regional development and competition. In particular, the study evaluates:

(1) to what extent regional investment aid has provided a real incentive for companies to locate their investments in disadvantaged areas of the EU ("effectiveness of the RAF 2014"),
(2) to what extent the RAF 2014 has allowed the Commission to focus on the potentially most distortive cases ("efficiency of the RAF 2014"),
(3) to what extent regional investment aid has been a relevant factor for companies to locate in the EU's disadvantaged regions in a global context ("relevance of the RAF 2014"),
(4) to what extent the RAF 2014 has been consistent with the EU structural funds legislation ("coherence of the RAF 2014"),
(5) to what extent the RAF 2014 has reduced the risk of subsidy races in the EU ("EU added value of the RAF 2014").

Methods employed

This study employed multiple research methods. First, we reviewed the relevant academic literature, studies and reports issued by national and international institutions and organisations. Second, we carried out a web-based survey of 66 aid-granting authorities. Third, case studies were conducted for 22 cases (pre-) notified to the Commission under the RAG in the period 2014-2018 (and closed in the same period. Fourth, we interviewed several experts advising investors on location decisions and inquired about enterprise decision-making, investment trends, and the role of regional State aid in the 2014-2020 period. Finally, we collected data on regional State aid and investment in the European Economic Area ("EEA") since 2007 and used econometric regression analysis to estimate the causal effects of changes in maximum aid intensities and in eligibility conditions on private investment by large enterprises in 'c' areas.

All of these methods have their strengths and weaknesses. In particular, it has to be highlighted that surveys can provide a sample of stakeholders' views in an efficient way, but are prone to strategic responses. Case studies are an intensive analysis of all aspects in full complexity, but largely they rely on publicly available information and may not be representative. The strength of the econometric analysis is to allow the measurement of the causal effect of the changes introduced in the RAF 2014. However, they do not allow easily identifying the mechanisms driving the results. They also require large datasets and variation in the data to produce robust outcomes. In the following text, we explain the main changes introduced by the RAF 2014 and present a summary of the results obtained by triangulating findings from all the methods.

Objectives of the RAF 2014

Regional aid aims to reduce the development gap between the different regions of the European Union ("EU"). With the help of well-targeted State aid, disadvantaged regions expect to attract additional investment and economic activity. The RAF 2014 establishes the methodology and criteria for the eligibility of regions for regional State aid in the Member States. It also establishes the conditions under which a Member State may grant regional aid without a notification and it defines the criteria that the Commission uses to assess the compatibility of regional investment aid and operating aid measures notified by Member States.

The regional aid maps identify the EU areas that are eligible for State aid under the RAF 2014. 'A' regions are the least developed regions in the EU, with the biggest scope for regional State aid and 'c' regions are less developed regions, with stricter regional aid rules. Regions not included in the maps are non-assisted regions. The desired impact of the EU State aid control is to allow aid for regional development while ensuring a level playing field in the internal market and limiting the negative effects on competition and trade to the minimum necessary.

This study covers the first five years of the RAF 2014; the quantitative data on investments is, however, only available for three years (2014, 2015 and 2016). Given this short time period, long-term effects of the rules cannot be evaluated. Thus, the study primarily looks at short to mid-term effects of the introduction of the RAF 2014.

(1) Effectiveness of the RAF 2014

The evidence collected in this study confirms that the availability of regional investment aid in the EU's disadvantaged regions does attract investments to those regions. The relative importance of regional aid as an incentive to attract investment varies depending on the stage in the decision process, the type of investment, enterprise, sector and the eligibility status of the region. This conclusion comes robustly from the econometric analysis, the survey of aid granting authorities, literature review and the expert interviews. In detail:

Under the RAF 2014, the most disadvantaged EU regions also spent the highest amount of regional State aid (when measured relative to its GDP), *i.e.* the higher the average maximum aid intensity of a Member State, the higher the share of regional State aid spent relative to a country's GDP over the period 2014-2017. This indicates that regional aid is well targeted. In addition, descriptive country-level data analysis revealed that the reduction in maximum aid intensities – as introduced by the RAG 2014 – is positively correlated with the change in private investment: the larger the reduction in a country's average maximum aid intensity, the larger the reduction in investment into the country. This provides preliminary suggestive evidence that the changes in aid intensity may affect actual investment flows.

The econometric analysis provides evidence for the incentive effect for LEs in 'c' areas. The incentive effect is identified by estimating the change in firms' investment, which is caused by one of the two key changes in regional State aid rules introduced by the RAF 2014.

First, State aid eligibility of investments by LEs in 'c' areas was restricted. We looked at private investment in 'c' areas solely affected by this restriction, *i.e.* where the maximum aid intensities did not change in 2014. We compared the investment growth rates in these areas to the investment growth rates in counterfactual non-assisted areas selected to be similar in the levels and growth of observable characteristics such as GDP and employment. Albeit still being positive, investment rate of LEs were significantly lower in the 'c' areas than in the counterfactual areas. This result is consistent with the views of aid granting authorities from 'c' areas who, based on several examples, hold restrictions related to aid being granted to

LEs responsible for their failure to attract the investment to 'c' regions. In the examples given, the investment projects were, after rejection, then carried out in other EU Member States (*e.g.* Poland, Hungary, Spain) or in non-European countries (Morocco, Turkey).

Second, maximum aid intensities in some 'a' and 'c' areas were decreased (and more so for the LEs than SMEs). For some areas, these changes were accompanied by a change in eligibility status from 'a' to 'c' or from 'c' to non-assisted. According to our estimates, the investment growth rate of LEs was smaller – yet still positive – in 'c' areas where the maximum aid intensity was reduced if compared to 'c' areas where the maximum aid intensities remained the same. Although being economically relevant, this effect is not statistically significant. We find an economically even larger and statistically significant drop in investment rates by LEs in areas that changed from a 'c' status to a non-assisted status if compared to 'c areas where the maximum aid intensities remained the same. In this case, it is not possible to cleanly identify whether this effect is determined by the change in eligibility status *per se* or by the implicit drop in maximum aid intensities to zero.

In contrast to these results for the 'c' areas and LEs, the investment levels in 'a' areas were not significantly impacted neither by the drop in maximum aid intensity levels nor by the change in eligibility from 'a' to 'c' areas. Neither were SMEs impacted by any of the changes introduced by the RAF 2014 – nor the reduction of maximum aid intensity nor the change in eligibility both in 'a' and in 'c' areas. Many reasons may explain these findings in theory, but our econometric analysis cannot identify them empirically.

The importance of regional aid for a company's investment decision making is confirmed by evidence from other research methods. The reviewed literature suggests that regional State aid has had a positive impact on both employment and investment, at least at the level of SMEs and on manufacturing sector. The interviewed experts agreed that investors do consider regional State aid when choosing the location for an investment project. However, it is not the investor's main criterion. According to the interviewed experts, investors' main criteria for the location choice of an investment have been labour availability and labour cost. The availability of regional aid is one of several (5-7) location factors and is considered as a qualitative plus in the initial stages of the location decision process of companies. When it comes to the final decision making, once the short list of potential locations has been established, regional State aid comes as a cost factor in the investment profitability calculation.

The interviewed experts also concur that both the absolute and the relative importance of State aid depends on the characteristics of the investing company, such as company size and age. Investment incentives are more important for companies in the course of establishing themselves in the EEA and for companies from outside the EU considering investment in the disadvantaged areas of the EEA. State aid in form of a direct cash subsidy is particularly important for capital-intensive industries like automotive or chemical and for start-ups and SMEs, which typically are financially constrained by the limited access to credit. On the other hand, tax breaks are more relevant for labour-intensive industries and for large enterprises, which typically have more financial resources for investments and consider a long-term perspective. Tax incentives are also more relevant for the location of headquarters. In addition, since LEs typically have better access to credit, they are less interested than SMEs in public funding in the form of low interest loans.

Some authorities do not have sufficient budget to fund the maximum levels of regional aid eligible in their region. In the survey, 20% of aid granting authorities representing 'a' areas and 35% of those representing 'c' areas noted in the survey that they experienced such constraints. This could limit the potential incentive effects of regional aid.

The effectiveness of the RAG rules may be limited by the fact that the RAG rules were considered not sufficiently clear on several aspects. Interviewed experts indicated that the concept of *maximum aid intensity* is sometimes not well understood by investors, who consider it as the amount typically being paid out and not as just a nominal maximum. One expert raised the lack of a definition for *relocation*. The authorities also pointed to difficulties with the definition of *new economic activity*, which requires an investment in an activity with a different NACE code.

(2) Efficiency of the RAF 2014

The efficiency of the RAF 2014 was assessed mainly by case studies. We assessed the balance between the *ex ante* risk of the aid measure to negatively distort competition and affect trade between Member States and the expected effort required from the stakeholders involved in notifying and assessing a case under the RAG 2014. For 'a' areas, we found that the effort was balanced with the *ex ante* risk in all notified cases. For 'c' areas we found that the effort was often not balanced.

The Commission received 11 (pre-) notifications of regional State aid to notifiable investments in 'c' areas. All those cases were for LEs and concerned diversification investments into new products or process innovations. Only in one case the aid amount exceeded the notification threshold. All other cases concerning investments in 'c' areas were notified precisely because those diversification projects are not block-exempted but are to be notified.

For eight cases we consider that of competition and effect on trade between Member States. the risk of the aid negatively distorting competition and affecting trade between Member States was low or very low. The aid amounts notified ranged from EUR 0.1 to 4.6 million. Still, those cases had to be notified and were then withdrawn. We therefore consider that the required effort appears unjustified by the potential distortions

Only for two of the cases we concluded that the risk to competition and ettect on trade between Member States would be moderate, despite the low or very low aid amounts, because the beneficiaries operated as one of the top manufacturers in at least a moderately concentrated cross-border market. In those cases, the assessment might have been worth the effort. Those cases, however, were finally withdrawn and were realised without State aid since they were not considered as real process innovations.

The case studies provide further insights on the incentive effect and show that not all investment projects really need the aid. Out of the 11 (pre-) notified and withdrawn projects, 5 were most likely pursued without State aid thereafter, exemplifying the lack of incentive effect.

The case studies also hint to some potential room for improvement with respect to clarity under the current rules. First, the fact that ten out of eleven 'c' region cases notified pursuant to paragraph 15 RAG 2014 were later withdrawn, suggests that the projects might not have been notified in the first place if the criteria of paragraph 15 RAG 2014 had been more clear or straightforward. Similarly, the GBER requirements may not be clear to the Member States and beneficiaries in all instances. For the two cases erroneously notified under the RAG, both the Commission and the parties exerted significant amount of effort before realising that the aid could be granted under GBER.

Additional hints that complexity hinders its application, can be found in the survey results. 10% of the surveyed authorities reported that they tried to avoid RAG notifications when feasible. The interviewed experts also stated that for larger projects for which the State aid amounts are close to the notification thresholds, the project may be restructured in a way to avoid notification. In general, the

interviewed experts considered the notification and assessment procedures for regional State aid cases too long and lacking transparency from the perspective of investors.

(3) Relevance of the RAF 2014

We have assessed the relevance of the RAF 2014 by examining whether, and if so to what extent, regional aid has contributed to attracting Foreign Direct Investment ("FDI") to the disadvantaged regions of the EU.

Overall, the descriptive analysis of FDI data does not provide indications of a clear relation between the maximum aid intensity and the share in worldwide FDI inflows. At the EU28-level, both maximum aid intensities and the share in FDI flows have decreased over the period 2007 to 2017. Comparing the levels of FDI flows and maximum aid intensities of the individual Member States reveals that there is a negative correlation between the (average) maximum aid intensity and the share in FDI inflows. This in our view illustrates that the RAF 2014 targets precisely those Member States with slow developing regions. We further looked at time development of FDI inflows and maximum aid intensities and we found a weak positive relationship between average maximum aid intensities and FDI flows. However, this correlation appears to be driven by developed countries that prior to the RAG 2014 had a low average maximum aid intensity and thus it is likely unrelated to regional aid availability.

The expert interviews indicated that regional State aid has played a role in attracting investment to the disadvantaged regions of the EU though. However, investment incentives are typically not the key factor in the location decision-making process - they can tip the decision at times when two locations are similar in terms of all other characteristics.

The importance of regional State aid does also vary depending on the origin of the investors, according to the experts interviewed. American and Canadian companies are used to negotiating proactively investment incentives and putting regions against each other, as it is a common practice in the US. Asian and Australian investors tend to focus more on the trustworthiness if the relationship with the region (as a business partner) than on the financial package only.

(4) Coherence of the RAF 2014

One of the objectives of the State Aid Modernisation was to ensure consistency and synergy of State aid policy with other EU policies, in particular with the EU Cohesion Policy for what concerns the RAF 2014, as they both are tools to serve the EU regional policy enshrined in Article 3 TUE. This consistency objective is clearly mentioned in the ESI Funds provisions and the RAF 2014 and is reflected in the two sets of rules through multiple references to the other set of provisions.

This consistency and complementarity between the two sets of rules also follow from the various sources of evidence used for the purposes of this Study:

- the review of legislation shows that the objectives, criteria for application and approval are clearly pre-defined and objective;
- the analysis of the Scoreboard data shows that, under the RAF 2014, nearly 40% of all cases were co-financed, accounting for EUR 6 billion (more than 50% of total aid spent), showing that the ESI Funds provisions and the RAF are very often applied in parallel;
- views of aid-granting authorities surveyed for the study, a majority of whom considered the two sets of rules somewhat complementary in all aspects (*i.e.* scope, objectives, approval criteria, outcomes, procedure).

The descriptive analysis and the survey of aid-granting authorities show some differences between the RAF 2014 and the ESI Funds provisions, in particular in terms of scope of application (geographic and sectoral), definitions of terms and criteria for approval. However, these differences are mainly about some extra burden for the beneficiaries and aid-granting authorities rather than contradictions that would make the two sets of rules irreconcilable.

(5) EU added value of the RAF 2014

Regional aid rules can bring added value to the Member States and the EU by preventing wasteful subsidy races, when regional authorities compete with each other to attract investment to their region. More in general, the RAF 2014 reduced regional State aid eligibility and maximum aid intensities compared to the previous regional aid rules and it prohibited State aid from relocating existing investment between Member States. In theory, these measures restricted aid granting authorities in their ability to bid for investments against other EU regions. In practice, we looked at regional State aid cases reviewed with a location scenario under both RAG. These cases do not cover all subsidy races: cases under GBER and investments moving away of the EU are not included, so it is not possible to conclude about the overall change in the frequency of regions in the EU competing against each other since 2014. Focusing on cases with location scenario only, they were reviewed under the RAG 2014 more frequently compared to the previous RAG period.

Kontext und Ziele der Studie

Im Januar 2019 begann die Europäische Kommission (Kommission) mit der Evaluierung ihrer Beihilferegelungen, die im Rahmen der Modernisierung staatlicher Beihilfen erlassen wurden. Die Evaluierung zielt darauf ab zu überprüfen, ob die Regeln noch zweckmäßig sind und den europäischen Bürgern und Unternehmen die gewünschten Ergebnisse zu minimalen Kosten geliefert haben. Im Rahmen dieses Prozesses beauftragte die Kommission ein Konsortium aus DIW Berlin, E.CA Economics und Sheppard Mullin mit der retrospektiven Evaluierungsstudie zum EU-Regionalbeihilferahmen für den Zeitraum 2014 bis 2020 („RAF 2014"). Die RAF 2014 umfassen die Leitlinien für Regionalbeihilfen („RAG") und die Allgemeine Gruppenfreistellungsverordnung („GBER"). Die RAF 2014 enthalten sowohl Regelungen für Investitions- als auch für Betriebsbeihilfen, allerdings befasst sich die vorliegende Studie ausschließlich mit der Evaluierung der Regelungen zu Investitionsbeihilfen.

Ziel dieser Studie ist es, der Kommission eine unabhängige, evidenzbasierte Evaluierung der Umsetzung der RAF 2014 und ihrer Wirkungen auf die regionale Entwicklung und den Wettbewerb vorzulegen. Insbesondere evaluiert die Studie, ob die regionalen Investitionsbeihilfen

(1) einen echten Anreiz für Unternehmen geschaffen haben, ihre Investitionen in benachteiligten Regionen der EU zu tätigen ("Wirksamkeit der RAF 2014"),

(2) es der Kommission ermöglicht haben, sich auf die potenziell am meisten verzerrenden Fälle zu konzentrieren ("Effizienz der RAF 2014"),

(3) einen relevanten Faktor für die Ansiedlung von Unternehmen in benachteiligten Regionen der EU im globalen Kontext darstellten ("Relevanz der RAF 2014"),

(4) mit den EU-Strukturfondsvorschriften vereinbar waren ("Kohärenz der RAF 2014"),

(5) das Risiko von Subventionswettläufen in der EU verringert haben ("EU-Mehrwert der RAF 2014").

Angewandte Methoden

Für diese Studie wurden mehrere Forschungsmethoden verwendet. Erstens wurden die relevante wissenschaftliche Literatur sowie Studien und Berichte nationaler und internationaler Institutionen und Organisationen gesichtet. Zweitens wurde eine webbasierte Umfrage unter 66 Bewilligungsbehörden durchgeführt. Drittens wurden 22 Fallstudien zu regionalen Investitionsbeihilfeprojekten durchgeführt, die unter den RAG bei der Kommission seit 2014 (vor-)angemeldet wurden. Viertens wurden mehrere Experten, die Investoren bei Standortentscheidungen beraten, zu Unternehmensentscheidungen, Investitionstrends und der Rolle von regionalen Investitionsbeihilfen im Zeitraum 2014-2020 befragt. Schließlich wurden Daten zu Regionalbeihilfen und Investitionen im Europäischen Wirtschaftsraum (EWR) für den Zeitraum ab 2007 gesammelt und mithilfe einer ökonometrischen Regressionsanalyse die kausalen Effekte von Änderungen der Beihilfehöchstintensitäten und Förderbedingungen auf private Investitionen großer Unternehmen in 'c'-Regionen geschätzt.

Alle diese Methoden haben Schwächen und Stärken. Insbesondere ist hervorzuheben, dass Umfragen auf effiziente Weise stichprobenartige Einblicke in die Ansichten verschiedener Interessengruppen liefern können, jedoch anfällig für strategische Antworten sind. Fallstudien ermöglichen eine tiefgehende Analyse aller Aspekte in voller Komplexität, stützen sich jedoch weitgehend auf öffentlich zugängliche Informationen und sind möglicherweise nicht repräsentativ. Die Stärke ökonometrischer Analysen besteht darin, den kausalen Effekt der mit den RAF 2014 eingeführten Änderungen messen zu können. Allerdings ist es oft nicht einfach anhand ökonometrischer Analysen die Mechanismen, welche die kausalen Effekte treiben, zu identifizieren. Auch erfordern sie große Datensätze und Variationen in den Daten, um robuste Aussagen treffen zu können.

Im Folgenden erläutern wir die wichtigsten Änderungen, die mit den RAF 2014 eingeführt wurden, und fassen die Ergebnisse zusammen, die durch Triangulation der Methoden erzielt wurden.

Ziele der RAF 2014

Regionalbeihilfen sollen das Entwicklungsgefälle zwischen den verschiedenen Regionen der Europäischen Union verringern. Benachteiligte Regionen gehen davon aus, mit gezielten staatlichen Beihilfen zusätzliche Investitionen und wirtschaftliche Aktivitäten anziehen zu können. Die RAF 2014 legen die Methodik und Kriterien der Bestimmung der Förderfähigkeit von Regionen hinsichtlich regionaler staatlicher Beihilfen in den Mitgliedstaaten fest. Darüber hinaus legen sie die Kriterien fest, anhand derer die Kommission die Vereinbarkeit der von den Mitgliedstaaten angemeldeten regionalen Investitions- und Betriebsbeihilfemaßnahmen mit dem Binnenmarkt beurteilt.

Auf den Fördergebietskarten sind die EU-Regionen aufgeführt, für die im Rahmen der RAF staatliche Beihilfen gewährt werden können. 'a'-Regionen sind die am wenigsten entwickelten Regionen in der EU mit dem größten Spielraum für die Vergabe von Regionalbeihilfen und 'c'-Regionen sind weniger entwickelte Regionen mit strengeren Vorschriften für die Vergabe regionaler Beihilfen. Regionen, die nicht in den Karten enthalten sind, sind nicht geförderte Regionen. Die gewünschte Wirkung der EU-Beihilfenkontrolle besteht darin, einerseits Beihilfen für die regionale Entwicklung zuzulassen und andererseits dabei die Wettbewerbsbedingungen im Binnenmarkt nicht zu verzerren bzw. die negativen Auswirkungen auf Wettbewerb und Handel auf das erforderliche Minimum zu beschränken.

Die vorliegende Studie bezieht sich auf die ersten fünf Jahre der RAF 2014; die quantitativen Daten sind jedoch nur für drei Jahre verfügbar (2014, 2015 und 2016). Angesichts dieser kurzen Zeitspanne können die langfristigen Auswirkungen der Regeln nicht bewertet werden. So betrachtet die Studie vor allem die kurz- bis mittelfristigen Auswirkungen der Einführung der RAF 2014.

(1) Wirksamkeit der RAF 2014

Die in dieser Studie gesammelten Erkenntnisse bestätigen, dass die Verfügbarkeit regionaler Investitionsbeihilfen in den benachteiligten Regionen der EU Investitionen in diese Regionen anzieht. Die relative Bedeutung von Regionalbeihilfen als Investitionsanreiz hängt davon ab, in welcher Phase des Entscheidungsprozesses ein Unternehmen eine regionale Investitionsbeihilfe beantragt, der Art der Investition, dem Unternehmen, dem Wirtschaftszweig und dem Förderstatus der Region. Diese Schlussfolgerung ergibt sich aus der ökonometrischen Analyse, der Befragung der Bewilligungsbehörden, der Literaturrecherche und den Experteninterviews. Im Detail:

Im Rahmen der RAF 2014 gaben die am stärksten benachteiligten EU-Regionen auch den höchsten Betrag für Regionalbeihilfen (im Verhältnis zu ihrem BIP) aus,

d.h. je höher die durchschnittliche Beihilfehöchstintensität eines Mitgliedstaats, desto höher ist der Anteil der Regionalbeihilfen am BIP im Zeitraum 2014-2017. Dies zeigt, dass die Regionalbeihilfen zielgerichtet sind. Darüber hinaus ergab eine deskriptive Datenanalyse auf Länderebene, dass die Verringerung der Beihilfehöchstintensitäten – wie sie mit den RAG 2014 eingeführt wurde – positiv mit der Änderung der privaten Investitionen korreliert: Je stärker die Verringerung der durchschnittlichen Beihilfehöchstintensität eines Landes, desto stärker ist der Rückgang der Investitionen in dem Land. Dies liefert vorläufige Hinweise darauf, dass sich Änderungen in der Beihilfeintensität auf die tatsächlichen Investitionsströme auswirken können.

Die ökonometrische Analyse liefert starke Evidenz für einen Anreizeffekt regionaler Investitionsbeihilfen für große Unternehmen (LE) in 'c'-Regionen. Der Anreizeffekt wird identifiziert, indem geschätzt wird, inwiefern die zwei wesentlichen Änderungen in den Beihilferegeln, die mit den RAF 2014 eingeführt wurden, zu Änderungen der Investitionsströme geführt haben.

Erstens wurde mit den RAF 2014 die Förderfähigkeit staatlicher Beihilfen für Investitionen von LEs in 'c'-Regionen eingeschränkt. In der ökonometrischen Analyse werden private Investitionen in 'c'-Regionen, die ausschließlich von dieser Beschränkung betroffen waren, d.h. in denen sich die Beihilfehöchstintensitäten im Jahr 2014 nicht geändert haben, betrachtet. Die Wachstumsraten der Investitionen in diesen Regionen werden mit den Wachstumsraten der Investitionen in ausgewählten, nicht unterstützten Regionen verglichen, die eine ähnliche Höhe und Wachstumsrate bei beobachtbaren Merkmalen wie dem BIP und der Beschäftigungsquote aufweisen. Die Wachstumsrate der Investitionen der LEs in den betrachteten Regionen war zwar weiterhin positiv, jedoch erheblich niedriger als in den zum Vergleich herangezogenen, nicht unterstützten Regionen. Dieses Ergebnis steht im Einklang mit der Auffassung von Bewilligungsbehörden in 'c'-Regionen, die anhand mehrerer Beispiele dargelegt haben, dass die Beschränkungen der Förderfähigkeit von LEs in 'c'-Regionen ursächlich dafür waren, dass diese Regionen weniger Investitionen anziehen konnten. In den angegebenen Beispielen wurden die Investitionsprojekte statt in den jeweiligen 'c'-Regionen in anderen EU-Mitgliedstaaten (z. B. Polen, Ungarn, Spanien) oder in außereuropäischen Ländern (Marokko, Türkei) durchgeführt.

Zweitens wurden die Beihilfehöchstintensitäten in einigen 'a'- und 'c'-Regionen gesenkt (und zwar noch mehr für LEs als für kleine und mittlere Unternehmen, KMU). In einigen Regionen ging diese Änderung mit einer Änderung des Förderfähigkeitsstatus von 'a'- auf 'c' oder von 'c' auf „nicht gefördert"' einher. Die empirischen Schätzungen zeigen, dass das Wachstum von Investitionen durch LEs in Gebieten, in denen die Beihilfehöchstintensität verringert wurde, geringer war – aber immer noch positiv – als in Regionen, in denen die Beihilfehöchstintensität gleich blieb. Dieser Effekt ist wirtschaftlich bedeutend, jedoch statistisch nicht signifikant. Die Analysen zeigen einen wirtschaftlich noch bedeutenderen und statistisch signifikanten Rückgang des Investitionswachstums von LEs in Regionen, in denen sich der Status von ‚c' in ‚nicht gefördert' geändert hat, verglichen mit dem Wachstum von Investitionen durch LEs in Regionen, in denen die Beihilfehöchstintensitäten gleich geblieben sind. In diesem Fall kann nicht eindeutig festgestellt werden, ob dieser Effekt durch die Änderung des Förderfähigkeitsstatus an sich oder durch das implizite Absinken der Beihilfehöchstintensität auf null getrieben ist.

Im Gegensatz zu diesen Ergebnissen bezüglich 'c'-Regionen und LEs wurde das Investitionsniveau in 'a'-Regionen weder durch den Rückgang der Beihilfehöchstintensität noch durch die Änderung des Förderfähigkeitsstatus von 'a'- auf 'c' wesentlich beeinflusst. Weder die durch die RAF 2014 eingeführten Änderungen noch die Verringerung der Beihilfehöchstintensität oder die Änderung des Förderfähigkeitsstatus wirkten sich auf KMUs in 'a'- und 'c'-Regionen aus. Viele

Gründe mögen diese Ergebnisse theoretisch erklären können, über die ökonometrische Analyse können sie jedoch nicht weiter eingegrenzt werden.

Die Relevanz von Regionalbeihilfen für die Investitionsentscheidung eines Unternehmens wird durch andere Forschungsmethoden bestätigt. Aus der Literaturstudie geht hervor, dass regionale Beihilfen sich sowohl auf Beschäftigung als auch auf Investitionen positiv auswirken, zumindest in Bezug auf KMUs und im verarbeitenden Gewerbe. Die befragten Experten waren sich einig, dass Investoren bei der Auswahl des Standortes für ein Investitionsprojekt regionale staatliche Beihilfen berücksichtigen. Sie seien jedoch nicht das Hauptkriterium des Investors. Nach Ansicht der befragten Experten sind die Hauptkriterien der Investoren für die Standortwahl die Verfügbarkeit von Arbeitskräften und die Arbeitskosten. Die Verfügbarkeit von Regionalbeihilfen sei einer von mehreren (5-7) relevanten Standortfaktoren und werde im frühen Stadium des Entscheidungsprozesses von den Unternehmen qualitativ berücksichtigt. Am Ende des Entscheidungsprozesses, sobald eine engere Auswahl der potenziellen Standorte getroffen wurde, stellten Regionalbeihilfen einen finanziellen Faktor bei der Berechnung der Investitionsrentabilität dar.

Die befragten Experten sind sich auch einig, dass sowohl die absolute als auch die relative Bedeutung der Regionalbeihilfen von den Merkmalen des investierenden Unternehmens, wie etwa Unternehmensgröße und Alter, abhängt. Investitionsanreize seien relativ wichtiger für Unternehmen, die sich im EWR (neu) niederlassen wollen, oder für Unternehmen aus Drittländern, die Investitionen in den benachteiligten Gebieten des EWR in Betracht ziehen. Beihilfen in Form einer direkten Subvention seien besonders wichtig für kapitalintensive Branchen wie die Automobil- oder Chemieindustrie sowie für Start-ups und KMUs, die in der Regel durch den begrenzten Zugang zu Krediten finanziell beschränkt seien. Andererseits seien Steuererleichterungen relevanter für arbeitsintensive Branchen und Großunternehmen, welche typischerweise über größere finanzielle Ressourcen für Investitionen verfügen und eine langfristige Perspektive einnehmen. Steuererleichterungen seien auch relevanter für die Wahl des Standorts des Unternehmenshauptsitzes. Da LEs in der Regel einen besseren Zugang zu Krediten haben, seien sie zudem weniger an einer staatlichen Finanzierung in Form von zinsgünstigen Darlehen interessiert als KMUs.

Einige Behörden verfügten nicht über ein ausreichendes Budget, um die in ihrer Region förderfähigen Regionalbeihilfen zu finanzieren. In der Umfrage gaben 20% der Beihilfen gewährenden Behörden in 'a'-Regionen und 35% der Beihilfen gewährenden Behörden in 'c'-Regionen an, dass sie solchen Einschränkungen ausgesetzt waren. Dies könnte die potenziellen Anreizeffekte regionaler Beihilfen begrenzen.

Die Wirksamkeit der RAG-Leitlinien könnte dadurch eingeschränkt sein, dass sie in vielerlei Hinsicht nicht als klar genug eingestuft wurden. Die befragten Experten gaben an, dass das Konzept der Beihilfe*höchst*intensität von Investoren zum Teil nicht gut verstanden werde und die Investoren typischerweise davon ausgingen, dass es sich um den auszuzahlenden Betrag und nicht um den nominalen Höchstbetrag handele. Ein Experte wies auch auf die Verständnisschwierigkeiten bezüglich des Begriffs einer neuen ökonomischen Tätigkeit („new economic activity") hin, welche eine Investition in eine Tätigkeit mit einem anderen NACE-Code erfordert.

(2) Effizienz der RAF 2014

Die Effizienz der RAF 2014 wurde hauptsächlich mithilfe von Fallstudien bewertet. Wir haben das Gleichgewicht zwischen dem Ex-ante-Risiko, dass eine Beihilfemaßnahme den Wettbewerb verzerrt und den Handel zwischen den Mitgliedstaaten negativ beeinflusst, und den erwarteten Aufwand der an der Anmeldung und Bewertung eines Falles im Rahmen der RAF 2014 beteiligten

Akteure bewertet. Für 'a'-Regionen waren der Aufwand und das Ex-ante-Risiko nach unserer Einschätzung ausgewogen. Für 'c'-Regionen stellen wir fest, dass der Aufwand oft nicht verhältnismäßig war.

Die Kommission hat 11 (Vor-)Anmeldungen von regionaler Staatsbeihilfe an meldepflichtige Investitionen in 'c'-Regionen erhalten. Alle diese Fälle betrafen LEs und Diversifikationsinvestitionen in neue Produkte oder Prozessinnovationen. Nur in einem Fall überschritt der Beihilfebetrag die Meldeschwelle. Alle weiteren Investitionen in 'c'-Regionen wurden aufgrund der Tatsache, dass diese Diversifikationsinvestitionen nicht gruppenweise freigestellt sind, angemeldet.

Bei acht Fällen ist unsere Einschätzung, dass das Risiko auf Wettbewerbsverzerrung oder negative Beeinflussung des Handels zwischen Mitgliedsstaaten gering oder sehr gering war. Die angemeldeten Beihilfen betrugen zwischen 0,1 und 4,6 Millionen EUR. Die Beihilfen waren dennoch anmeldepflichtig und wurden später zurückgezogen. Deshalb sind wir der Auffassung, dass der erforderliche Aufwand nicht durch mögliche Wettbewerbsverzerrungen oder Beeinflussung des Handels zwischen Mitgliedsstaaten gerechtfertigt erscheint.

Nur bei zwei der Fälle kamen wir zum Schluss, dass das Risiko auf Wettbewerbsverzerrung und Beeinflussung des Handels zwischen Mitgliedsstaaten moderat war, trotz geringer oder sehr geringer Beihilfebeträge, weil die Empfänger als einer der der größten Hersteller in einem gemäßigt konzentrierten grenzüberschreitenden Markt agierten. In diesen Fällen könnte die Prüfung sich gelohnt haben. Jedoch wurden diese Fälle schließlich zurückgezogen und ohne staatliche Beihilfen durchgeführt, da sie nicht als echte Prozessinnovationen bewertet wurden.

Die Fallstudien liefern weitere Erkenntnisse zum Anreizeffekt und zeigen, dass nicht alle Investitionsprojekte die Beihilfe gebraucht haben. Von den 11 (vor-)angemeldeten und später zurückgezogenen Fällen wurden 5 wahrscheinlich anschließend ohne Staatsbeihilfen durchgeführt, was vom Fehlen einer Anreizwirkung zeugt.

Die Fallstudien weisen auch auf Verbesserungspotenziale in Bezug auf die Klarheit nach den geltenden Vorschriften hin. Erstens deutet die Tatsache, dass zehn von elf gemäß Absatz 15 RAG 2014 in einer der 'c'-Region angemeldeten Fälle später eingestellt wurden, darauf hin, dass die Projekte möglicherweise gar nicht erst gemeldet worden wären, wenn die Kriterien des Absatz 15 RAG 2014 klarer oder einfacher gewesen wären. Ebenso sind die GBER-Anforderungen für die Mitgliedstaaten und die Begünstigten möglicherweise nicht in allen Fällen klar. In den beiden Fällen, die zu Unrecht im Rahmen des RAG gemeldet wurden, haben sowohl die Kommission als auch die Parteien erhebliche Anstrengungen unternommen, bevor sie feststellten, dass die Beihilfe im Rahmen des GBER gewährt werden konnte.

Zusätzliche Hinweise darauf, dass Komplexität die Anwendung behindert, finden sich in den Umfrageergebnissen. So gaben 10% der befragten Behörden an, dass sie versucht haben, Anmeldungen der Regionalbeihilfen zu vermeiden, wenn dies möglich ist. Die befragten Experten erklärten auch, dass bei größeren Projekten, bei denen die Höhe der Beihilfen nahe an den Anmeldeschwellen liegt, das Projekt so umstrukturiert werden kann, dass eine Anmeldung vermieden wird. Im Allgemeinen hielten die befragten Experten die Anmelde- und Bewertungsverfahren für Regionalbeihilfen für zu langwierig und für aus Sicht der Investoren intransparent.

(3) Relevanz der RAF 2014

Wir haben die Relevanz der RAF 2014 untersucht, indem wir abgeschätzt haben, ob und – wenn ja – in welchem Umfang sie dazu beitragen, ausländische

Direktinvestitionen (*foreign direct investment*, FDI) in die benachteiligten Regionen der EU zu ziehen.

Insgesamt liefert die deskriptive Analyse der FDI-Daten keine Hinweise auf einen klaren Zusammenhang zwischen der maximalen Beihilfeintensität und dem Anteil an den weltweiten FDI-Zuflüssen. Auf EU28-Ebene sind sowohl die maximalen Beihilfeintensitäten als auch der Anteil an den FDI-Strömen im Zeitraum 2007 bis 2017 gesunken. Ein Vergleich der Volumina der FDI-Ströme und der maximalen Beihilfeintensitäten der einzelnen Mitgliedstaaten zeigt, dass ein negativer Zusammenhang zwischen der (durchschnittlichen) maximalen Beihilfeintensität und dem Anteil an den FDI-Zuflüssen besteht. Dies zeigt aus unserer Sicht, dass die RAF 2014 genau auf die Mitgliedstaaten mit langsamen Entwicklungsregionen ausgerichtet sind. Wir haben außerdem die Entwicklung von FDI-Strömen und maximalen Beihilfeintensitäten über die Zeit betrachtet und dabei einen schwachen positiven Zusammenhang zwischen den durchschnittlichen maximalen Beihilfeintensitäten und den FDI-Strömen festgestellt. Dieses Ergebnis wird aber getrieben durch Länder, die in der RAG 2014–2020 eine niedrige durchschnittliche maximale Beihilfeintensität hatten und wird deshalb wahrscheinlich von anderen Faktoren als der Verfügbarkeit regionaler Beihilfen beeinflusst.

Die Experteninterviews deuten darauf hin, dass Regionalbeihilfen eine Rolle bei der Gewinnung von Investitionen in den benachteiligten Regionen der EU gespielt haben. Investitionsanreize seien in der Regel zwar nicht der Schlüsselfaktor bei der Standortentscheidung – sie könnten aber die Entscheidung beeinflussen, wenn zwei Standorte in Bezug auf alle anderen Merkmale ähnlich sind.

Die Bedeutung regionaler Beihilfen hängt nach Ansicht der befragten Experten auch von der Herkunft der Investoren ab. Amerikanische und kanadische Unternehmen seien es gewohnt, proaktiv über Investitionsanreize zu verhandeln und Regionen gegeneinander auszuspielen, wie es in den USA üblich sei. Asiatische und australische Investoren neigten dazu, von Vertrauen geprägte Beziehungen zur Region (als Geschäftspartner) gegenüber einem reinen Finanzpaket zu bevorzugen.

(4) Kohärenz der RAF 2014

Eines der Ziele der Modernisierung der RAG bestand darin, die Kohärenz und Synergie der Beihilfepolitik mit anderen EU-Politiken zu gewährleisten, insbesondere der EU-Kohäsionspolitik mit den RAF 2014, da beide Instrumente zur Unterstützung der in Artikel 3 EUV verankerten EU-Regionalpolitik sind. Dieses Kohärenzziel wird in den Bestimmungen des ESI-Fonds und der RAF 2014, die sich aus der Reform 2014 ergeben haben, klar erwähnt und spiegelt sich in den beiden Regelwerken durch mehrfache Verweise auf die anderen Regelwerke wider.

Diese Kohärenz und Komplementarität zwischen den beiden Regelwerken ergibt sich auch aus den verschiedenen Quellen von Beweisen, die für die Zwecke dieser Studie verwendet werden:

- die Überprüfung der Rechtsvorschriften zeigt, dass die Ziele, Kriterien für die Anwendung und Genehmigung klar definiert und objektiv sind;

- die Analyse der Scoreboard-Daten zeigt, dass im Rahmen der RAF 2014-2020 fast 40% aller Fälle kofinanziert wurden, was 6 Mrd. EUR (mehr als 50% der Gesamtausgaben) entspricht und zeigt, dass die Bestimmungen des ESI-Fonds und der RAF sehr oft parallel angewendet werden;

- eine Mehrheit der für die Studie befragten Bewilligungsbehörden hält die beiden Regelwerke in allen Aspekten (d.h. Bereich, Ziele, Genehmigungskriterien, Ergebnisse, Verfahren) für einigermaßen komplementär.

Die deskriptive Analyse und die Befragung der Bewilligungsbehörden zeigen einige Unterschiede zwischen den Bestimmungen der RAF 2014 und des ESI-Fonds, insbesondere hinsichtlich des Anwendungsbereichs (geografisch und branchenspezifisch), der Definition von Begriffen und der Kriterien für die Genehmigung. Bei diesen Unterschieden geht es jedoch hauptsächlich um einen gewissen zusätzlichen Aufwand für die Begünstigten und die Bewilligungsbehörden und nicht um Widersprüche, die die beiden Regelwerke unvereinbar machen würden.

(5) EU-Mehrwert der RAF 2014

Vorschriften zu Regionalbeihilfen können den Mitgliedstaaten und der EU einen Mehrwert bringen, indem sie verschwenderische Subventionswettläufe in solchen Fällen verhindern, in denen die regionalen Behörden miteinander konkurrieren, um Investitionen in ihren jeweiligen Region anzuziehen. Generell reduzierte die RAF 2014 die Förderfähigkeit der Regionalbeihilfen und die Beihilfehöchstintensität im Vergleich zu den vorherigen Regelungen zu Regionalbeihilfen und verhinderte Beihilfen für die Verlagerung bestehender Investitionen zwischen den Mitgliedstaaten. Theoretisch sollten diese Maßnahmen die Behörden bezüglich ihrer Fähigkeit einschränken, bei der Anziehung von Investitionen andere EU-Regionen durch Beihilfemaßnahmen zu überbieten.

In der Praxis haben wir die im Rahmen der RAG 2007 und der RAG 2014 überprüften Fälle regionaler Beihilfen mit einem Standortszenario untersucht. Diese Fälle decken nicht alle Arten von Subventionswettlauf ab: nicht umfasst sind gruppenfreigestellte Fälle sowie Investitionen, die sich aus der EU heraus verschieben. Deshalb können keine Schlussfolgerungen zu Änderungen in der generellen Häufigkeit von gegenseitig wetteifernden EU-Regionen seit 2014 gezogen werden. Für Fälle mit einem Standortszenario lässt sich aber schlussfolgern, dass sie unter den RAG 2014 häufiger geprüft wurden als in der Periode der vorigen RAG.

Résumé

Contexte et objectifs de l'étude

En janvier 2019, la Commission européenne (la « Commission ») a lancé une évaluation des règles en matière d'aides d'État adoptées dans le cadre de la « modernisation des aides d'État ». Il s'agit de vérifier si ces règles apportent les changements souhaités aux citoyens et entreprises européens au moindre coût possible et sont toujours adaptées à leurs objectifs. Dans le cadre de cette évaluation, la Commission a sélectionné un consortium composé de DIW, E.CA Economics et Sheppard Mullin en vue de la réalisation d'une étude d'évaluation rétrospective de l'application du Cadre des Aides Régionales de 2014 à 2020 prolongé jusqu'en 2022 (« CAR 2014 »). Le CAR 2014 comprend les lignes directrices concernant les aides d'État à finalité régionale (« LD ») et le règlement général d'exemption par catégorie (« RGEC »). Le CAR 2014 prévoit des dispositions s'agissant à la fois des investissements et des aides au fonctionnement, mais la présente étude se concentre exclusivement sur l'évaluation des règles relatives aux aides aux investissements.

L'objectif de cette étude est de fournir à la Commission une évaluation indépendante et fondée sur des éléments objectifs, de la mise en œuvre du CAR 2014 et de ses effets sur le développement régional et la concurrence. En particulier, l'étude évalue:

(1) si l'aide régionale à l'investissement a réellement incité les entreprises à diriger leurs investissements vers les zones défavorisées de l'Union (« effectivité du CAR 2014 ») ;

(2) si le CAR 2014 a permis à la Commission de se concentrer sur les cas susceptibles de fausser le plus la concurrence (« efficience du CAR 2014 ») ;

(3) si l'aide régionale à l'investissement a été un facteur pertinent pour les entreprises dans leurs décisions d'implantation dans les régions défavorisées de l'Union dans un contexte mondial (« pertinence du CAR 2014 ») ;

(4) dans quelle mesure le CAR 2014 a-t-il été en ligne avec la législation sur les Fonds structurels de l'Union (« cohérence du CAR 2014 ») ;

(5) dans quelle mesure le CAR 2014 a-t-il réduit le risque de surenchère aux subventions au sein de l'Union (« valeur ajoutée européenne du CAR 2014 »).

Méthodes employées

La présente étude a fait appel à de multiples méthodes de recherche. Tout d'abord, nous avons revu la doctrine pertinente, les études et les rapports publiés par les institutions et organisations nationales et internationales. Deuxièmement, nous avons mené une enquête en ligne auprès de 66 autorités dispensatrices d'aides régionales. Troisièmement, nous avons spécifiquement étudié 22 affaires pré-notifiées ou notifiées à la Commission depuis 2014 au titre des LD. Quatrièmement, nous avons interrogé plusieurs experts spécialisés dans le conseil aux investisseurs sur les décisions d'implantation, en particulier sur le processus décisionnel des entreprises, les tendances en matière d'investissement et le rôle des aides d'État régionales pour la période 2014-2020. Enfin, nous avons collecté des données sur les aides d'État à finalité régionale et l'investissement dans l'EEE depuis 2007 et réalisé une analyse de régression économétrique pour estimer les effets des modifications des intensités d'aide maximales et des conditions d'éligibilité des grandes entreprises dans les régions « c », concernant les investissements privés dans ces régions.

Toutes ces méthodes ont leurs faiblesses et leurs points forts. En particulier, il faut souligner que si les enquêtes peuvent fournir un échantillon utile des visions des parties prenantes, elles peuvent aussi susciter des réponses stratégiques. Par ailleurs, les études de cas requièrent une analyse approfondie de multiples aspects complexes, mais elles se fondent, dans une large mesure, sur des informations publiques et peuvent ne pas être représentatives. Enfin, si le point fort des analyses économétriques est de permettre de mesurer l'effet des modifications apportées par le CAR 2014, elles n'identifient pas facilement les mécanismes conduisant aux résultats et nécessitent un grand nombre de données et des variations dans celles-ci pour produire des résultats solides. Dans le texte qui suit, nous expliquons les changements principaux introduits par le CAR 2014 et résumons les résultats obtenus en combinant les conclusions de toutes les méthodes utilisées.

Objectifs du CAR en 2014

Les aides régionales ont pour objectif de réduire les écarts de développement entre les différentes régions de l'Union européenne. Au moyen d'aides d'État bien ciblées, les régions défavorisées cherchent à attirer de nouveaux investissements et à augmenter l'activité économique. Le CAR 2014 établit une méthodologie et des critères d'éligibilité des régions aux aides régionales dans les États membres. Il prévoit également les conditions selon lesquelles un État membre peut octroyer une aide régionale sans notification préalable. De plus, il définit les critères que la Commission doit employer pour examiner la compatibilité des aides régionales à l'investissement et des mesures d'aides au fonctionnement notifiées par les États membres.

Les cartes régionales définissent les régions de l'UE qui sont éligibles aux aides d'État selon le CAR 2014. Les régions « a » sont les régions les moins développées dans l'UE, jouissant de la plus grande marge de manœuvre en matière d'aides d'État à finalité régionale. Les régions « c » sont des régions moins développées, sujettes à des règles plus strictes. Les régions non reprises dans les cartes régionales sont des régions non-assistées. L'effet escompté du contrôle européen des aides régionales est de permettre le développement régional tout en maintenant une concurrence loyale au sein du marché intérieur et en limitant les effets négatifs sur la concurrence et les échanges entre États membres au minimum nécessaire.

(1) Effectivité du CAR 2014

Les données recueillies dans le cadre de la présente étude confirment que la disponibilité des aides régionales à l'investissement dans les régions défavorisées de l'Union attire effectivement des investissements dans ces régions. L'importance relative des aides régionales en tant qu'incitation à l'investissement varie selon l'étape du processus décisionnel, le type d'investissement, l'entreprise, le secteur et le niveau d'éligibilité de la région. Cette conclusion ressort clairement de l'analyse économétrique, de l'enquête auprès des autorités dispensatrices d'aides, de l'examen de la littérature et des interviews des experts. Les enseignements plus spécifiques sont décrits ci-après.

Dans le cadre du CAR 2014, les régions les plus défavorisées de l'UE ont également dépensé les montants les plus élevés d'aides d'État à finalité régionale (par rapport au PIB) : cela signifie que, plus l'intensité maximale moyenne des aides d'un État membre est élevée, plus la part des aides d'État régionales dépensée par rapport au PIB du pays sur la période 2014-2017 est élevée. Cela indique que les aides régionales sont bien ciblées. En outre, l'analyse des données descriptives par État membre a révélé que la réduction des intensités d'aide maximales - introduite par les LD 2014 - est positivement corrélée à l'évolution de l'investissement privé : plus la réduction de l'intensité maximale moyenne de l'aide d'un État membre est importante, plus l'investissement dans cet État membre diminue. Cela suggère de façon préliminaire que les variations d'intensité des aides peuvent avoir une incidence sur les flux réels d'investissement.

L'analyse économétrique démontre l'existence d'un effet incitatif pour les grandes entreprises (« GEs ») dans les régions « c ». Cet effet incitatif est identifié en estimant la modification du niveau des investissements de ces GEs, à la suite de l'un des deux changements clés des règles sur les aides régionales introduits par le CAR 2014.

Premièrement, l'éligibilité aux aides des investissements des GEs dans les régions « c » a été réduite. Nous avons examiné l'investissement privé dans les régions « c » affectées seulement par cette restriction, c'est-à-dire où les intensités maximales d'aide n'ont pas changé en 2014. Nous avons comparé les taux de croissance des investissements dans ces régions aux taux de croissance en contrefactuel dans les régions non-assistées, sélectionnées comme étant similaires en termes de niveaux et de croissance de paramètres observables tels que le PIB et l'emploi. Bien que positif, le taux d'investissement des GEs était significativement inférieur dans les régions « c » par rapport aux régions en contrefactuel. Ce résultat est cohérent avec les commentaires des autorités dispensatrices d'aides des régions « c » qui, sur la base de plusieurs exemples, considèrent que les restrictions des aides octroyées aux GEs sont la cause de leur déficit d'attraction d'investissement dans leurs régions « c ». Dans les exemples donnés, les projets d'investissement étaient, après leur rejet, mis en œuvre ensuite dans d'autres États membres (par exemple, la Pologne, la Hongrie, l'Espagne) ou dans des pays tiers (Maroc, Turquie).

Deuxièmement, les intensités maximales d'aide dans certains régions « a » et « c » ont diminué (et ceci plus pour les GEs que les PMEs). Dans certains régions, ces changements se sont accompagnés d'une modification du statut d'éligibilité de « a » à « c » ou de « c » à non-assisté. Selon nos estimations, le taux de croissance des investissements des GEs était plus petit – encore que positif – dans les régions « c » où l'intensité maximale d'aide était réduite, par comparaison aux régions « c » où les intensités maximales d'aide étaient restées inchangées. Bien qu'économiquement pertinent, cet effet n'est pas statistiquement significatif. Nous observons une baisse économiquement plus importante et statistiquement significative du taux d'investissement des GEs dans les régions qui sont passées du statut « c » à celui de non-assistée par comparaison aux régions « c » où les intensités maximales d'aide sont restées inchangées. Dans ce cas, il n'est pas possible d'identifier clairement si l'effet est déterminé par le changement de statut d'éligibilité en soi ou par la baisse implicite des intensités maximales d'aide jusqu'à zéro.

En contraste à ces résultats dans les régions « c » et les GEs, les niveaux d'investissement dans les régions « a » n'ont pas été significativement affectés, ni par la baisse des intensités maximales d'aide ni par le changement de statut d'éligibilité de régions « a » vers régions « c ». Les PMEs n'ont pas non plus été affectées, que ce soit dans les régions « a » ou « c », par aucune des modifications apportées par le CAR 2014, ni par la réduction d'intensité maximale d'aide ou le changement d'éligibilité. Plusieurs raisons peuvent expliquer ces observations en théorie, mais notre analyse économétrique n'est pas à même de les identifier empiriquement.

L'importance des aides régionales pour la décision d'investissement d'une entreprise est confirmée par les éléments de preuve résultant d'autres méthodes de recherche. La littérature examinée suggère que les aides d'État à finalité régionale ont eu un impact positif à la fois sur l'emploi et sur l'investissement, au moins s'agissant des PMEs et du secteur manufacturier. Les experts interrogés sont d'accords sur le fait que les investisseurs prennent en compte les aides régionales lorsqu'ils choisissent la localisation d'un projet d'investissement. Toutefois, ce n'est pas le critère principal de l'investisseur. Selon ces experts, la disponibilité et le coût de la main-d'œuvre sont les principaux critères du choix d'implantation d'un investissement. L'existence d'aides régionales est l'un des facteurs de localisation parmi cinq à sept autres et est considérée comme un élément qualitatif dans le processus de décision initiale de la localisation de l'investissement. Au stade de la décision finale, une fois la liste

restreinte des sites potentiels établie, l'aide d'État à finalité régionale constitue un facteur de coût dans le calcul de la rentabilité des investissements.

Les experts interrogés conviennent également que l'importance tant absolue que relative des aides d'État dépend des caractéristiques de l'entreprise qui investit, telles que sa taille et son âge. Les incitations à l'investissement sont plus importantes pour les entreprises qui s'établissent dans l'UE et pour les entreprises de pays tiers qui envisagent d'investir dans les zones défavorisées de l'UE. Les aides d'État sous la forme d'une subvention directe sont particulièrement importantes pour les industries à forte intensité de capital comme l'automobile ou la chimie et pour les jeunes entreprises et les PMEs, qui sont généralement restreintes financièrement par l'accès limité aux crédits. D'autre part, les allégements fiscaux sont plus pertinents pour les industries à forte intensité de main-d'œuvre et pour les GEs, qui disposent en général de plus grandes ressources financières pour les investissements et ont une perspective à long terme. Les incitations fiscales sont également plus pertinentes pour l'implantation du siège social. En outre, comme les GEs ont généralement un meilleur accès aux crédits, elles sont moins intéressées que les PMEs par un financement public sous la forme de prêts à faible taux d'intérêt.

Certaines autorités ne disposent pas de budget suffisant pour atteindre les niveaux maximum d'aide régionale éligibles dans leurs régions. Dans notre enquête, 20% des autorités dispensatrices représentant des régions « a » et 35% de celles représentant des régions « c » ont indiqué qu'elles étaient confrontées à de telles contraintes. Ceci pourrait limiter les effets des aides régionales.

L'effectivité des règles du CAR 2014 peut être limitée par le fait qu'elles n'ont pas été jugées suffisamment claires à plusieurs égards. Les experts interrogés ont indiqué que le concept d'intensité maximale de l'aide n'est parfois pas bien compris par les investisseurs, qui considèrent qu'il s'agit du montant généralement versé et non d'un simple montant nominal maximal. Un expert a soulevé le manque d'une définition du concept de délocalisation. Les autorités ont également relevé des difficultés liées à la définition de la nouvelle activité économique utilisée par les LD, qui nécessite un investissement dans une nouvelle activité sous un différent code NACE.

(2) Efficience du CAR 2014

L'efficience du CAR 2014 a été évaluée principalement au travers des études de cas. Nous avons examiné l'équilibre entre le risque *ex ante* que la mesure d'aide fausse la concurrence et affecte les échanges entre États membres de façon négative et l'effort attendu des parties prenantes impliquées dans la notification et l'examen d'une affaire au titre des LD. Dans les régions « a », nous avons observé que l'effort était équilibré avec le risque *ex ante* dans toutes les affaires notifiées. Dans les régions « c », nous avons observé que l'effort n'était pas équilibré.

La Commission a reçu 11 pré-notifications et notifications d'aides régionales pour des investissements notifiables dans des régions « c ». Toutes ces affaires concernaient des GEs et des investissements de diversification dans des nouveaux produits ou des innovations de procédé. Dans un cas seulement, le montant d'aide excédait le seuil de notification. Tous les autres cas concernant des investissements dans des régions « c » ont été notifiés précisément parce que ces projets de diversification ne bénéficient pas de l'exemption par catégorie et doivent dès lors être notifiés.

Pour huit cas, nous considérons que le risque d'effets négatifs sur la concurrence et les échanges entre États membres était faible ou très faible. Les montants d'aides notifiés allaient de EUR 0,1 million à EUR 4,6 millions. Pourtant, ces affaires devaient être notifiées et ont ensuite été retirées. Nous pensons dès lors que l'effort administratif nécessaire n'apparaît pas justifié au regard des potentielles distorsions de la concurrence et affectations des échanges.

Dans deux des cas, nous avons conclu que le risque d'effet négatif à la concurrence et d'affectations des échanges entre États membres serait modéré, en dépit des montants d'aide faibles, voire très faibles, parce que les bénéficiaires évoluaient comme l'un des fabricants de tête dans des marchés internationaux modérément concentrés. Dans ces cas, l'analyse n'aurait pas été vaine. Ces affaires ont toutefois été finalement retirées et se sont réalisés sans le soutien d'aides d'État dès lors qu'elles n'étaient pas considérées comme de véritables innovations de procédé.

Les études de cas éclairent également la condition de l'effet incitatif et montrent que tous les projets d'investissement ne nécessitent pas une aide. Parmi les onze projets pré-notifiés et retirés, cinq auraient plus que probablement été poursuivis sans aide, démontrant l'absence de tout effet incitatif.

Les études de cas indiquent également que la clarté des règles actuelles est susceptible d'amélioration. Premièrement, le fait que dix des onze cas concernant des régions « c », notifiés conformément au paragraphe 15 des LD, ont été retirés par la suite donne à penser que les projets n'auraient peut-être pas été notifiés en premier lieu si les critères du paragraphe 15 des LD avaient été plus clairs ou simples. De même, les exigences du RGEC peuvent ne pas être claires pour les États membres et les bénéficiaires dans tous les cas. Dans les deux cas notifiés par erreur dans le cadre des LD, la Commission et les parties ont déployé des efforts considérables avant de se rendre compte que l'aide pouvait être accordée au titre du RGEC.

Les résultats de l'enquête donnent d'autres indications confirmant que la complexité du RGEC entrave sa mise en œuvre. 10% des autorités interrogées ont indiqué qu'elles s'efforçaient d'éviter les notifications au titre des LD dans la mesure du possible. Les experts interrogés ont également indiqué que, pour les projets de plus grande envergure, dont les montants d'aide d'État sont proches des seuils de notification, le projet peut être restructuré de manière à éviter la notification. D'une manière générale, les experts interrogés ont estimé que les procédures de notification et d'évaluation des aides d'État à finalité régionale étaient trop longues et manquaient de transparence du point de vue des investisseurs.

(3) Pertinence du CAR 2014

Nous avons évalué la pertinence du CAR 2014 en examinant si, et dans quelle mesure, les aides régionales ont contribué à attirer les investissements étrangers directs (« IED ») dans les régions défavorisées de l'UE.

Dans l'ensemble, l'analyse descriptive des données relatives aux IED ne fournit pas d'indications claires quant à la relation entre l'intensité maximale de l'aide et la part d'IED dans les flux entrants mondiaux. Au niveau de l'UE28, l'intensité maximale de l'aide et la part des flux d'IED ont diminué au cours de la période 2007-2017. La comparaison des niveaux d'IED et des intensités maximales d'aide des différents États membres révèle une corrélation négative entre l'intensité maximale (moyenne) de l'aide et la part des entrées d'IED. Selon nous, cela montre que le CAR 2014 cible précisément les États membres dont les régions sont en développement lent. Nous avons ensuite examiné le développement des flux d'IED dans le temps et les intensités maximales d'aide. Nous avons observé une faible relation positive entre l'intensité maximale moyenne de l'aide et les flux d'IED. Toutefois, cette corrélation apparaît être tirée par les États membres développés qui, avant les LD 2014-2020, avaient une intensité maximale moyenne d'aide faible, susceptible de ne pas être en relation avec la disponibilité d'aides régionales.

Les entretiens avec les experts ont toutefois montré que les aides d'État à finalité régionale ont joué un rôle pour attirer des investissements dans les régions défavorisées de l'Union. Cependant, les incitations à l'investissement ne sont généralement pas le facteur clé dans le processus de prise de décision de la localisation de l'investissement – mais elles peuvent être déterminantes lorsque

deux localisations sont similaires en prenant en compte toutes les autres caractéristiques.

L'importance des aides d'État à finalité régionale varie également en fonction de l'origine des investisseurs, selon les experts interrogés. Les entreprises américaines et canadiennes ont l'habitude de négocier de manière proactive des incitations à l'investissement et de « faire jouer la concurrence » entre les régions, comme c'est une pratique courante aux États-Unis. Les investisseurs asiatiques et australiens ont tendance à se concentrer davantage sur la fiabilité de la relation avec la région (en tant que partenaire commercial) que sur le seul montage financier.

(4) Cohérence du CAR 2014

L'un des objectifs de la modernisation des aides d'État était d'assurer la cohérence et la synergie de la politique des aides d'État avec les autres politiques de l'Union, en particulier avec la politique de cohésion de l'Union pour ce qui concerne le CAR 2014, étant donné que ces deux instruments sont au service de la politique régionale européenne consacrée à l'article 3 TUE. Cet objectif de cohérence est clairement mentionné dans les dispositions relatives aux Fonds structurels et d'investissement européens (Fonds ESI) et dans le CAR 2014, et se reflète dans les deux ensembles de règles par de multiples références aux autres ensembles de dispositions.

Cette cohérence et cette complémentarité entre les deux ensembles de règles découlent également des diverses sources de preuves utilisées aux fins de la présente étude :

- l'examen de la législation montre que les objectifs, les critères d'application et d'approbation sont clairement prédéfinis et objectifs ;

- l'analyse des données du tableau de bord « aides d'État » (Scoreboard) montre que, dans le cadre du CAR 2014, près de 40% de tous les cas ont été cofinancés, représentant 6 milliards EUR (plus de 50% de l'aide totale dépensée), ce qui montre que les dispositions des Fonds ESI et du CAR 2014 sont très souvent appliqués en parallèle ;

- les points de vue des autorités dispensatrices d'aides interrogées dans le cadre de l'étude, dont la majorité ont estimé que les deux ensembles de règles étaient plutôt complémentaires dans tous leurs aspects (champ d'application, objectifs, critères d'approbation, résultats, procédure).

L'analyse descriptive et l'enquête auprès des autorités dispensatrices d'aides montrent certaines différences entre les dispositions du CAR 2014 et celles des Fonds ESI, notamment en termes de champ d'application (géographique et sectoriel), de définitions des termes et de critères d'approbation. Toutefois, ces différences entraînent principalement une charge supplémentaire pour les bénéficiaires et les autorités dispensatrices d'aides plutôt que des contradictions qui rendraient les deux ensembles de règles inconciliables.

(5) Valeur ajoutée du CAR 2014 pour l'Union européenne

Les aides d'État à finalité régionale peuvent apporter une valeur ajoutée aux États membres et à l'Union européenne en empêchant une surenchère aux subventions inutiles, lorsque les autorités régionales se font concurrence pour attirer les investissements dans leur région. De manière plus générale, le CAR 2014 a réduit l'éligibilité aux aides d'État à finalité régionale et l'intensité maximale des aides par rapport aux règles sur les aides régionales précédentes et a interdit les aides d'État ayant pour effet de délocaliser des investissements existants entre États membres. En théorie, ces mesures ont limité la capacité des autorités dispensatrices d'aides à se porter candidates pour des investissements contre d'autres régions de l'UE. En

pratique, nous avons étudié les cas d'aides régionales avec un scénario de délocalisation selon les deux LDs. Ces cas ne couvrent pas toute surenchère de subvention : les cas couverts par le RGEC et les investissements se déplaçant au-delà de l'UE ne sont pas inclus. Il n'est dès lors pas possible de conclure à un changement global dans la fréquence avec laquelle les régions dans l'UE se livrent à une concurrence mutuelle depuis 2014. En se concentrant sur les cas avec scénario de délocalisation seulement, il apparaît que ceux-ci ont été plus fréquemment examinés sous les LDs 2014 que sous celles de la période précédente.

1. INTRODUCTION

1.1 CONTEXT AND OBJECTIVES OF THE STUDY

This study provides input to the retrospective and evidence-based assessment of the implementation of the RAF 2014. The RAF 2014 comprises the Guidelines on Regional State Aid for 2014-2020 ("the RAG 2014") and the provisions applicable to regional aid of the General Block Exemption Regulation ("the GBER"), which dates from 2014 and was revised in 2017. The study (the "Study") was commissioned by the Commission on the basis of the specific contract 013-01, within the framework contract COMP/2017/013, concluded with the consortium of DIW Berlin, E.CA Economics (leader of the consortium), Lear, Sheppard Mullin and UEA Consulting. The following consortium members contributed to this study: DIW Berlin, E.CA Economics and Sheppard Mullin.

The Study focuses on regional investment aid and addresses the following issues. First, it provides an assessment of the effectiveness of the current regional aid framework, *i.e.* whether it has provided a real incentive for companies to locate their investments in disadvantaged areas of the EU. Second, the Study evaluates the efficiency of the current the RAF 2014 by reviewing whether it has allowed the Commission to focus on the most (potentially) distortive cases. Third, the Study looks at the framework's relevance, coherence with other EU policies and its EU added value. Since only the years 2014-2017 are covered by the quantitative assessment, only short-term effects are taken into account. To the extent feasible, the Study additionally interprets the results in the light of the potential long-term effects, direct and indirect effects and the complementarities with other regional policies. The relevant effects and cost assessments in the Study have been quantified where possible.

All references can be found in Appendix 1.

1.2 STRUCTURE OF THE REPORT

This report is structured as follows. Section 1.3 describes the regional aid framework and its objectives. Section 2 explains the methodological framework for each type of analysis done in the context of this Study. Section 2.1 starts with the introduction of the data and the descriptive analysis. Section 2.2 moves on to explain the econometric strategy to identify the causal relationship between the regional State aid and investment. Section 2.3 describes the implementation of the survey of aid-granting authorities. Our approach to case studies is explained in Section 2.4. The concluding Section 2.5 introduces the expert interviews. The overview of existing studies, reports and academic papers is provided in Section 3.

The remainder of the report provides answers to evaluation questions grouped by the evaluation criterion. Section 4 addresses evaluation questions regarding the effectiveness of regional investment State aid. Section 5 looks at the efficiency of regional investment State aid. The relevance is considered in Section 6, the cohesion with other policies in Section 7 and the EU added value in Section 8. Section 9 provides a summary of conclusions for all questions. Annexes collate the most technical details of the Study, tables, statistics, references and sources.

1.3 REGIONAL INVESTMENT STATE AID FRAMEWORK AND ITS OBJECTIVES

This section introduces the RAF for 2014-2020 (the "RAF 2014") and discusses the key changes made as compared to the previous RAF for 2007-2013 (the "RAF 2007").

1.3.1 Key objectives of regional State aid

The EU regional policy is enshrined in the key objectives of the EU. In setting out the EU's aims, Article 3 TFEU states in particular that "*The Union shall promote economic, social and territorial cohesion, and solidarity among Member States*". Article 174 TFEU adds that "*In order to promote harmonious development, the Union shall develop and pursue actions leading to a strengthening of economic, social and territorial cohesion*". This goal is pursued on the one hand through regional and cohesion policies and, on the other hand, through different specific EU policies, including competition policy.

As far as competition rules are concerned, regional State aid provisions are mainly contained in Article 107(3)(a) and (c) TFEU which empowers the Commission to declare compatible with the internal market: *"(a) aid to promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment, and of the regions referred to in Article 349, in view of their structural, economic and social situation*;" and *"(c) aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest*".

The application of Article 107(3) (a) and (c) TFEU is clarified by the Commission's decisional practice, subject to EU case law of course. The RAG provides detailed guidance to the Member States on the eligibility and compatibility assessment of regional aid measures which are notified to the Commission under Article 108(3) TFEU.

The GBER draws from the progressive maturity of State aid law in order to dispense Member States from their notification obligation provided that they design their measures in strict compliance with the conditions set out therein.

The RAF therefore aims at promoting the economic development of certain disadvantaged regions, while limiting the distortions of competition and the effect on trade between Member States of the State aid measures adopted. The main tools used are (i) the definition of the regions eligible to receive regional aid ("assisted regions"), (ii) the setting up of maximum aid intensity for each region, (iii) the setting up of notification thresholds, (iv) the setting up of eligibility and compatibility conditions and (v) the provision of specific conditions, *e.g.* for large investment projects.

1.3.2 Revision of the RAF in 2014

In 2014, many factors contributed to the need for the Commission to redesign its regional aid policy, including the Europe 2020 growth strategy, the economic and financial crisis 2009 and the enlargement of the EU from 15 to 28 (at present) Member States. The overarching objectives of the resulting RAG 2014 were to enhance the effectiveness and efficiency of State aid employed by the EU Member States' authorities to foster cohesion and economic development in the disadvantaged regions and to increase administrative efficiency of regional State aid control.

More specifically, the role of GBER has been strengthened, while enhancing the level of *ex ante* screening for notified cases under the RAG 2014. In addition, the RAG 2014 attempted to reduce forum shopping by aligning the requirements under RAG for specific aid purposes (*e.g.* broadband, R&D&I infrastructures) to the substantive requirements in the relevant Guidelines, or by excluding aid to certain sectors (aid to airports, energy).

The key changes in comparison with the RAF 2007 are:

- the overall share of regions where regional aid can be granted increased from 45.5% of the EU27 population to 46.53% of the EU27[1] population (47% of the EU28 population) in order to reflect the difficult economic situation of many Member States;

- large aid measures are subject to in-depth assessment of their incentive effect, necessity, appropriateness, proportionality, contribution to regional development and effects on competition;

- the RAG 2014 adopt a stricter approach on eligibility of aid for investments made by large enterprises in the more developed assisted areas;

- in outermost regions and sparsely populated areas, the possibility for Member States to grant operating aid to companies is extended and simplified;

- the maximum levels of aid remain unchanged for the least developed regions. For other assisted regions, intensities are slightly lowered by 5% motivated by the general reduction in EU regional disparities and the need to avoid subsidy races between Member States in times of tight budgetary constraints;

- provisions disincentivising aid for relocation are strengthened and regional aid measures that induce similar activity to relocate within the European Economic Area ("EEA") are prohibited;

- the compatibility assessment is made on the basis of "common principles" (similar to a balancing test) for all notified cases (and not only for cases exceeding certain market share/capacity thresholds);

- to increase transparency and accountability, Member States have to make public how much regional aid they granted and to whom (Commission, IP-13-569).

In the remainder of this section, we focus on a number of aspects, which are particularly relevant for the present evaluation objective.

1.3.2.1 Compatibility

State aid can be compatible with the internal market when its positive effects (pursuing a public interest objective) outweigh its negative effects (distortion of competition and effect on trade between Member States), while keeping the negative effects to the strict minimum.

As far as regional State aid is concerned, the standard compatibility requirements resulting from Article 107(3) (a) and (c) TFEU and reflected in the RAG 2014 are as follows:

- contribution to a well-defined objective of a common interest:

    - investment aid schemes: regional aid schemes may be put in place in 'a' areas to support initial investments of SMEs or of large undertakings. In 'c' areas, schemes may be put in place to support initial investments of SMEs and initial investment in favour of new activity of large undertakings. The investment must be maintained in the area concerned for at least five years, or three years for SMEs, after its completion;

[1] Croatia is not included since it was not covered by the RAF 2007.

- individual investment aid: Member States may use a variety of indicators to demonstrate the regional contribution of the aid measure, including the number of direct and indirect jobs created, clustering effects, knowledge spill overs, *etc.*

- need for State intervention: this condition is considered as satisfied for aid granted in 'a' and 'c' areas because in these regions, the Commission considers that the market does not deliver the expected cohesion objectives set out in the Treaty without state intervention;

- appropriateness of the aid measure: the regional aid measure must be an appropriate policy instrument to address the objective of common interest;

- incentive effect:

  - formal incentive effect: the aid application must be submitted before the start of the works;

  - substantial incentive effect: it can be proven in two possible scenarios: (i) the aid gives an incentive to adopt a positive investment decision because an investment that would otherwise not be sufficiently profitable for the beneficiary can take place in the area concerned (*scenario 1*, investment decision); or (ii) the aid gives an incentive to opt to locate a planned investment in the relevant area rather than elsewhere because it compensates for the net disadvantages and costs linked to a location in the area concerned (*scenario 2*, location decision);

- proportionality of the aid: the amount of the regional aid must be limited to the minimum needed to induce additional investment or activity in the area concerned. The 'net-extra cost approach' and the definition of eligible costs and maximum aid intensities are used for this purpose;

- avoidance of undue negative effects: aid cannot be declared compatible with the internal market where the negative effects of the aid manifestly outweigh any positive effects. For scenario 1 cases (investment decisions), this is for example the case where the creation of capacity by the project takes place in a market which is structurally in absolute decline. In scenario 2 cases (location decisions), this is the case where without aid the investment would have been located in a region with a regional aid intensity which is higher or the same as the target region or where the beneficiary closes down the same or a similar activity in another area in the EEA and relocates that activity to the target area;

- transparency of the aid measure.

The GBER 2014 exempts Member States from their notification obligation, as long as all the GBER criteria are fulfilled. The GBER 2014 simplified the procedure for aid-granting authorities at national, regional and local level. The common conditions that all aid under the GBER must satisfy are the following:

- the aid must be transparent, *i.e.* it must be possible to calculate precisely the gross grant equivalent of the aid *ex ante* without any risk assessment;

- incentive effect:

  - the aid is considered to have an incentive effect if the beneficiary has submitted a written application for the aid to the Member State concerned before work on the project or activity starts.

- for ad hoc aid to large enterprises, the beneficiary must establish that: (i) in the case of regional investment aid: the project would not have been carried out in the area concerned without the aid, or would not have been sufficiently profitable; (ii) in all other cases, that there is: a material increase in the scope of, in the total amount spent on, or in the speed of completion of the project/activity concerned.

- specific conditions apply to measures in the form of tax advantages;

- regional operating aid and regional urban development aid are not required to have or are deemed to have an incentive effect where the relevant conditions laid down in Articles 15 and 16 of the GBER are fulfilled;

- the aid must respect the intensity and eligible costs conditions;

- the Member State concerned must publish on a comprehensive State aid website, at national or regional level, various information.

1.3.2.2 Regional aid maps

1. Population coverage eligible for regional aid

Regional aid maps are adopted for each Member State. They define geographical areas where companies may receive regional State aid, and at which intensities. The maps delineate the 'a' regions (Article 107(3) (a) TFEU) and the 'c' regions (Article 107(3) (c) TFEU):

- 'a' regions are NUTS 2[2] regions with GDP per capita below or equal to 75% of the EU27[3] average as well as outermost regions (Article 349 TFEU);

- 'c' regions are classified in 'predefined' and 'non-predefined' 'c' areas:

  - predefined 'c' areas fulfil certain pre-established conditions (former 'a' areas and sparsely populated areas);

  - non-predefined 'c' areas are areas that fulfil certain socio-economic criteria.[4] These include areas which constitute part of NUTS 3 regions. Member States define whether NUTS 3 regions are totally or only partially eligible for regional aid.

In the RAG 2014, the overall coverage of the 'a' and 'c' areas is set at 47% of the EU28 population (46.53% of the EU27 population). In the previous RAG 2007, the overall coverage ceiling was set at 45.5% of the EU27 population. This slight increase in the overall coverage ceiling is motivated by the Commission by the fact that a lot of Member States ended up in a difficult economic situation because of the financial crisis. Furthermore, there was a shift from 'a' to 'c' areas of certain assisted regions due to a process of catching-up in these regions.[5]

2. Maximum aid intensities

[2] The NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the economic territory of the EU. For socio-economic analyses of the regions, there are three levels of classification: NUTS 1: major socio-economic regions; NUTS 2: basic regions for the application of regional policies; and NUTS 3: small regions for specific diagnoses.

[3] At the time the RAG was adopted, Croatia was not an EU Member State.

[4] The RAG 2014 provided for a mid-term review of the maps in 2017 to assess whether certain areas could become eligible for regional aid and to adjust the maximum aid intensities.

[5] The RAG 2014 went through a mid-term review in 2017 to assess whether certain areas could become eligible for regional aid and to adjust the maximum aid intensities.

The changes in the eligibility status were accompanied with changes in maximum aid intensities in both 'a' and 'c' areas, which are summarised in Table 1 and Table 2, respectively.

Table 1: Changes in the maximum aid intensities in gross grant equivalent (GGE) in 'a' areas

'a' areas with the following GDP per capita to EU avg.	Large enterprises		Medium-sized enterprises		Small enterprises	
	RAG 2007	RAG 2014	RAG 2007	RAG 2014	RAG 2007	RAG 2014
GDP per capita to EU avg.[6] ⩽ 45%	50%	50%	60%	60%	70%	70%
45% < GDP per capita to EU avg. ⩽ 60%	40%	35%	50%	45%	60%	55%
60% < GDP per capita to EU avg. ⩽ 75%	30%	25%	40%	35%	50%	45%

Source: RAG 2007 and 2014.

Table 2: Maximum aid intensities in gross grant equivalent (GGE) in 'c' areas

Area definition	Large enterprises	Medium-sized enterprises	Small enterprises
Sparsely populated 'c' areas / 'c' areas sharing a land border with an extra-EEA or EFTA country	15%	25%	35%
Non-predefined 'c' areas	10%	20%	30%
'c' areas being former 'a' areas until 31/12/2017	15%	25%	35%
'c' areas being former 'a' areas as of 01/01/2018	10%	20%	30%

Source: RAG 2014.

1.3.2.3 Large investment projects

Large investment projects, which are defined by the RAG 2014 as an initial investment with eligible costs exceeding EUR 50 million, calculated at prices and exchange rates on the date of award of the aid, can play an important role for regional development. Attracting a large, potentially multinational firm to the EU and committing it to invest in a second tier location is an important element of inclusive regional growth. At the same time, the business risks associated with a long-term regional commitment should be properly taken into account.

[6] As regards the RAG 2007, the EU avg. refers to average EU25 GDP per capita. As for the RAG 2014, the EU avg. refers to average EU27 GDP per capita.

Under the RAG 2007, the assessment of large projects was a two-step procedure. The first step included verifying whether (i) the aid beneficiary accounted before or after the investment for more than 25% of the sales of the concerned product market, or (ii) the production capacity created by the project was more than 5% of the market for the concerned product (unless it concerned a fast growing market). If either of the two conditions were met, the in-depth assessment was initiated. This involved a detailed verification under a formal investigation that the aid provides an incentive effect.

The RAG 2007 was complemented in 2009 by a communication on large investment projects (the '2009 LIP guidelines'). The 2009 LIP guidelines obliged the Member States to prove the existence of an incentive effect based on one of two alternative scenarios: investment decision scenario and location decision scenario. The investment decision scenario requires demonstrating that the aid will cause a positive investment decision in the assisted region that would otherwise not be profitable enough and would therefore not be carried out at all or not in the same manner. Within the location decision scenario, it has to be established that the aid is responsible for locating a planned investment in the relevant region rather than elsewhere because the aid compensates for the net handicaps and costs linked to a location in the assisted region.

The RAG 2014 moved away from the first step of the old RAG 2007 and therefore removed the need to define a product market and calculate market shares. Under the RAG 2014, the detailed assessment is required for all notified measures.

In the investment decision scenario, the Commission examines whether the aid measure will induce negative effects, such as the build-up of overcapacity in declining industries, the prevention of exit and the notion of substantial market power, the closure of activities, *etc*. If the negative effects are unlikely to be compensated by any positive effects, the aid cannot be found compatible with the internal market. Other compatibility criteria are also examined (*e.g.* proportionality).

In the location decision scenario, the Commission checks where the investment would have been located without aid and examines whether the aid amount does not exceed the compensation of the handicaps of the preferred region in comparison to the second region (proportionality). Negative effects such as closing down the same or a similar activity in another area in the EEA or relocating that activity to the target area are also checked and if present, the aid will not be found compatible with the internal market.

1.3.2.4 Investments made by large enterprises

The RAF 2014 adopts a stricter approach on aid for investments made by large enterprises in the more developed assisted areas as evidence available at the moment of the revision of the RAF 2007 showed that large companies' decisions to invest in a given region are often prompted by factors such as the cost and availability of production factors and the general economic context, rather than by State aid.

Following these insights, under the RAF 2014 aid to large enterprises in these areas is only allowed for investments that bring new economic activity, for initial investments for the diversification of existing establishments into new products or for new process innovation. For these types of investments, it is more likely that these investments are carried out thanks to the aid. In the poorest regions (regions below 75% of average EU GDP), the RAG 2014 continue to allow aid for all types of investments by large companies.

Reflecting concerns that aid to large enterprises might be less effective (Commission's Impact Assessment on RAG), likely to lead to fierce subsidy races

and/or lead to anti-cohesion effects (by drawing away investment from less developed areas or areas that have the same level of development), the GBER 2014 and the RAG 2014 also limit the eligibility of initial investment projects by large enterprises in 'c' areas: regional investment aid for the expansion of existing activities in 'c' areas is no longer possible.

1.3.2.5 Procedure

The RAG 2014, together with the reviewed GBER 2014, introduced several procedural changes.

Notification requirements

Regional aid is subject to notification when its amount exceeds the notification thresholds set forth in the GBER 2014. This notification threshold is dependent upon the maximum aid intensity in the region and corresponds to the maximum adjusted aid amount for an investment with eligible costs of EUR 100 million.

The RAF 2014 applies, in principle, to all sectors of economic activity. However, the following activities are currently excluded (with some exceptions for operating aid and outermost regions):

- regional aid to the steel and synthetic fibres sectors is considered incompatible with the internal market in the RAG 2014 due to the particularities of those sectors and is excluded from the scope of the regional aid section of the GBER.

- the sectors of fisheries and aquaculture, agriculture (with some specific exceptions), transport, airports and energy are subject to sector-specific State aid rules and are therefore excluded from the scope of the RAG 2014 and the regional aid section of the GBER;

- the GBER also excludes the coal and shipbuilding sectors from regional aid.

Finally, regional operating aid is not allowed in favour of undertakings whose principal activities fall under Section K 'Financial and insurance activities' of the NACE Rev. 2, or to undertakings that perform intra-group activities whose principal activities fall under classes 70.10 'Activities of head offices' or 70.22 'Business and other management consultancy activities' of NACE Rev. 2.

The RAG 2014 apply to both notified regional aid schemes and individual aid. In particular, individual aid granted under a notified scheme is also subject to the notification obligation where the amount of aid exceeds the notification thresholds (see Table 3 below). Regional aid is block-exempted only if the beneficiary confirms that he has not carried out a relocation[7] of the same or similar activity in the European Economic Area in the two years (i) preceding the application for aid and (ii) provide a commitment that it will not do so up to two years following the completion of the initial investment. Finally, investment aid to large firms to diversify an existing establishment in a 'c' area into new products or new process innovations is also subject to notification and to the application of the rules of the RAG 2014.

[7] Defined as "a transfer of the same or similar activity or part thereof from an establishment in one contracting party to the EEA Agreement (initial establishment) to the establishment in which the aided investment takes place in another contracting party to the EEA Agreement (aided establishment). There is a transfer if the product or service in the initial and in the aided establishments serves at least partly the same purposes and meets the demands or needs of the same type of customers and jobs are lost in the same or similar activity in one of the initial establishments of the beneficiary in the EEA;"

Table 3: Notification thresholds

RAG 2007		RAG 2014	
Aid intensity	Notification threshold (in EUR million)	Aid intensity	Notification threshold (in EUR million)
10%	7.5	10%	7.5
15%	11.25	15%	11.25
20%	15.0	20%	15.0
		25%	18.75
30%	22.25		
		35%	26.25
40%	30		
50%	37.5	50%	37.5

Source: RAG 2007 and RAG 2014.

New requirement for *ex post* assessment for aid schemes

The GBER 2014 requires *ex post* evaluation for regional aid schemes with the average annual State aid budget exceeding EUR 150 million. The insights from the evaluations are expected to help designing more effective aid schemes and minimise distortions of competition and trade in the future.

2. METHODOLOGICAL FRAMEWORK

In this section, we present the methods used in the Study: the data and descriptive analysis (Section 2.1), the econometric analysis (Section 2.2), the survey of aid granting authorities (Section 2.3), the case studies (Section 2.4) and the expert interviews (Section 2.5).

2.1 DATA AND DESCRIPTIVE ANALYSIS

In this section, we present our descriptive analysis that relies on a "*before and during*" approach by studying the evolution of various measures considered before the introduction of the RAG 2014 and GBER. We complement this analysis with a graphical presentation using heat maps. We also present the data used throughout for the purposes of the Study.

2.1.1 Eurostat data

The retrospective evaluation of the effectiveness of regional investment aid involves collecting information on regional characteristics themselves. In our Study, we exploit the following regional statistics provided by Eurostat:

- population density as expressed by the number of inhabitants per square kilometres at the NUTS 3 level for the years 2007-2016;
- Gross Domestic Product (GDP) in Purchasing Power Standards (PPS) in EUR million per capita (NUTS 2 and NUTS 3 level) for the years 2007-2016;
- Gross Value Added (GVA) in EUR million (NUTS 3) for the years 2008-2016;
- employment (in thousand persons) is provided at the NUTS 3 level for the years 2008-2010;
- employment (in thousand persons) is provided at the NUTS 3 level for the years 2008-2010.

The regional data are exploited in the econometric analysis (see Appendix 10) to control for time-varying factors at a regional level, which may potentially affect investment as well as in the propensity score matching procedure.

For our descriptive analysis and the evaluation of the relevance of regional investment aid, additional regional statistics from Eurostat are used to aggregate regional eligibility information to the country level:

- Gross fixed capital formation (GFCF) in EUR million at country level for the years 2007-2017;
- population as expressed by the number of inhabitants at the NUTS 3 level for the year 2004[8];
- GDP in EUR million at the NUTS 3 level for the years 2004 and 2010.

2.1.2 Scoreboard database

The Study exploits data on regional State aid for the period 2007-2017. The starting point is the data on aid reported by the Member States provided by the

[8] The value for 2010 is also used, but obtained from regional aid map for 2014-2020.

Commission for the purposes of the project under the State Aid Scoreboard ('Scoreboard Database').[9] These data are analysed as a primary source of information. To complete missing information, the following two complementary data sources are then used:

- search on State aid cases notified to the Commission[10] ('EC search Database');
- State aid transparency public search ('TAM Database').

Exploiting information provided in these complementary databases allows us to allocate a case in the Scoreboard Database to a particular RAF[11] and exclude cases that are not of direct interest to the Study. For the purpose of our preliminary analysis and the descriptive statistics presented in this section, we define *regional State aid* as aid that had *regional development* as its primary objective. Complementing information from the EC search Database and TAM Database, we are able to isolate cases which are not of direct interest to the Study and can be excluded. These are operating aid cases, as well as cases regarding the aviation, broadband, or energy sectors. We also exclude from the analysis cases in which the Commission opened the formal investigation procedure due to doubts as to the compatibility of the measure with the common market, cases referring to aid to governments to implement the interactive State aid system (SARI), or cases specifically granted under a different primary/secondary legal basis, as defined in the Scoreboard database.

We also complete information on the precise region (NUTS 3) to which aid was granted, when this information was not provided in the Scoreboard Database. The detailed description of their construction of the data is provided in Appendix 7.

The data are primarily exploited in the descriptive analysis below, as well as in the econometric analysis (Appendix 10) to address the question of the effectiveness of regional aid in terms of its actual impact on investment in the region.

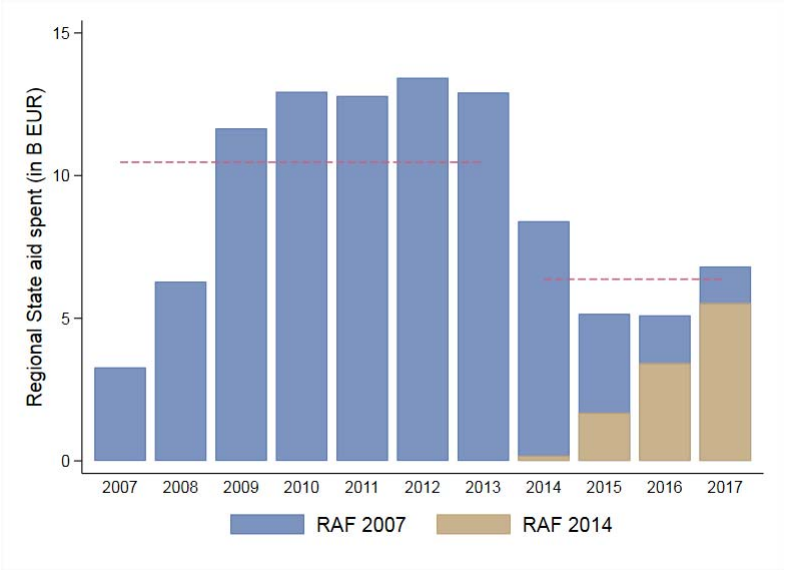
The evolution of regional aid granted under the respective two regional aid frameworks (the RAF 2007 and the RAF 2014) is provided in Figure 1 below.

[9] We refer here to the file containing data on regional investment and operating aid reported by Member States under the State Aid Scoreboard provided by European Commission for the purpose of the project under the name "2018 SCB - overview dataset for fitness check.xlsx".

[10] https://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=3 (accessed on 29 August 2019).

[11] Our analysis distinguishes between the RAF 2007 and the RAF 2014. Regional State aid granted under previous RAFs is not included in the analyses.

Figure 1: Regional State aid spent, distinguishing between the RAF 2007 and the RAF 2014[12]



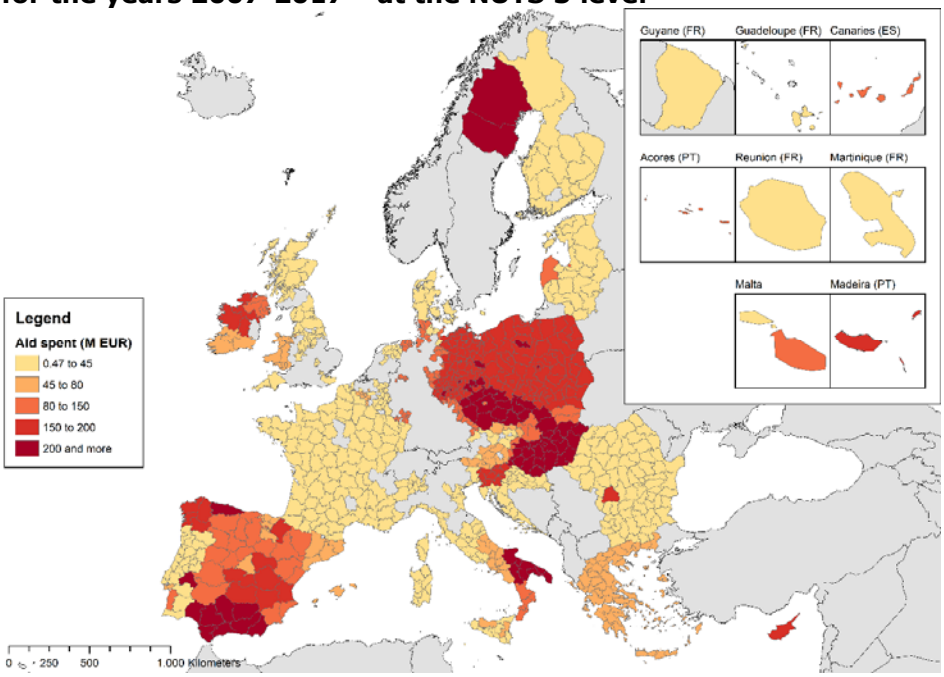
Source: Own analysis based on Scoreboard Database, EC search database and TAM Database.
Note: The red dashed lines refer to the average levels of regional State aid spent out in respectively the years 2007-2013 and 2014-2017, not distinguishing between the RAF under which it was spent out. The total aid spent is computed for EU 27 until 2012 and for EU 28 from 2013 onwards.

Comparing the periods 2007-2013 and 2014-2017, the yearly regional State aid spent has decreased from approximately EUR 10.5 billion to EUR 6.4 billion. However, the comparison between the two RAF periods is not straightforward. First, while aid was granted under the RAF 2007, it may still be spent after 2013. Second, we only observe the first four years of the RAF 2014, for which aid spending is gradually increasing. Indeed, it is still too early to make an overall and final evaluation of the RAF 2014 in place. This is inherent to the review procedures and better regulation for rules that only apply to a time limited period.

Figure 2 and Figure 3 provide then a geographical presentation of regional State aid spent by focusing on regional differences, respectively under the RAF 2007 for the years 2007-2017 and the RAF 2014 for the years 2014-2017.

[12] Note that the figure covers only the beginning of the RAF 2014the RAF 2014. The evaluation in the Study is naturally limited to the data and information available at this point. An overall and final evaluation of the Study may be undertaken once information of the total duration of the RAG 2014 is available.

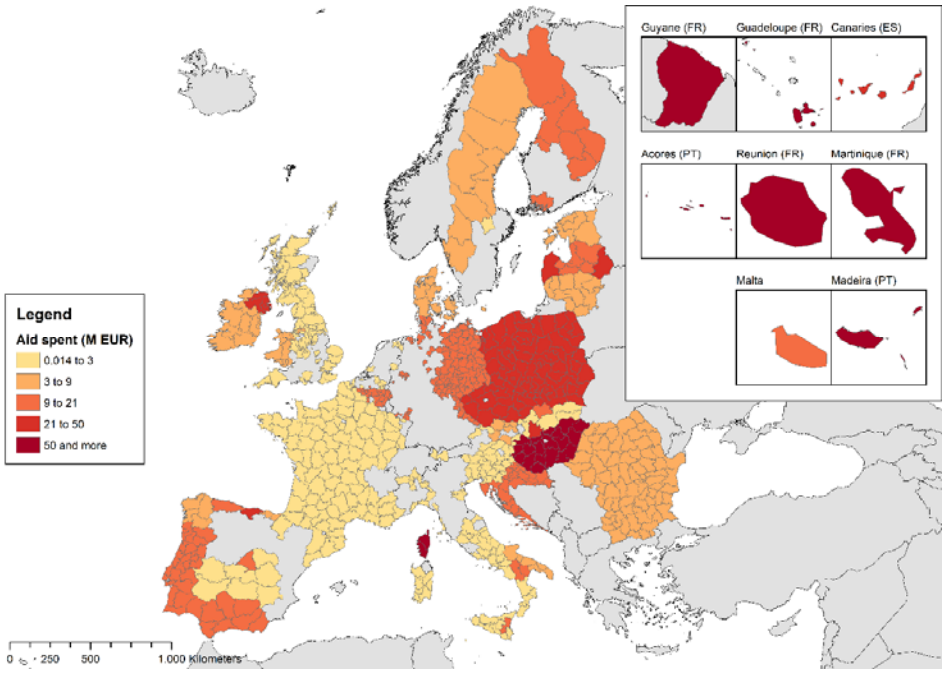
Figure 2: Regional State aid spent (in EUR million) under the RAF 2007 for the years 2007-2017[13] at the NUTS 3 level



Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and European Commission. © EuroGeographics for the administrative boundaries. Note: Due to delays in reporting, data may be incomplete for some Member States.

[13] Note that the end of the period is 2017 because even if the aid is granted under the RAF 2007, it may be paid after 2013.

Figure 3: Regional State aid spent (in EUR million) under the RAF 2014 for the years 2014-2017 at the NUTS 3 level

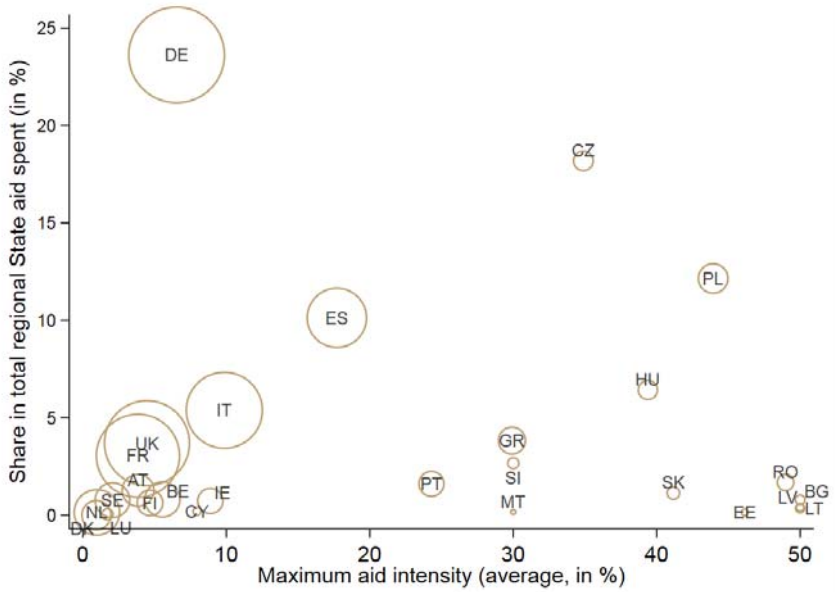


Source: Own analysis based on Scoreboard Database, EC search database, TAM database and European Commission. © EuroGeographics for the administrative boundaries. Note: Due to delays in reporting, data may be incomplete for some Member States.

The direct comparison of the levels of aid granted is not possible because of the different number of years throughout which aid under respectively the RAF 2007 and the RAF 2014 was spent out. However, what is clear, is that aid effectively spent out follows the rules regarding aid intensity imposed in regions.

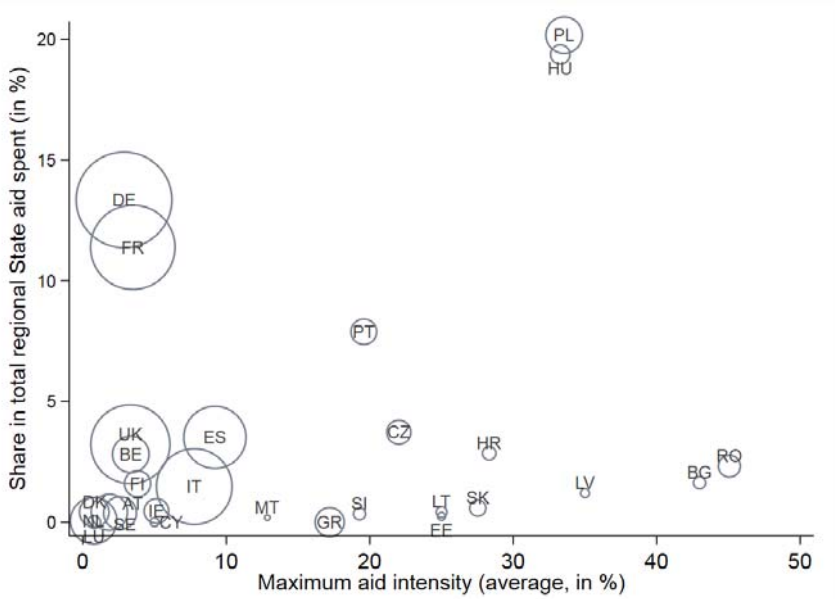
The following figures show the average maximum aid intensities and actual regional State aid spent (as% of total aid) for each of the Member States under the respective RAFs: the RAF 2007 (Figure 4) and the RAF 2014 (Figure 5).

Figure 4: Regional State aid spent (as % of total) and maximum aid intensities across Member States under the RAF 2007



Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).
Notes: (i) Average maximum aid intensity in period 2011-2013 weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) Regional State aid spent under the RAF 2007 throughout the period 2007-2017.

Figure 5: Regional State aid spent (as % of total) and maximum aid intensities across Member States under the RAF 2014

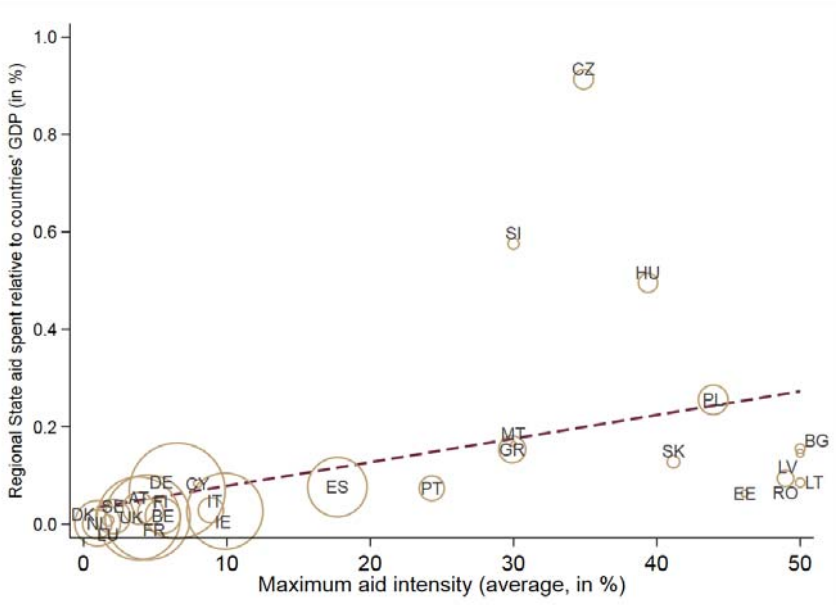


Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).
Notes: (i) Average maximum aid intensity in period 2014-2017 weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) Regional State aid spent under the RAF 2014 throughout the period 2014-2017.

Under the RAF 2007[14], Germany, the Czech Republic and Poland were among the three countries which granted most regional State aid to beneficiaries, accounting for respectively 24%, 18% and 12% - respectively - of the total regional State aid spent out during 2007-2017. Although, countries with the highest average aid intensities were Bulgaria, Lithuania and Latvia, though. However, each of them accounted for less than 1% of total aid. For the first year of the RAF 2014, Poland, Hungary and Germany appear to be the key grantors of regional investment aid, accounting for 20%, 20% and 13% - respectively - of total aid. As compared to the RAF 2007, average aid intensities have decreased for most countries. Bulgaria and Romania remained the only countries where the average aid intensities remained above 40%.

In Figure 6 and Figure 7, we then perform the country-level comparison by focusing on the amount of regional State aid relative to the country's GDP in PPS. This accounts for the relative size of the economy of each of the Member States and allows for a more reasonable analysis of the relationship between aid spent and average intensities among EU countries. Figures comparing the development of aid spent and average maximum aid intensities between the RAF 2007 and the RAF 2014, separately for each Member State can be found in Appendix 8.

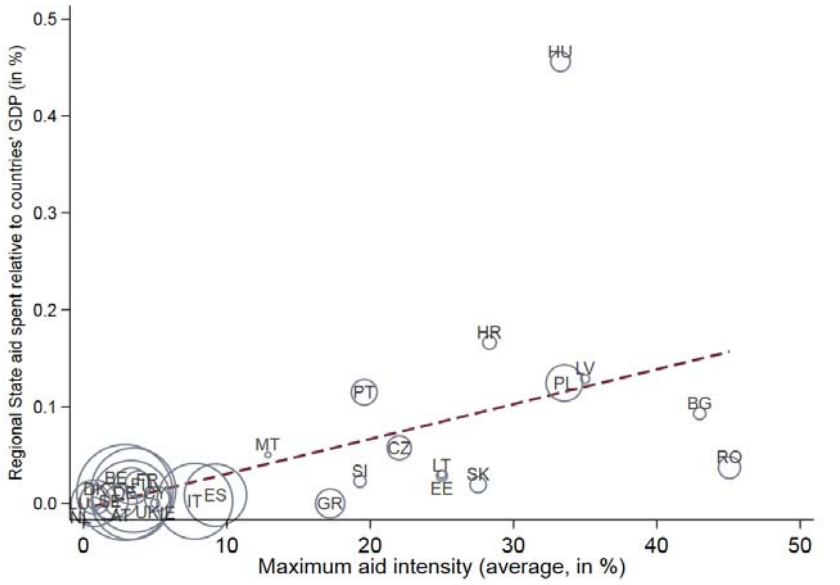
Figure 6: Regional State aid spent (as % of GDP) and maximum aid intensities across Member States under the RAF 2007



Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).
Notes: (i) Average maximum aid intensity weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed red line indicates the fitted (linear) relation. (iv) Regional State aid spent under the RAF 2007 throughout the period 2007-2017.

[14] Aid granted under the RAF 2007 may indeed be spent out in the years following.

Figure 7: Regional State aid spent (as % of GDP) and maximum aid intensities across Member States under the RAF 2014

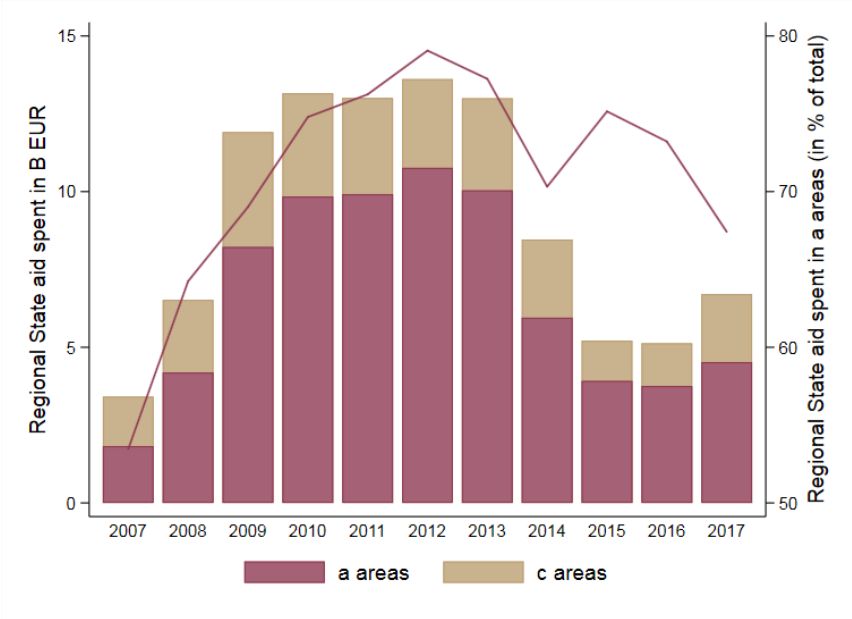


Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).
Notes: (i) Average maximum aid intensity weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed red line indicates the fitted (linear) relation. (iv) Regional State aid spent under the RAF 2014 throughout the period 2014-2017.

These figures suggest that, at an aggregate country-level of analysis, there is a positive relationship between average maximum aid intensities and aid spent relative to GDP: countries with a higher maximum aid intensity typically spend more regional State aid relative to their GDP than countries with a small maximum aid intensity. Among the countries with the highest maximum aid intensity, there is an interesting heterogeneity in this respect. The highest aid spent can be observed for Hungary in both RAF periods and Czech Republic and Slovenia in the RAF 2007, all small countries with maximum aid intensities between 30% and 40%. However, countries with the highest average maximum aid intensity above 40% do not spend as much, as would be predicted by the trend line. These countries may still be catching up in the use of regional State aid for their regional development.

In Figure 8, we then further explore the evolution of regional aid, by distinguishing between aid granted to 'a' and 'c' areas, presented respectively in red and gold. In addition, the red line follows the change over time the share of aid spent in 'a' areas with respective to the total regional aid spent.

Figure 8: Regional State aid spent, distinguishing between aid spent in `a' and `c' areas in the period 2007-2017

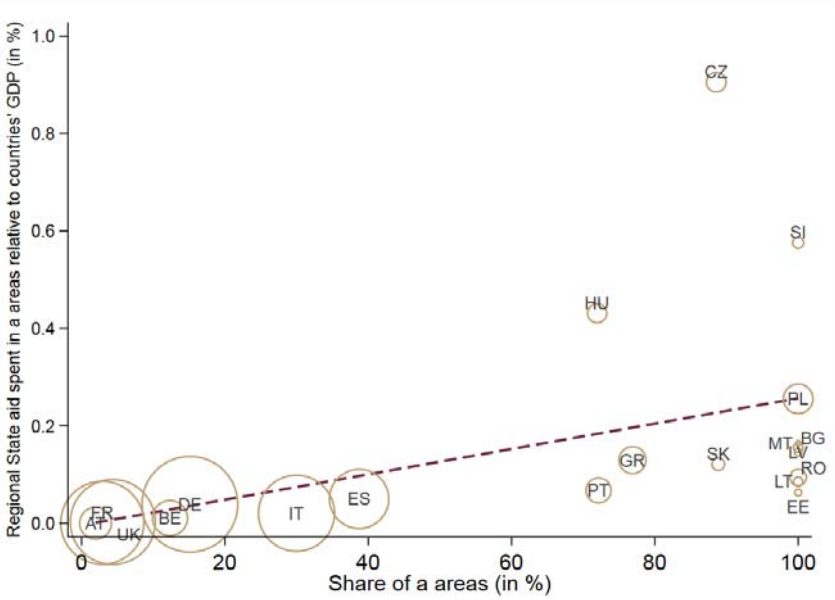


Source: Own analysis based on Scoreboard Database, EC search database and TAM Database and regional aid maps (2007-2013/2014-2020).
Note: The total regional State aid spent is computed for EUR 27 until 2012 and for EU 28 from 2013 onwards.

Throughout the analysed years, aid spent in 'a' areas accounted from 50% to 80% of total aid. It reached its highest level in 2012 and in the period 2014-2017, the share fluctuated at 70%.

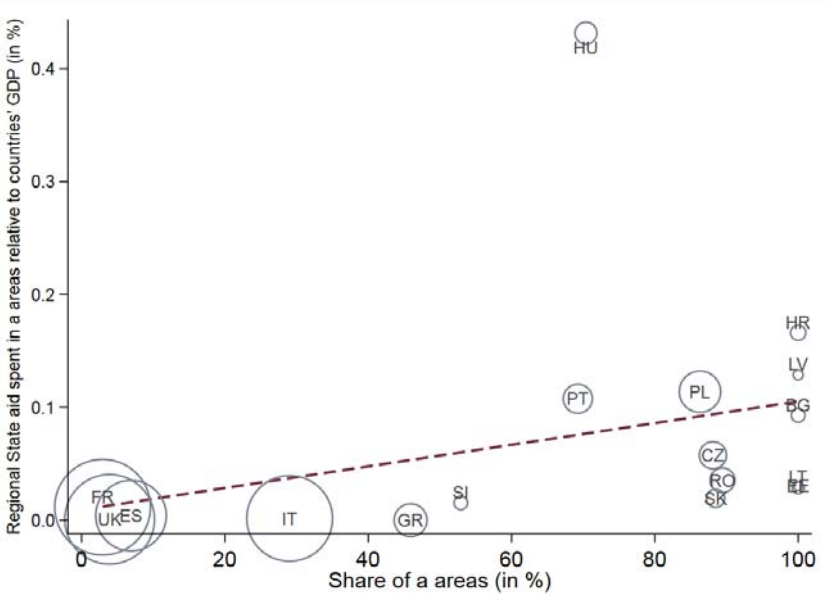
In Figure 9, we pursue the country-level comparison by focusing on the amount of State aid spent in 'a' areas relative to the country's GDP in PPS. The focus of analysis is the relationship between aid spent in 'a' areas and the country coverage of such areas among EU Member States, respectively under the RAF 2007 and the RAF 2014. As these figures refer to population-weighted coverage of `a' areas, they can be interpreted as the share of population of each Member State located in 'a' areas.

Figure 9: Regional State aid spent in 'a' areas (as % of GDP) and share of 'a' areas (in %) across Member States under the RAF 2007



Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).
Notes: (i) Shares in `a' areas weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed red line indicates the fitted (linear) relation. (iv) Countries with a 0% share of 'a' areas were excluded from the figures. (v) Regional State aid spent under the RAF 2007 throughout the period 2007-2017.

Figure 10: Regional State aid spent in 'a' areas (as % of GDP) and share of 'a' areas (in %) across Member States under the RAF 2014

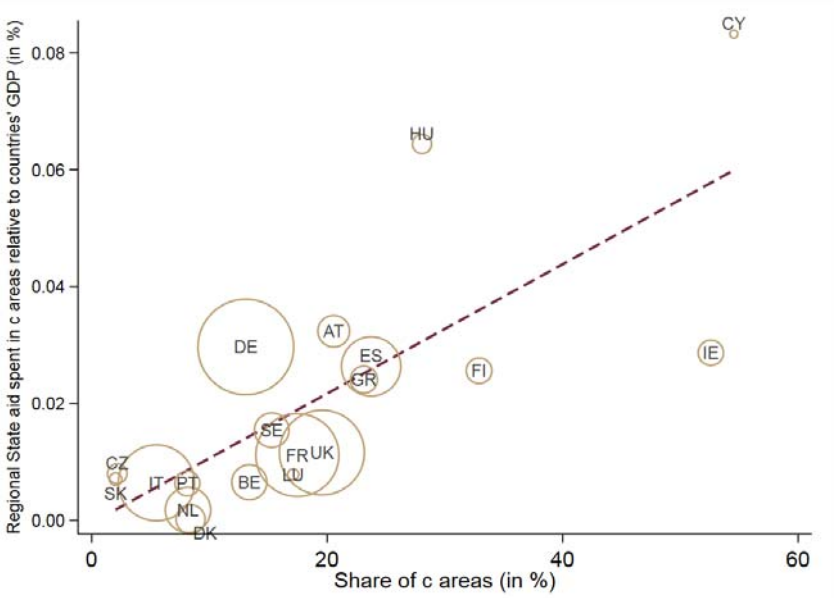


Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).
Notes: (i) Shares in `a' areas weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed red line indicates the fitted (linear) relation. (iv) Countries with a 0% share of 'a' areas were excluded from the figures. (v) Regional State aid spent under the RAF 2014 throughout the period 2014-2017.

Comparing the RAF 2007 and the RAF 2014, the figures above show that for most Member States the share of 'a' areas have decreased. These figures also suggest that, at an aggregate country-level of analysis, there is a positive relationship between average share of 'a' areas and aid spent in these same areas relative to GDP: Member States with a higher share of 'a' areas typically spend more regional State aid relative to their GDP than Member States with a smaller share.

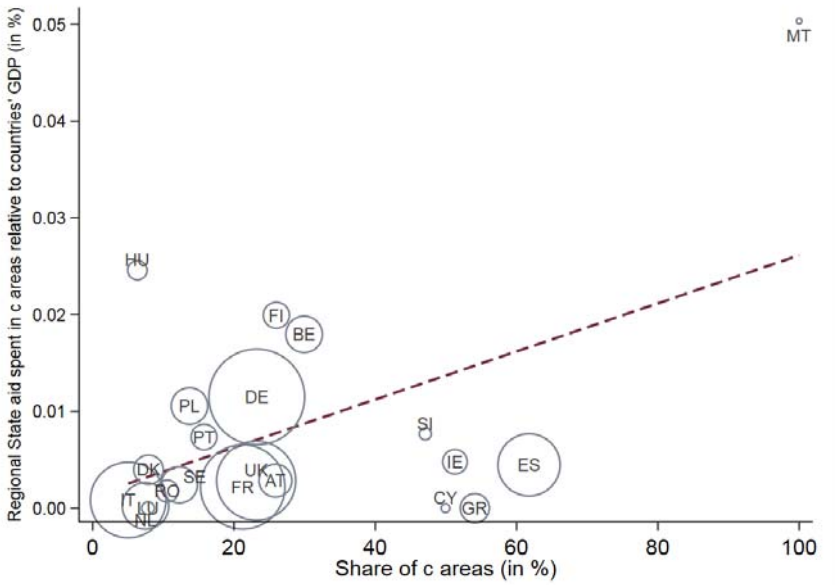
Figure 11 then perform an analogous comparison, by focusing on 'c' areas and studying the relationship between aid spent in 'c' areas and the country coverage of 'c' areas among EU Member States, respectively under the RAF 2007 and the RAF 2014. As these figures refer to population-weighted coverage of `c' areas, they can be interpreted as the share of population of each Member State located in `c' areas.

Figure 11: Regional State aid spent in 'c' areas (as % of GDP) and share of 'c' areas (in %) across Member States under the RAF 2007



Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).
Notes: (i) Shares in `c' areas weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed red line indicates the fitted (linear) relation. (iv) Countries with a 0% share of 'c' areas were excluded from the figures. (v) Regional State aid spent under the RAF 2007 throughout the period 2007-2017.

Figure 12: Regional State aid spent in 'c' areas (as % of GDP) and share of 'c' areas (in %) across Member States under the RAF 2014



Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).
Notes: (i) Shares in `c' areas weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed red line indicates the fitted (linear) relation. (iv) Countries with a 0% share of 'c' areas were excluded from the figures. (v) Regional State aid spent under the RAF 2014 throughout the period 2014-2017.

These figures suggest that, at an aggregate country-level of analysis, the relationship between average share of 'c' areas and aid spent in these same areas relative to GDP is positive.

2.1.3 Changes in regional aid maps

The RAF establishes the criteria under which European regions are eligible for regional State aid (see Section 1 for more details). It encompasses rules about the share of European regions in which regional aid can be granted, the eligibility for regional State aid itself (*i.e.* whether regions are assigned as 'a' or 'c' areas), as well as the levels of maximum aid intensity (*i.e.* the maximum amount of eligible costs that can be reimbursed by the Member States). It also sets the conditions under which Member States may grant regional aid without a notification procedure to the Commission, *i.e.* the so called notification thresholds. Based on the rules laid down by the Commission and the regional economic conditions, the Member States draw up so-called regional maps. These maps designate which regions are eligible to receive investment aid ('a' and 'c' areas), and at what level of maximum aid intensities (so-called aid ceilings).

When comparing the RAF 2007 and the RAF 2014, there are two main sources of changes in regional aid maps. The first is the changes in the rules and conditions laid down by the Commission on the basis of which Member States can define regional aid maps. Indeed, the currently applicable rules were introduced in 2014 following the State aid modernisation strategy launched be the Commission in 2012. The main changes relevant for the analysis of regional aid maps in the RAF 2014 are: 1) an increase in overall share of regions where regional aid can be granted, 2) a slight decrease in maximum aid ceilings for the more developed 'a' areas.

The second source of change relates to the evolution in economic conditions of the regions. These include economic indicators such GDP in PPS to EU average, unemployment rate, or population density.[15] Changes in these conditions might imply changes in the allocation of regions to different eligibility areas as well as different maximum levels of aid intensity.

With the introduction of the RAF 2014, and following these two sources of change, the regional aid maps, *i.e.* the maps identifying the assisted areas, the category of assistance (a- or c-area) and establishing the maximum level of aid intensities, were updated accordingly. This is the source of variation used in this Study and described in this section. Indeed, the changes in regional aid maps create heterogeneous changes in the potential exposure of regions to State aid rules that can be exploited to identify the effect of maximum aid ceilings on the outcomes of interest.[16]

In this section, we focus on the changes in the regional aid maps between the RAF 2007 for the years 2011-2013 and the RAF 2014 for the years 2014-2017. Within each RAF period, levels of maximum aid intensities may change following a mid-term review of the regional aid maps. Therefore, throughout the Study, to analyse changes between the RAF 2007 and the RAF 2014, we focus on respectively the second period of the RAF 2007 (years 2011-2013) and the first period of the RAF 2014 (years 2014-2017). Table 4 looks at the first dimensions of these changes and shows how many NUTS 3 regions encountered changes in eligibility between the two RAF periods. Approximately 14%[17] of the areas have seen a change of their status, and specifically 9.1% have been changes from 'a' to 'c' areas. The latter change is particularly relevant for large enterprises. This was one of the major changes in the rules introduced by the reform. Under the RAF 2014, large enterprises in 'c' areas may have aid granted only for initial investments that create new economic activities, or for the diversification of existing establishments into new products or new process innovations. Instead, in 'a' areas they may also finance expansion investment.

[15] When establishing regional aid maps, Member States account for the economic conditions in the years several years prior to their introduction. As an example, for the RAF 2014, GDP in PPS in relation to the EU27 average are based on a three-year average for the period 2008-2010.

[16] While the RAF 2007 aid intensities and eligibility are provided under the NUTS 2003 classification, the RAF 2014 is defined under the NUTS 2010 classification. In order to present all results under the NUTS 2010 classification, we account for changes in the NUTS 3 classification by means of conversion tables provided by Eurostat. These allow us to reclassify the NUTS codes and compare the respective RAF periods. For those regions where a direct conversion is not provided (because of small shifts of border), we introduce a conversion based on regions' labels. Where a one-to-one conversion between codes or labels is not straightforward, we assess whether all regions under the old classification composing regions under the new classification faced exactly the same aid intensity and area eligibility in the RAF 2007. If this is the case, we are able to compute changes between the two periods. It is impossible to analyse changes for the following regions NUTS 3 regions: DED43, FI1B1.

[17] 9.1% + 4.6% = 13.7%.

Table 4: Number (and %) of NUTS 3 regions by changes in area eligibility between the RAF 2007 for the years 2011-2013 and the RAF 2014 for the years 2014-2017

Changes	NUTS 3 regions concerned (N)	NUTS 3 regions concerned (%)
a → a	302	23.4%
a → c	118	9.1%
c → c	374	28.9%
na → c	47	3.6%
c → na	59	4.6%
na → na	392	30.3%
Total	**1292**	**100%**

Source: Own analysis based on regional aid maps (2007-2013/2014-2020).
Note: (i) The table covers 13 territories of NUTS 3 level, located in the EU outermost regions, designated as 'a' areas throughout the two periods. (ii) Croatia is not included presented in the table, as it is a Member State of the EU only since July 2013 and, consequently, not concerned by the RAF 2007. Croatia had all areas (21 NUTS 3 regions) assigned as 'a' areas throughout the RAF 2014. (iii) The term "na" refers to non-assisted area. (iv) The change in the NUTS codification between NUTS 2003 (codification used for the RAF 2007) and NUTS 2010 (codification used for the RAF 2014) make it impossible to identify changes for the following regions NUTS 3 regions: DED43, FI1B1.

Table 5 looks at a second dimension of the changes introduced in 2014 by providing how many regions (at the NUTS 3 level of aggregation) encountered changes in maximum aid intensities between the two RAF periods. More than 50% of regions faced a decrease in maximum aid intensities ranging from -5 to -25 percentage points, while 44% saw no change in maximum aid intensities.

Table 5: Number (and %) of NUTS 3 regions by changes in maximum aid intensities between the RAF 2007 for the years 2011-2013 and the RAF 2014 for the years 2014-2017

Changes (percentage points)	NUTS 3 regions concerned (N)	NUTS 3 regions concerned (%)
-25	20	1.5%
-15	214	16.6%
-10	48	3.7%
-5	373	28.9%
0	565	43.7%
5	6	0.5%
10	65	5.0%
15	1	0.1%
Total	1292	100.0%

Source: Own analysis based on regional aid maps (2007-2013/2014-2020).
Note: (i) The table covers 13 territories of NUTS 3 level, located in the EU outermost regions, all facing changes amounting to -5 percentage points (ii) Croatia is not included in the table, as it is a Member State of the EU only since July 2013 and, consequently, not concerned by the RAF 2007. Croatia faced maximum aid intensities of 25% GGE (14 NUTS 3 regions) and 35% GGE (7 NUTS 3 regions) throughout the RAF 2014. (iii) The term "na" refers to non-assisted area. (iv) The change in the NUTS codification between NUTS 2003 (codification used for the RAF 2007) and NUTS 2010 (codification used for the RAF 2014) make it impossible to identify changes for the following regions NUTS 3 regions: DED43, FI1B1.

Table 6 then puts these two dimensions together by picturing both changes in terms of the area eligibility criterion, as well as changes in maximum aid intensities. The background colours represent different types of regions in terms of eligibility under the RAF 2014-2020: 'a' areas are represented in red, 'c' areas in gold, non-assisted regions in blue.

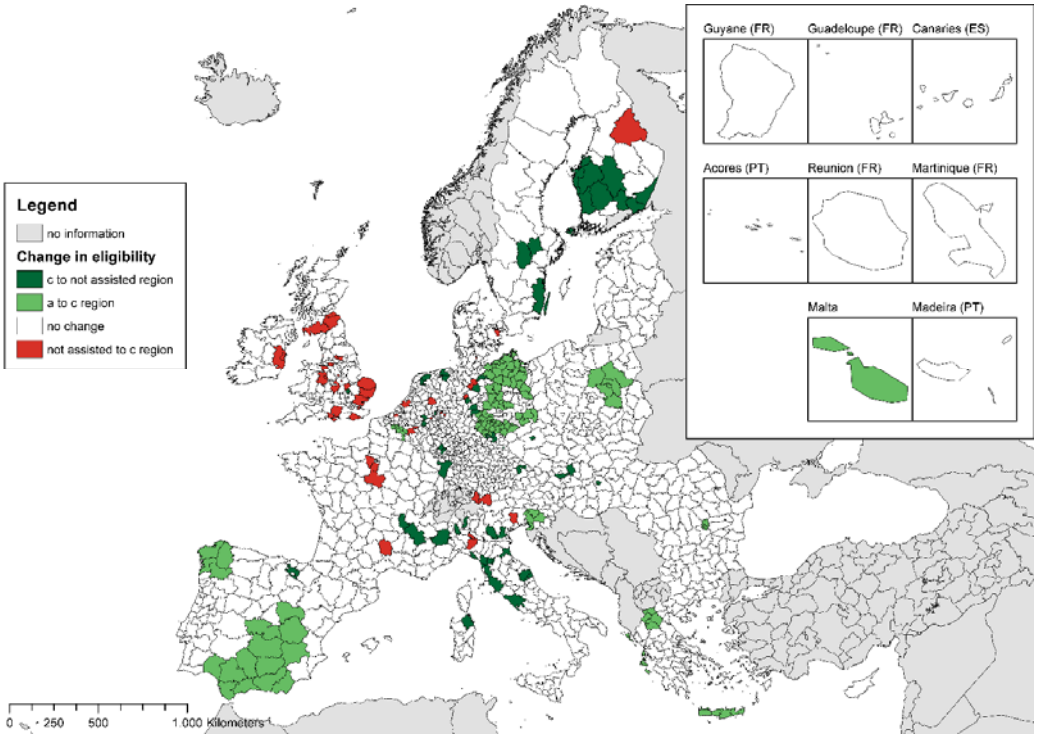
Table 6: Number (and %) of NUTS 3 regions by changes in rules between the RAF 2007 for the years 2011-2013 and the RAF 2014 for the years 2014-2017

RAF	RAF 2014: 2014-2017											
2011-2013	a 55%	a 50%	a 45%	a 35%	a 25%	c 35%	c 20%	c 15%	c 10%	na 0%	Total (N)	Total (%)
a 60%	1	0	0	0	0	0	0	0	0	0	1	0%
a 50%	0	85	4	33	19	0	0	0	0	0	141	11%
a 40%	0	0	0	19	48	1	0	1	0	0	69	5%
a 30%	0	0	0	0	93	4	9	103	0	0	209	16%
c 30%	0	0	0	0	0	1	0	0	0	0	1	0%
c 20%	0	0	0	0	0	0	2	18	24	0	44	3%
c 15%	0	0	0	0	0	0	0	15	237	30	282	22%
c 10%	0	0	0	0	0	0	0	1	57	15	73	6%
c 0%	0	0	0	0	0	0	0	0	19	14	33	3%
na 0%	0	0	0	0	0	0	0	1	46	392	439	34%
Total (N)	1	85	4	52	160	6	11	139	383	451	1292	100 %
Total (%)	0%	7%	0%	4%	12%	0%	1%	11%	30%	35%	100%	

Source: Own analysis based on regional aid maps (2007-2013/2014-2020).
Note: (i) The table covers 13 territories of NUTS 3 level, located in the EU outermost regions. (ii) Croatia is not included in the table, as it is a Member State of the EU only since July 2013 and, consequently, not concerned by the RAF 2007. Croatia had all areas assigned as 'a' areas and faced maximum aid intensities of 25% GGE (14 NUTS 3 regions) and 35% GGE (7 NUTS 3 regions) throughout the RAF 2014 for the years 2014-2017. (iii) The term "na" refers to non-assisted area. (iv) The change in the NUTS codification between NUTS 2003 (codification used for the RAF 2007) and NUTS 2010 (codification used for the RAF 2014) make it impossible to identify changes for the following regions NUTS 3 regions: DED43, FI1B1.

Figure 13 provides a geographical presentation of changes in area eligibility encountered between the two RAF periods. Relatively few regions have encountered a change in area eligibility. These changes consisted mainly in a change in designation from 'a' to 'c' area (light green) or rather from 'c' to a non-assisted area (dark green). In addition some regions have become eligible to receive aid by being designated as a 'c' area (red).

Figure 13: Changes in eligibility between the RAF 2007 for the years 2011-2013 and the RAF 2014 for the years 2014-2017 periods at the NUTS 3 level

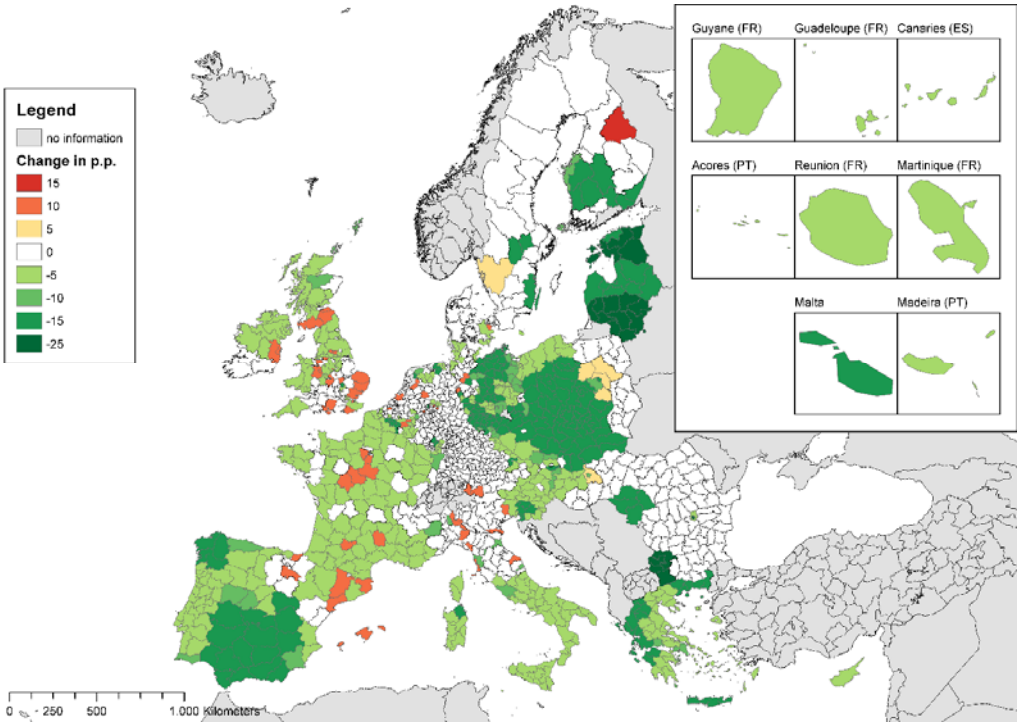


Source: Own analysis based on regional aid maps (2007-2013/2014-2020). © EuroGeographics for the administrative boundaries.
Note: (i) The change in the NUTS codification between NUTS 2003 (codification used for the RAF 2007) and NUTS 2010 (codification used for the RAF 2014) make it impossible to identify changes for the following regions NUTS 3 regions: DED43, FI1B1. These areas are marked in grey. (ii) Croatia is not presented in the map, as it is a Member State of the EU only since July 2013 and, consequently, not concerned by the RAF 2007.

Figure 14 provides a geographical representation of changes in maximum aid intensities encountered between the two RAF periods.[18] Overall, most regions have seen a decrease of maximum aid ceilings, ranging from -5 percentage points (light green) to -25 percentage points (dark green).

[18] In Appendix 6 we report similar figures representing the rules respectively under the RAF 2007 and the RAF 2014, which are at the base of these differences.

Figure 14: Changes in maximum aid intensities between the RAF 2007 for the years 2011-2013 and the RAF 2014 for the years 2014-2017 periods at the NUTS 3 level



Source: Own analysis based on regional aid maps (2007-2013/2014-2020). © EuroGeographics for the administrative boundaries.

Note: (i) The change in the NUTS codification between NUTS 2003 (codification used for the RAF 2007), NUTS 2006 and NUTS 2010 (codification used for the RAF 2014) make it impossible to identify changes for the following regions NUTS 3 regions: DED43, FI1B1. These areas are marked in grey. (ii) Croatia is not presented in the map, as it is a Member State of the EU only since July 2013 and, consequently, not concerned by the RAF 2007.

The most pronounced changes are observed for regions of Bulgaria (5 regions), Estonia (4 regions), Lithuania (10 regions), and Romania (1 region), where maximum aid intensities decreased from 50% to 25%. In addition, a number of regions across Europe observed increases in aid intensities, which ranged from 5 to 15 percentage points. These are predominantly regions which changed their status from non-assisted to 'c' areas, encountering increases in maximum aid intensities from 0 to 10%/15%.

2.1.4 Firm-level data

The Study exploits firm-level data to construct regional (NUTS 3) measures of investment. Firm-level data on investment were obtained from the Bureau van Dijk's (2010) Amadeus database. We use the unconsolidated version of the Amadeus database.[19] This database contains the name of all subsidiaries of a firm, its precise address, the NUTS 3 identifier, the NACE identifier as well as total fixed assets, where the latter was used to create a measure of investment.

This database allows us to look at individual firms' outcomes - especially at investment defined as total asset in a given year minus the total assets in the previous year. This is a great advantage of the Amadeus database with respect

[19] These include information retrieved from unconsolidated financial statements as well as unconsolidated data provided in consolidated financial statements.

to alternative data sources since it is not easy to find good quality data on investment at the regional level. Once we have allocated a given firm to a given NACE sector in a given NUTS 3 region, we aggregate the variable of interest to create a measure of the total investment at the regional level, distinguishing between investment made by the different sizes of enterprises: small, medium and large.

The firm-level data at the regional level are exploited in the econometric analysis (see Appendix 10) to address the question of the effectiveness of regional aid in terms of its actual effect on investment. The detailed description of their construction is provided in Appendix 9.

The key variable of interest in the econometric analysis is total regional investment (all firms or firms in the different size classes) in a region as a percentage of its GDP. Table 33 provides summary statistics on investment for the sample of NUTS 3 regions used in the econometrics analysis and distinguishing between different sizes of enterprises. In particular, we exploit information on total investment for 762 NUTS 3 regions. These are eligible regions, which either have seen no change in aid rules (142 regions) or faced a decrease in aid intensities (620 regions). The data cover the years 2011-2016, which provides information on the two recent regional aid guidelines periods: the RAF 2007 and the RAF 2014.

Table 7: Summary statistics on total investment to GDP in percentages per NUTS 3 region for the years 2011-2016

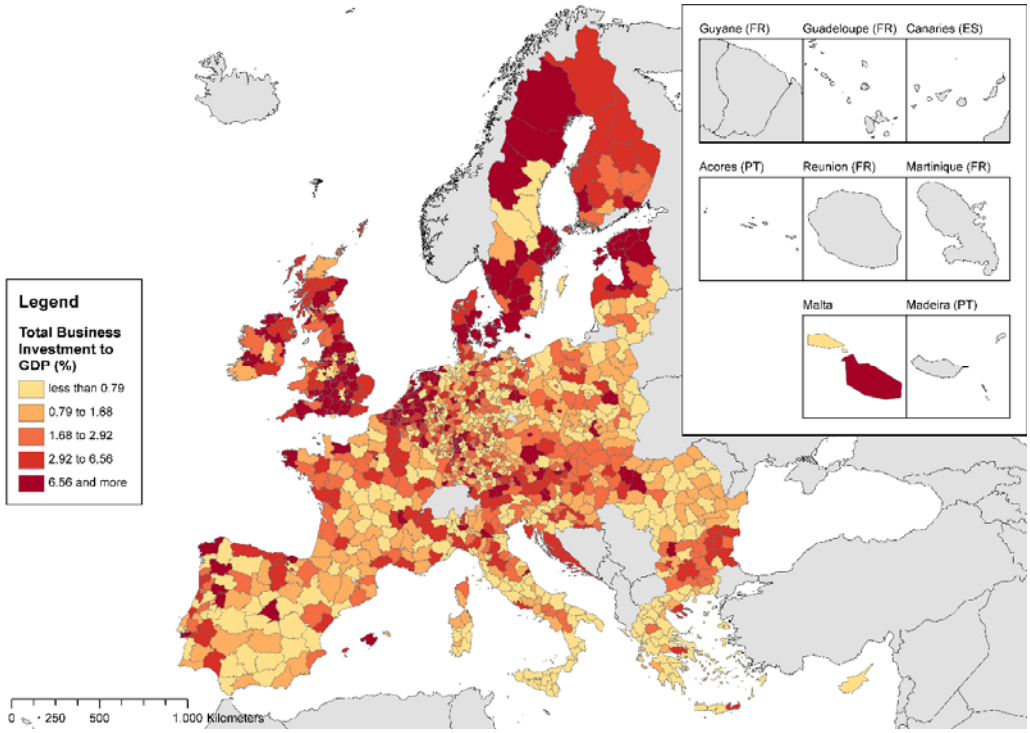
Variables	Δ Aid intensities	N of NUTS3 regions	Mean	Std. Dev.	Min.	Max.
Total investment - all firms						
2011-2013	-	142	2.98	6.85	-21.77	78.85
2014-2016	-	142	2.77	7.88	-25.07	70.04
2011-2013	Decrease	620	2.98	6.34	-17.36	85.08
2014-2016	Decrease	620	2.61	7.69	-28.21	94.71
Total investment - large firms						
2011-2013	-	142	1.60	5.52	-24.38	54.92
2014-2016	-	142	1.77	6.86	-21.81	65.12
2011-2013	Decrease	620	1.74	6.07	-19.30	103.01
2014-2016	Decrease	620	1.80	7.06	-28.59	96.89
Total investment - medium firms						
2011-2013	-	142	0.67	2.23	-20.06	21.48
2014-2016	-	142	0.68	1.77	-5.84	18.56
2011-2013	Decrease	620	0.71	1.37	-13.87	13.17
2014-2016	Decrease	620	0.56	1.75	-28.31	29.29
Total investment - small firms						
2011-2013	-	142	0.71	1.28	-4.72	10.21
2014-2016	-	142	0.31	2.50	-30.00	29.84
2011-2013	Decrease	620	0.53	1.16	-18.49	8.70
2014-2016	Decrease	620	0.25	1.57	-21.23	31.43

Source: Own analysis based on Amadeus and regional aid maps (2007-2013/2014-2020).
Note: (i) We exclude from the analysis, the smallest and largest 1% of the observations. (ii) Non-assisted regions are not included in the analysis.

When comparing the means of total regional investment for all firms between the two RAF periods, the table suggests that regions which have seen a decrease in aid intensities have seen a smaller increases in total investment as compared to those that have seen no change in maximum aid intensities.

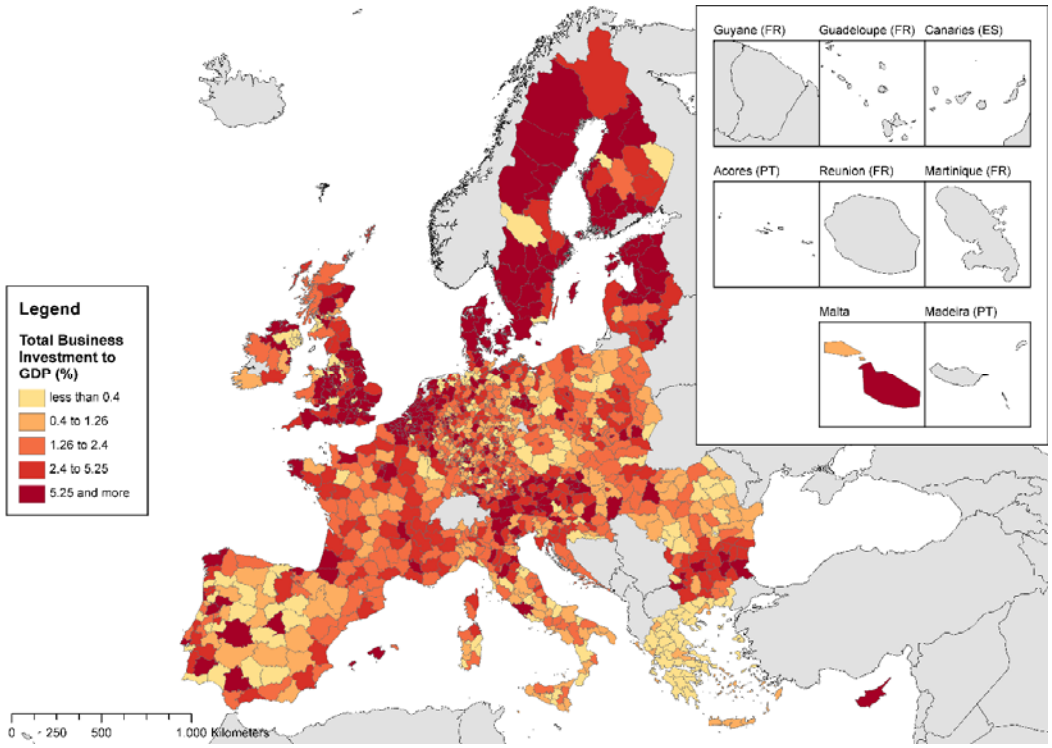
The following two figures provide a geographical presentation of total business investment to GDP by focusing on differences between NUTS3 regions, respectively for the years 2011-2013 and 2014-2016.

Figure 15: Average yearly total business investment to GDP (in %) for the years 2011-2013



Source: Own analysis based on Amadeus and Eurostat. © EuroGeographics for the administrative boundaries.

Figure 16: Average yearly total business investment to GDP (in %) for the years 2014-2016



Source: Own analysis based on Amadeus and Eurostat. © EuroGeographics for the administrative boundaries.

2.1.5 Foreign Direct Investment data

Foreign investments are investments that involve capital flows from one country to another. FDI are a specific type of foreign investments, whose objective is to establish a lasting interest by an investor in one economy in an enterprise residing in another country (OECD 2008, p. 48). Such an interest is deemed to exist when a direct investor owns at least 10% of the voting power of the direct investment enterprise. By contrast, foreign *indirect* investments (also referred to as foreign portfolio investments) are investments that have a different objective.[20] FDI includes all *foreign* direct investments; hence, for EU countries this also includes investments originating from other EU countries (*i.e.* intra-EU FDI).

FDI activities can be pursued by multinational enterprises for various strategic reasons, such as enhancing local market penetration or gaining access to specific resources. These motives are discussed in more detail in section 3. FDI can also take on various forms, depending on the type of financial transaction. There are four types of financial transactions that qualify as FDI: (i) mergers and acquisitions (purchase/sale of existing equity in the form of mergers and acquisition), (ii) greenfield investments (entirely new investments), (iii) extension of capital (additional new investments as an expansion of an established business, and (iv) financial restructuring (investment for debt repayment or loss reduction).

To assess the relevance of regional State aid rules (*i.e.* how well adapted are the State aid rules to market developments), we examine to what extent there is a link between regional eligibility and FDI trends. For this purpose, we compare the development of (i) FDI inflows in the EU and individual Member States and (ii) the development of regional aid eligibility. This section describes the relevant data and presents descriptive statistics that will be used to evaluate the relevance of regional aid.

We have focused on data provided by UNCTAD, in a series of tables that accompanies the World Investment Report (WIR) (UNCTAD 2019).[21] The choice of this dataset is motivated by a number of important advantages:

- The data is provided on **FDI flows**, which are preferable over FDI stock to analyse the development of FDI over time. Such information is not always provided in other data sources (*e.g.* the IMF's CDIS data).

- **Consistent information** is provided for a **long period of time (1990-2018)**. Consistency is an important consideration, as some of the datasets have break points due to important changes in the underlying methodology.[22]

- The geographical coverage of the data is **worldwide** (207 countries), which enables to identify both the level of FDI into the EU, as well as the level of FDI globally. The latter aspect is important, as there is a significant trend in the level of global FDI, which should be taken into account when analysing the development of FDI inflows to the disadvantaged areas in the EU.

The dataset does also have one important disadvantage, as it only contains information on inward and outward FDI that is **aggregated by country**. It contains the total level of FDI inflows (*i.e.* investments made by foreign investors into the country) for each of the relevant countries, as well as the total level of

[20] The focus of such investments is typically on the earnings resulting for the investment, but not the aspect of control as such.

[21] For a detailed description of available FDI data and data selection, see Appendix 5.

[22] For example, the information is Eurostat is only provided as of 2013 as of this point FDI is reported according to the directional principle.

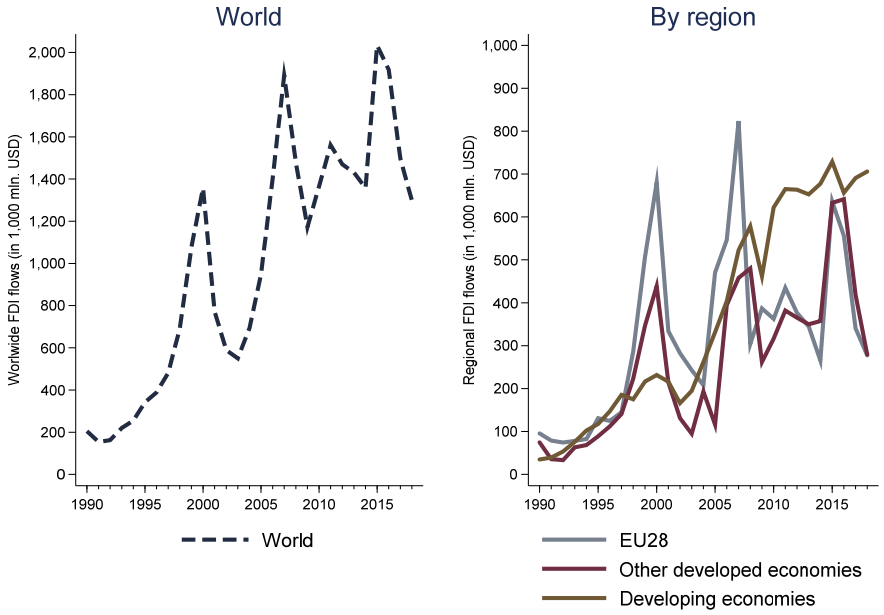
FDI outflows (*i.e.* investments made into foreign countries). It does not have bilateral data that show the combination of both types of information (*i.e.* for each country, the origin and destination of the relevant FDI inflows and outflows).

The lack of bilateral data in the UNCTAD dataset implies that the total level of FDI to the disadvantaged areas in the EU can be calculated, but that no explicit distinction can be made with respect to intra- and extra-European FDI. Both types of FDI are, however, relevant for regional development. Furthermore, useful analyses can still be performed using these data by comparing the level and flows of FDI in the EU and individual Member States to those globally (and calculating the share in global inward FDI flows).

2.1.5.1 Evolution of FDI flows into the EU28

The following figure shows the development of inward FDI flows during the period 1990-2018 for the EU28 countries, other developed countries and developing countries.[23]

Figure 17: Development of inward FDI flows, 1990-2018



Source: Own analysis based on UNCTAD data.

During the period 1990-2018, FDI flows both globally and into the EU28 increased significantly.

In 1990, the level of worldwide inward FDI flows was approximately USD 0.2 trillion. In 2007, the level had increased to USD 1.9 trillion, the highest level thus far. This peak in the level of FDI was followed by a sharp decline during the financial crisis of 2007-2008, reducing the level of worldwide FDI to USD 1.2 trillion in 2009. By 2015, FDI flows had recovered to the level obtained before the financial

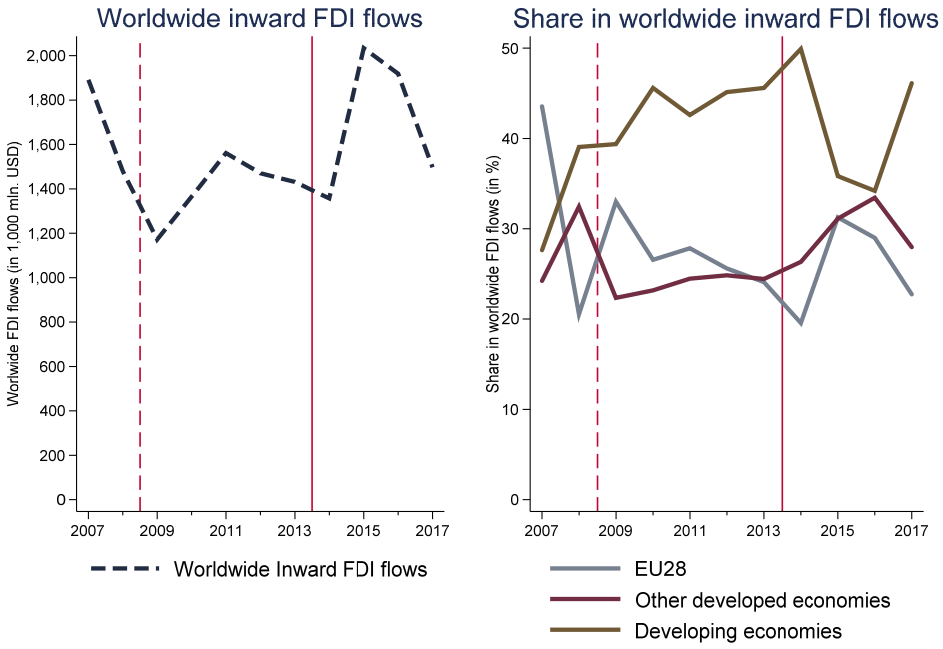
[23] "Other developed economies" refers to all non-EU28 countries which UNCTAD considers to be developed economies. This includes (i) other developed European countries (Gibraltar, Iceland, Norway, Switzerland), (ii) North America (United States and Canada) and (iii) other developed economies (Australia, Bermuda, Israel, Japan, New Zealand). "Developing economies" refer to all other (non-developed) economies, excluding "transition economies" (which are mainly countries in South-East Europe and CIS-countries).

crisis (USD 1.9 trillion). In recent years, FDI flows have again declined, reaching USD 1.3 trillion in 2018.

During the same period, the level of FDI into the EU28 also increased substantially. In 1990, the level amounted to USD 0.1 trillion, but by 2007 it had increased to USD 0.8 trillion. This peak was followed by a sharp decline, reducing the level to USD 0.3 trillion in 2008. In 2015, FDI flows briefly recovered to USD 0.6 trillion. In recent years, FDI flows into the EU28 have again declined, reaching USD 0.3 trillion in 2018.

The large movements in worldwide FDI flows are an important factor to take into account when analysing the development of FDI flows into the disadvantaged regions of EU28. An increase (or decrease) in the level of FDI into the EU that is driven by movements in the overall level of FDI is not necessarily informative on regional differences in FDI trends. A convenient way to control for such aggregate movements is to calculate the share of EU28 inflows in total (worldwide) FDI flows. Figure 14 shows the corresponding shares for the period 2007-2017, which will be analysed in later sections of this report. This period contains the entire RAG 2007 period, as well as the first part of the RAG 2014 period (*i.e.* before the mid-term review in 2018). We do not include 2018, as this is already part of the mid-term review, and therefore less comparable.

Figure 18: Share in worldwide inward FDI flows (in %), 2007-2017



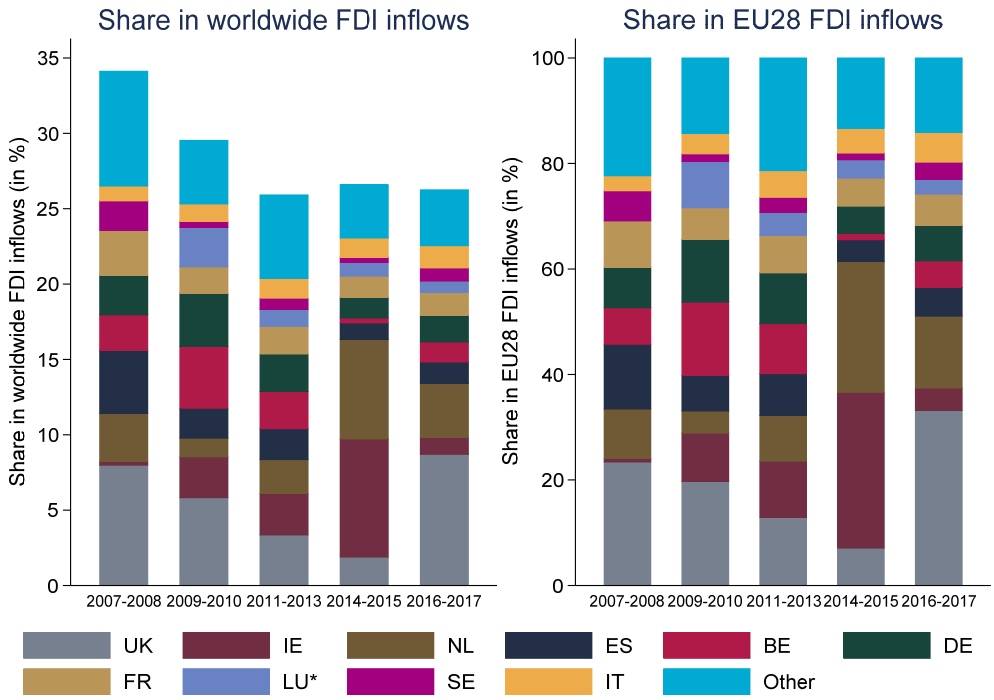
Note: The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis.
Source: Own analysis based on UNCTAD data.

During the period 2007-2017, the share of the EU28 in the worldwide inward FDI flows has fluctuated significantly. In 2007, the EU28 share was 43.5%, the highest share during the entire period 2007-2017. However, in the year 2008 when the financial crisis unfolded, the share had decreased significantly to 20.5%. The share then briefly recovered to 33.0% in 2009, but thereafter decreased almost continuously until 2015. In 2015, the share recovered once more (31.3%), but decreased in the two following years (29.0% in 2016, 22.7% in 2017).

The decrease in the FDI share of the EU28 coincides with an increase in the share of the developing economies, which indicates investments were more and more directed towards developing economies. The share of these countries increased from 27.6% in 2007 to 46.1% in 2017. At the same time, the share in inward FDI for other developed economies exceeded the EU28's share in 2013 and has kept its advantage for most of the period 2013-2017.

The following figure decomposes the total share of the EU28 into the underlying Member States. Smaller countries have been grouped and are shown under "Other". It should be noted that FDI flows at a country-level are quite volatile and can (temporarily) be negative (*i.e.* instances where the value of disinvestment exceeded that of investment, generating negative net inflows). For this purpose, years have been grouped to provide a more stable and insightful decomposition.

Figure 19: Share in worldwide inward FDI flows (in%) by Member State, 2007-2017*



Source: Own analysis based on UNCTAD data.
*Notes: * FDI flows in Luxemburg in 2007-2008 are slightly negative. To improve readability, the value of FDI flows for this period has been set to zero (as the distribution across countries is only sensible if each of the countries' values is positive). The EU28 total for 2007-2008 shown in the figure (34.1%) is therefore slightly too high (the actual EU28 total is 33.5%).*

The countries that contribute most to FDI inflows in the EU28 tend to be countries with a relatively large economy (*e.g.* the UK, Germany, France and Spain) or countries with a tax regime that is favourable to multinational enterprises (*e.g.* Ireland, Netherlands, Belgium, Luxembourg).

2.1.5.2 FDI and regional aid eligibility

To analyse the link between regional aid and FDI, we will compare the development of FDI inflows to the development of regional aid eligibility measures. For this purpose, we have constructed measures of aid eligibility at the national and EU28-

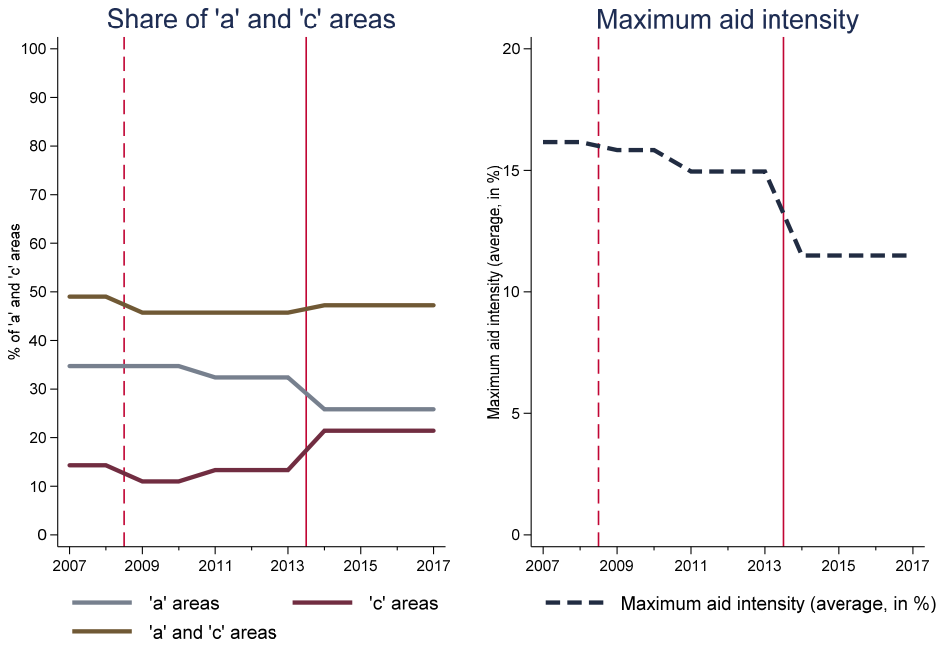
level. In general, these measures are obtained by aggregating regional (NUTS 3) aid eligibility information, by weighing each region's eligibility information by its population.[24] However, certain NUTS 3 regions are only partially covered, such that prior to aggregation the data were first adjusted to take this into account. [25] In Appendix 5 we have also provided aid eligibility measures aggregated using regional GDP, which shows a similar development.

The following figure presents the development of four aid eligibility measures aggregated to the EU28-level: (i) the percentage of 'a' areas, (ii) the percentage of 'c' areas, (iii) the percentage of 'a' and 'c' regions, and (iv) the (average) maximum aid intensity.

[24] The aggregation of regional aid eligibility information was complicated by the fact that the spreadsheets containing the aid eligibility measures at the NUTS 3-level were reported using older versions of the NUTS 3-classification (2007-2013: NUTS 3 2003; 2014-2020: NUTS 3 2010). Eurostat no longer provides regional information using these classifications, as only information for the latest NUTS classification (NUTS 3 2013/2016) is provided. In the spreadsheet containing the aid eligibility and intensities for 2014-2020 (*Regional Aid maps 1.7.2014 - 31.12.2020, Excel table with the eligibility and aid intensities up to level NUTS3*), information on the population size (in 2010) was already included such that this information could be used. The aid eligibility measures for the period 2014-2017 are therefore aggregated using regional information of the population in 2010. For 2007-2013, Eurostat user support was able to provide NUTS 3 level information up to 2004. As 2004 is the most recent data provided, the population in this year was used to aggregate the eligibility information for the period 2007-2013, which was extracted from the corresponding spreadsheet (*Regional Aid maps 2007 – 2013, Excel table with the eligibility and aid intensities up to level NUTS3)*

[25] Information is only provided at the NUTS 3 level. For certain areas (*e.g.* "non-predefined 'c' areas in the RAG 2014), coverage is often defined at a more granular level (*e.g.* only certain parts of the NUTS 3 area are covered). Such partially covered NUTS 3 regions need to be taken into account; as otherwise, the obtained aggregated numbers would overstate aid eligibility and intensity figures (*e.g.* by considering the entire NUTS 3 region to be eligible). For this purpose, the numbers obtained from the spreadsheets (which contain an indication of which NUTS 3 regions are partially covered) are compared and reconciled with country-level information on eligibility obtained from the RAG Annexes and the associated country-specific regional aid maps. In particular, the coverage of all partially covered NUTS 3 regions is adjusted such that the aggregated numbers obtained from the spreadsheets are largely consistent with the numbers obtained from the RAG Annexes and country-specific regional aid maps. In some cases, small deviations still occurred due to rounding (the aggregate information is rounded to a certain precision) and overlap (certain regions are eligible under multiple articles and can be counted twice in the aggregate statistics; *e.g.* region "E023 3 01" (Clare, Ireland) is eligible under Article 87(3)(c) EC for the whole period 2007-2013, as well as eligble under the derogation of Article 87(3)(c) EC.

Figure 20: Development of aid eligibility measures at the EU28-level



Source: Own analysis based on regional aid maps (2007-2013/2014-2020)

In terms of the types of areas, the share of 'a' areas decreased from 34.7% in 2007-2010 to 32.4% in 2011-2013 due to 'statistical effect' regions (which changed their status from 'a' to 'c' in 2011). The share of `a' areas further decreased to 25.8% in 2014-2017 due to the introduction of the RAG 2014.

The share of 'c' areas first decreased from 14.3% in 2007-2008 to 11.0%[26] in 2009-2010, as certain regions were only (transitionally) covered in 2007-2008. In 2011-2013, the share of 'c' areas increased to 13.3% due to the aforementioned 'statistical effect' regions, of which some regions became 'c' areas in 2011-2013. In 2014-2017, the share of 'c' areas further increased due to the introduction of the RAG 2014, in which the status of certain 'a' areas was changed to 'c'.

The overall share of 'a' and 'c' areas developed in the following way: it decreased from 49.0% in 2007-2008, to 45.7% in 2009-2013, and increased again to 47.2% in 2014-2017.[27]

The (average) maximum aid intensity decreased in the period 2007-2017 in three consecutive steps. It first decreased from 16.2%[28] in 2007-2008 to 15.8% in 2009-2010 due to the effects of the aforementioned transitionally covered regions. Subsequently, the maximum intensity further decreased to 15.0% in 2011-2013 due to the effects of the mid-term review of the RAG 2007-2013 (in which the

[26] This number is an approximation as the spreadsheet containing NUTS 3 level information on aid eligibility does not contain detailed information on the transitionally covered areas. These areas are often only partially covered (*i.e.* at a more granular level that NUTS 3).

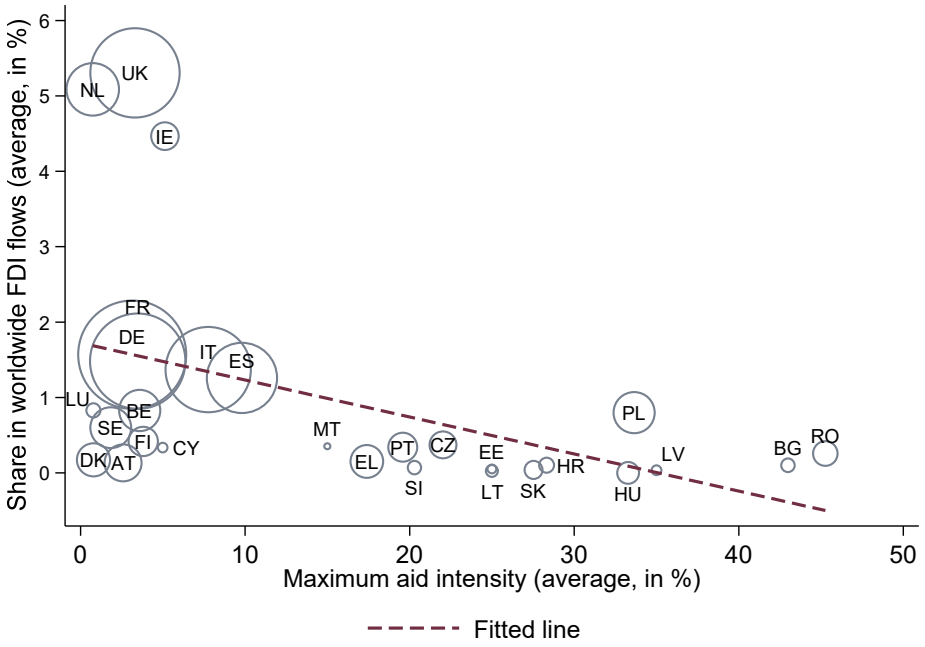
[27] These numbers refer to the entire EU28 and therefore also include Croatia (which is considered as not being eligible for the period 2007-2013). The numbers for 2007-2008 are higher compared to 2009-2010 due to regions that are only transitionally covered. For these regions no detailed information at the NUTS 3 level was available, such that the numbers for 2007-2008 are an approximation.

[28] This number is an approximation as the spreadsheet containing NUTS 3 level information on aid eligibility does not contain detailed information the transitionally covered areas. These areas are often only partially covered (*i.e.* at a more granular level that NUTS 3).

maximum aid intensities of certain regions were reduced). Finally, it decreased to 11.5% in 2014-2017 because of the introduction of the RAG 2014.

Regional aid aims to promote the economic development of certain disadvantaged areas within the EU. As the concentration of such disadvantaged areas varies across Member States, the average maximum aid intensity also varies significantly across Member States. The following figure demonstrates such differences by comparing the (population weighted) average maximum aid intensities to the share in world FDI inflows in the period 2014-2017 for all Member States. The economic size of each country is reflected by the size of the circle, which is proportional to the Member State's GDP.

Figure 21: Maximum aid intensities and FDI flows across Member States (average in period 2014-2017)



Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020)
Notes: (i) Average maximum aid intensity weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed red line indicates the fitted (linear) relation. (iv) The value for of FDI inflows for Hungary ('HU') was negative for the period 2014-2017, such that the implied share in world FDI flows is slightly negative (-0.1%). To improve readability, this share was therefore set to zero.

This figure indicates that Member States with a relatively high average maximum aid intensity tend to have a small share in direct foreign investment inflows, and vice versa. The countries with the highest (population weighted) average aid intensity in the period 2014-2017 are Romania (45.3%), Bulgaria (43.0%) and Latvia (35.0%). The respective shares in FDI flows of these countries are 0.26% (Romania), 0.1% (Bulgaria) and 0.04% (Latvia). By contrast, the countries with the lowest (average) maximum aid intensity are the Netherlands (0.7%), Luxembourg (0.8%) and Denmark (0.8%). The respective shares in FDI flows are 5.1% (the Netherlands), 0.8% (Luxembourg) and 0.2% (Denmark).

The negative relation between the (average) maximum aid intensity and the share in FDI inflows is indicated by the dashed red line, which shows the fitted linear relation. This negative relation illustrates that regional aid is successful in targeting Member States with less developed regions. However, it should not be interpreted

as being informative on the effect of maximum aid intensity on FDI inflows, as there are many other factors that differ across countries and are not taken into account in this figure.

2.2 ECONOMETRIC ANALYSIS

To causally identify how different State aid rules affect the allocation of State aid as well as total investment in a particular region, we perform an econometric analysis at the disaggregated NUTS 3 level data. The analysis proposed in the Study takes inspiration from the methodology for evaluating State aid schemes introduced in the Commission's methodology guidance paper.[29] It consists in evaluating how the changes in State aid rules in 2014 affected total business investment and regional State aid spent. This econometric analysis allows for controlling for other factors and specific regional characteristics as well as time trends that might be important drivers of firms' investment activities.

Specifically, we exploit the variation generated by the introduction of the RAF in 2014. As discussed above, this reform created heterogeneous changes in the eligibility criteria as well as in the maximum aid intensities and, thus, different investment incentives across European regions. The focus on the *changes in the rules* is crucial as it allows to create comparator groups — some regions are affected by the changes while others are not — which enables us to identify how these (new) rules affect outcomes. This step is key to perform a causal analysis, not necessarily to make a comparison with the past, but to understand the effectiveness of the rules and thereby to address the question of the effectiveness of regional State aid (see Section 4). Detailed results are presented in Appendix 10.

The advantages of the econometric analysis are threefold. First, it can help to assess the causality of the relation between State aid rules and economic outcomes. Second, it helps *quantifying the extent* of the impact of the changes on outcomes (*e.g.* how much more or less investment in a region is due to the change in State aid rules). Finally, it allows performing a *broad evaluation* of the current regional aid guidelines in light of their effect on levels of investment (and other variables of interest like State aid spent) that could complement information obtained by the descriptive analysis, surveys, case studies and expert interviews.

2.3 SURVEY OF AID GRANTING AUTHORITIES

We have conducted a survey amongst aid-granting authorities in EU Member States. The survey covers questions relevant for all five research areas: effectiveness, efficiency, relevance, coherence and EU added value. The survey was designed carefully with the advice from an expert in survey design. The survey questions can be found in Appendix 2.

We received the contact details of 248 aid granting authorities from the Commission of which 66 were selected.

The survey was conducted online through the Qualtrics platform, professional web-based survey software. Important technical capabilities used for this survey are, for example, randomised order of multiple-choice questions, several validation techniques, individualised web links for each respondent and ongoing monitoring of the responses.

All survey questions were implemented in Qualtrics and an individual survey link was sent by email in English to all 66 aid-granting authorities selected by the

[29] Commission staff working document, SWD(2014) 179 final, 28 May 2014, *available at* https://ec.europa.eu/competition/state_aid/modernisation/state_aid_evaluation_methodology_en.pdf (accessed on 29 August 2019).

Commission. The majority of authorities acknowledged receipt of the survey. Some asked for a translation of the survey into another language. For this reason, the survey was translated by external translators into seven languages (Czech, German, Estonian, Spanish, French, Latvian and Romanian) and provided to the relevant authorities with an appropriate deadline extension. Some authorities, particularly at the national level, suggested contact persons at other authorities in their country, usually at regional level, that would be better placed to respond to the survey. After remaining in close contact with the responsive aid-granting authorities and several agreed deadline extensions, the survey was ultimately closed after 46 days. After closure, one final response was accepted upon request from the Commission. Any corrections to previous answers sent by authorities by e-mail after closure of the survey were implemented.

2.3.1 Response rate

The completeness of responses varies greatly, particularly for open-ended (rather than multiple-choice) questions, with some providing very extensive responses with many helpful examples and explanations, and others answering summarily.

The following table presents the distribution of the completeness of replies to questions relating to regional State aid (*i.e.* not considering the questions related to the characteristics of the authority).

Table 8: Completeness of replies to survey questions relating to regional State aid

Percentage of questions answered	Total number of authorities	Authorities selected for analysis
Up to 10%	5	0
11%-20%	2	2
21%-30%	6	6
31%-40%	5	4
41%-50%	8	8
51%-60%	4	4
61%-70%	17	17
71%-80%	9	8
81%-90%	7	7
91%-100%	7	7
Total	70	63

Source: Survey of aid granting authorities. When deriving the percentage of questions answered, only questions that were shown to all respondents were considered (and not those that were only shown to a selection of respondents depending on their answers to previous questions).

Some replies were not considered meaningful: five authorities replied to less than 11% of questions not related to the characteristics of the authority. In addition, one authority filled out only random keystrokes in any open-text questions and therefore their responses to multiple-choice questions were also considered

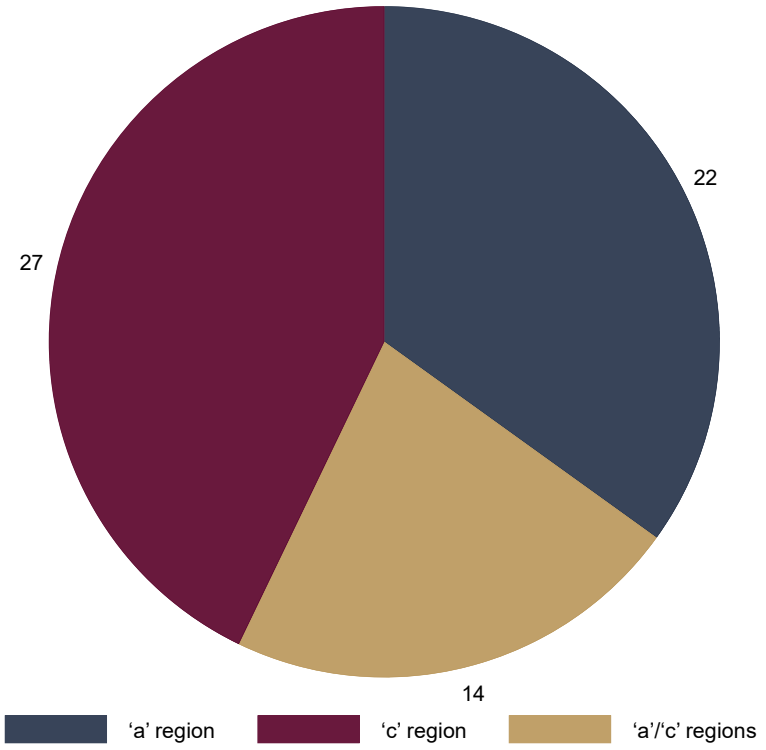
unreliable; and one authority indicated that they had only filled out test responses and forwarded the survey to another, more suitable authority in the same region. The remaining 63 of the replies were considered meaningful.

Considering the meaningful replies only, the response rate of the survey is 95% (63 replies compared to 66 initially suggested authorities). When considering replies with at least 50% answered questions, the response rate is 65% (43 replies compared to 66 initially suggested authorities).

2.3.2 About the respondents

The total of 63 aid-granting authorities constitutes the sample used for the evaluation of the survey. As shown in Figure 22, the sample of authorities is well balanced with respect to the region type.

Figure 22: Number of authorities by 'a' or 'c' region

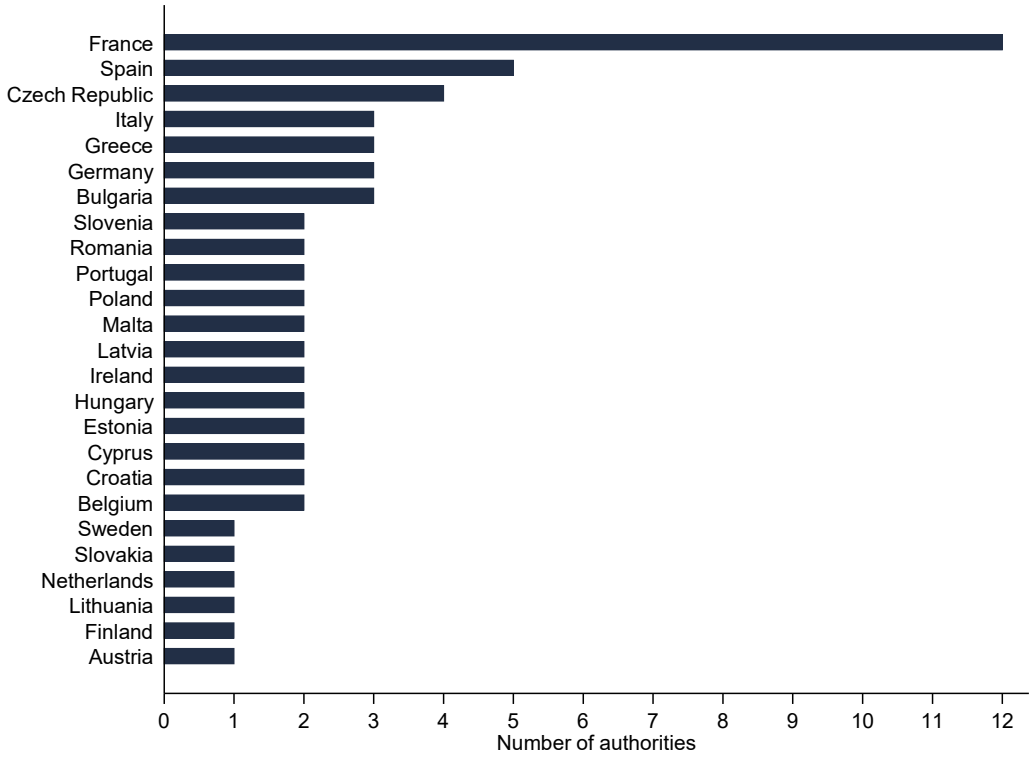


Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

22 authorities represented 'a' regions, 27 authorities represented 'c' regions and the remaining 14 authorities represented both 'a' and 'c' regions.

The responding aid-granting authorities come from 25 EU Member States, as shown in Figure 23. France is represented by the largest number of aid-granting authorities (12), while six Member States are represented by only one authority.

Figure 23: Number of authorities by Member State



Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

The respondents are all aid-granting authorities at national (36) or regional level (27). Five authorities supervise and monitor the work of subordinate aid-granting authorities (three regional from Germany, two national from Estonia and Italy). One national French authority also indicated that their role mainly consists in supervising regional aid granting authorities, apart from difficult cases they take over from regional authorities. In the same vein, the Swedish authority stated that they handle regional investment aid according to Article 14 GBER and act as central national body with cases throughout the Swedish regional aid map in those cases where investment costs are exceeding SEK 25 million (smaller cases are dealt with at regional level).

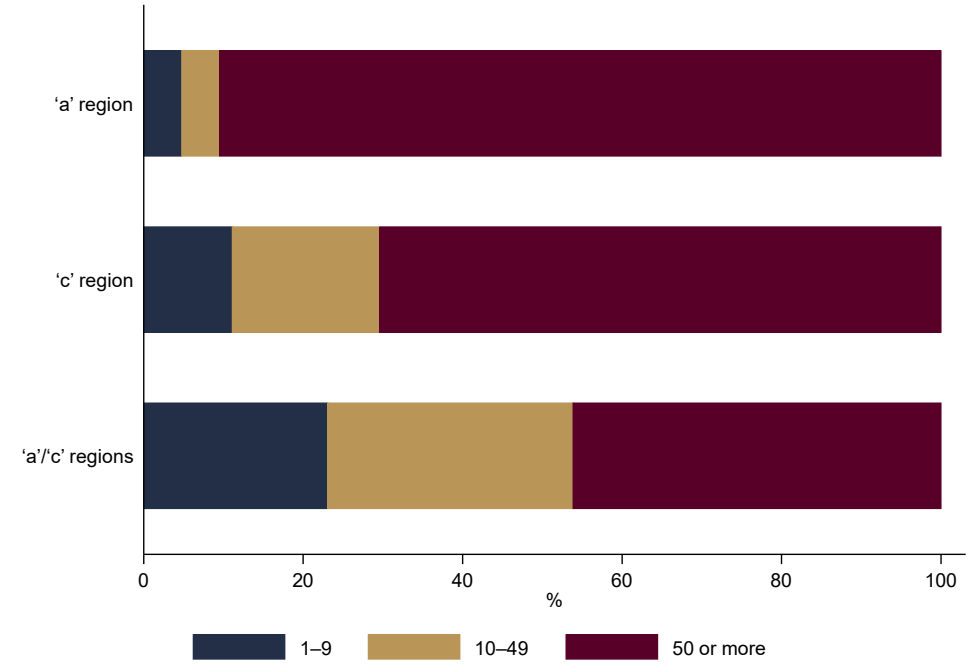
The large majority of authorities apply different State aid categories besides the RAF 2014 and do not focus on a specific sector. There are a few exceptions to this:

- two authorities (Croatia and Greece) only deal with State aid for SMEs;
- one authority (Bulgaria) focuses on urban development;
- one authority (Czech Republic) focuses on environmental projects;
- one authority (Czech Republic) specialises in the agricultural sector.

In addition, four authorities (Bulgaria, Hungary, Latvia and Portugal) indicated that they concentrate on tax instruments as a form of aid used across aid categories.

The authorities dealing with regional State aid cases in 'a' regions are larger than those for 'c' regions in terms of the total number of employees, as seen in Figure 24.

Figure 24: How many persons (in full-time equivalent) did your institution employ in 2018? (Question 2)

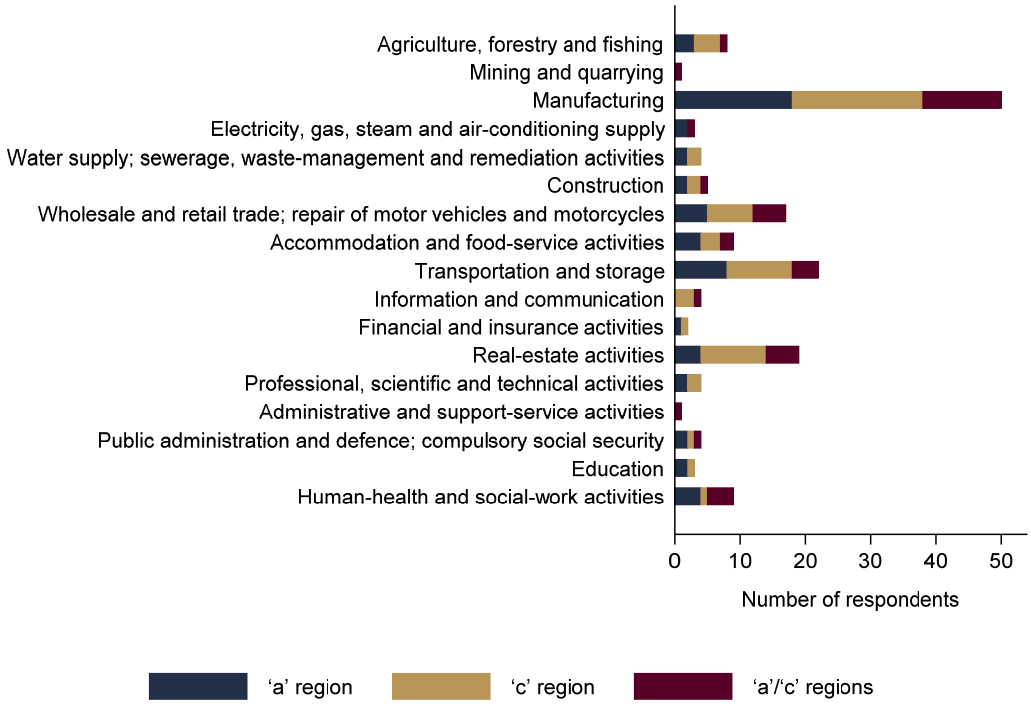


N = 61 of 63

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

In terms of sectors, manufacturing is reported to be one of the most important in their region by 40 authorities from both 'a' and in 'c' regions. Figure 25 presents all sectors reported by authorities to be amongst the most important for their region.

Figure 25: Please select three economic sectors that are the most important for your region (Question 3)



N = 57 of 63

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

Other major sectors are transportation and storage, and wholesale and retail trade, repair of motor vehicles and motorcycles and real-estate activities.

2.3.3 Reliability of survey

The survey of aid granting authorities gives a first-hand picture about the use of regional aid in the authorities' regions. It is an efficient data collection method: it can be implemented in limited time with online tools and is cost-effective.

Surveys have some limitations, also. First, the survey is not representative: it was addressed to a sample of aid granting authorities and was answered by a selection of those contacted authorities. The survey cannot provide the full picture, for example in terms of the total number of cases. The survey may be missing existing issues, which are specific for regions which were not contacted or did not answer. In addition, the importance of particular issues raised by the authorities may be over- or understated due to the bias in the sample selection.

Second, the survey collected views of the aid granting authorities and as such is not objective. Respondents may provide answers with a varying degree accuracy, presenting them in favourable manner or may not be fully aware of reasoning. They may also lack institutional memory in case of significant personnel rotation. Finally, different respondents may interpret the questions differently. For all these reasons, the results from the survey must be treated with caution.

2.4 CASE STUDIES

This section presents the methodology used for the assessment of the efficiency of regional State aid.

We review all individual regional State aid cases that were (pre-) notified to the Commission in the period between December 2014 and November 2017 in order to assess the extent to which the regional aid framework ensures that the Commission treats the most distortive cases (Question 4):

- To what extent was the risk of negatively affecting competition and trade associated with the (pre-) notified regional aid balanced with the effort required from the stakeholders involved in notifying and assessing the case under the RAG?

- What happened to the projects related to (pre-) notified regional investment aid cases that were subsequently withdrawn? To what extent were those investment projects carried out? Did those projects receive other types of aid?

In particular, we focus on whether the notified cases that are assessed under the RAG 2014 are those with the highest potential risk of distortion of competition and trade between Member States *ex ante*. For this assessment, we first assess the expected amount of effort required by reviewing the effort spent in cases that were pursued to an opening decision or a decision not to raise objections after preliminary investigation. We then assess the potential risks to competition and effect on trade between Member States from an *ex ante* perspective for all cases. Finally, we compare the potential risks to competition and effect on trade between Member States from an *ex ante* perspective to the expected amount of effort required in notifying and assessing the cases.

2.4.1 Effort required as a result of notification and assessment

To estimate the expected effort required to assess a notified case, we start from cases where the Commission proceeded until an opening or no objection decision. In particular, we take into account the average effort spent in notifying and assessing cases that led to such a decision.

For cases that were eventually withdrawn, the actual effort exerted represents only a partial view of the effort required to come to a decision. Thus, for the withdrawn cases, we also balance the *ex ante* risks to competition and effect on trade between Member States with the expected amount of effort that would have been required if the case had not been withdrawn but led to a decision.

2.4.2 Assessment criteria for potential distortions of competition and trade between Member States

Ex ante, key indicators of potential distortions of competition and effect on trade between Member States are the aid budget, market concentration, the competitive strength of the beneficiary, geographic scope of the market and market development.[30] Below, we discuss these indicators in more detail.

1. **How high is the aid budget?** One leading criteria for assessing the potential impact of the aid on competition and effect on trade between Member States is the aid budget. As a first order criterion, we take into account the notification thresholds as defined in paragraph 20 (n) RAG 2014 (see Table 9).

[30] For deriving the assessment criteria we draw upon Oxera (2017, pp. 11-112).

Table 9: Notification thresholds as set out in paragraph 20 (n) RAG 2014

Aid intensity	Notification threshold
10%	EUR 7.5 million
15%	EUR 11.25 million
25%	EUR 18.75 million
35%	EUR 26.25 million
50%	EUR 37.5 million

Source: Paragraph 20 (n) RAG 2014.

Given these notification thresholds, we consider an aid budget as

- **very low** if it lies **below half times the notification threshold** (*e.g.* in case of an aid intensity of 10% if it lies below EUR 3.8 million),
- **low** if it lies above half times the notification threshold and **below the notification threshold** (*e.g.* in case of an aid intensity of 10% if it lies between EUR 3.8 million and EUR 7.5 million),
- **moderate** if it lies above the notification threshold but **below one and a half times the notification threshold** (*e.g.* in case of an aid intensity of 10% if it lies between EUR 7.5 million and EUR 11.3 million),
- **high** if it lies above one and a half times the notification threshold but **below two times the notification threshold** (*e.g.* in case of an aid intensity of 10% if it lies between EUR 11.3 million and EUR 15 million), and
- **very high** if it lies **above two times the notification threshold** (*e.g.* in case of an aid intensity of 10% if it lies above EUR 15 million).

Table 10: Classification of the size of the aid budget in comparison to the notification thresholds set out in paragraph 20 (n) RAG 2014

Aid budget considered as… if it lies…	Maximum aid intensity					
	10%	**15%**	**20%**	**25%**	**35%**	**50%**
very low	< EUR 3.8 m	< EUR 5.6 m	< EUR 7.5 m	< EUR 9.4 m	< EUR 13.1 m	< EUR 18.8 m
low	< EUR 7.5 m	< EUR 11.3 m	< EUR 15 m	< EUR 18.8 m	< EUR 26.3 m	< EUR 37.5 m
moderate	< EUR 11.3 m	< EUR 16.9 m	< EUR 22.5 m	< EUR 28.1 m	< EUR 39.4 m	< EUR 56.3 m
high	< EUR 15 m	< EUR 22.5 m	< EUR 30 m	< EUR 37.5 m	< EUR 52.5 m	< EUR 75 m
very high	> EUR 15 m	> EUR 22.5 m	> EUR 30 m	> EUR 37.5 m	> EUR 52.5 m	> EUR 75 m

Source: Paragraph 20 (n) RAG 2014.

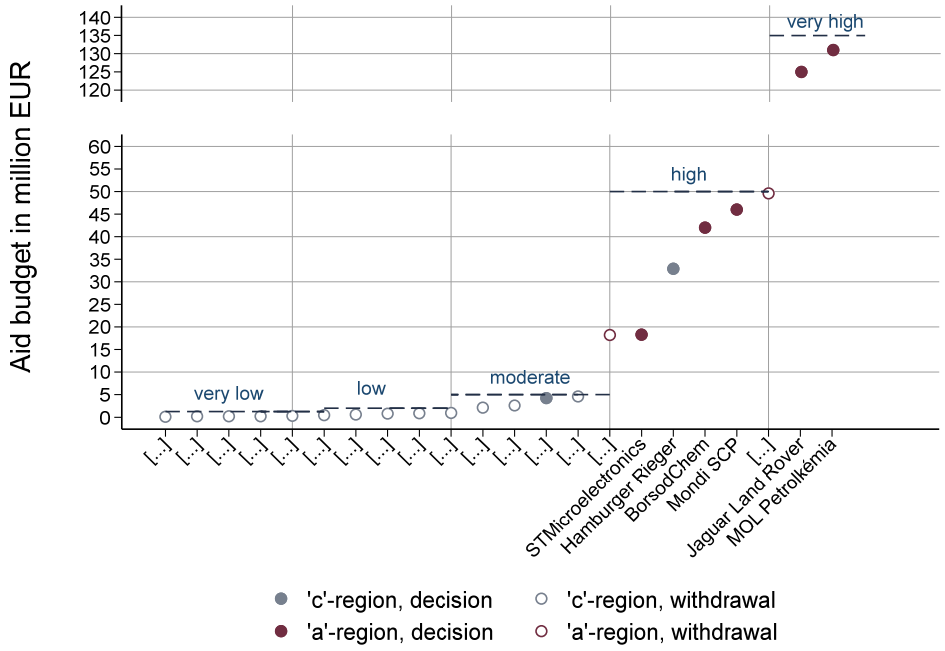
A case with an aid budget that is classified as low or very low can be required to notify for 'c' region cases only, concerning investments to diversify an existing establishment into new products or new process innovations, as these must be notified independent of the aid budget.[31]

As a second order criterion, we compare the aid budget across all cases, regardless of the region being an 'a' or 'c' region and regardless of the maximum aid intensity in that region.

Figure 26 shows the distribution of aid budgets across all 22 reviewed cases, distinguishing between 'a' and 'c' region cases and cases with and without a decision. It can be seen that most cases with relatively low aid budgets were withdrawn. In addition, the cases notified in 'c' regions were mostly for relatively low aid budgets (below EUR 5 million), with the exception being Hamburger Rieger (with an aid budget of approximately EUR 30 million and a maximum aid intensity of 20% in that region).

[31] As clarified in paragraph 24 RAG 2014 "*Investment aid granted to a large undertaking to diversify an existing establishment in a 'c' area into new products, remains subject to the notification obligation pursuant to Article 108(3) of the Treaty.*" As further specified in paragraph 15 RAG 2014: "*Since regional aid to large undertakings for their investments is unlikely to have an incentive effect, it cannot be regarded to be compatible with the internal market under Article 107(3)(c) TFEU, unless it is granted for initial investments that create new economic activities in these areas, or for the diversification of existing establishments into new products or new process innovations.*"

Figure 26: Distribution of aid budgets across all 22 reviewed cases



Source: Own analysis. Note: There is a break in the y-axis between EUR 60 million and EUR 120 million. The x-axis identifies the beneficiary name.

The median annual aid budget across all 22 reviewed cases is EUR 2.4 million. Taking into account the notification thresholds, the median annual aid budget can be considered very low. The median annual aid budget is so low because the share of 'c' region cases among all reviewed cases is high (15 out of 22 reviewed cases). While the median annual aid budget across the 15 reviewed 'c' region cases is EUR 800,000, it is EUR 48.8 million across the seven reviewed 'a' region cases.

Overall, there are just eight cases with aid budgets above the lowest notification threshold of EUR 7.5 million, ranging between EUR 18.2 million and EUR 131 million. Accordingly, when compared to the annual aid budget across all 22 reviewed cases, we consider an annual aid budget between EUR 7.5 million and EUR 35 million as moderate (three cases), between EUR 35 million and EUR 50 million as high (three cases) and above EUR 50 million as very high (two cases).

2. **Is the beneficiary active in a concentrated or oligopolistic product market? What is the beneficiary's product market share? Would the aid strengthen or maintain the market power of the beneficiary?** We expect a competitive advantage to have a larger negative impact on rivals in case the beneficiary is active in a rather concentrated product market and the beneficiary's product market share is relatively high. In this case, rivals are more likely to alter their strategies in response to the aid, which may reduce the efficiency of the market. Furthermore, aid to large firms requires particular scrutiny regarding the potential effects on foreclosure and predation. By contrast, a small, capacity-constrained beneficiary that expands output with the aid may remain below the threshold at which it has power to behave independently of competitive pressures.

3. **Is the beneficiary active in a growing or declining product market?** If the product market in which the beneficiary is operating is a growing market, the additional capacity brought to the market through an aided investment might shift market shares between competitors but not drive competitors that are more efficient out of the market. However, if the market in which the beneficiary is

operating is a declining market, the aid could very well force competitors that are more efficient to exit the market. Thus, in a declining market, the aid has a higher potential to affect competition negatively.

4. **What is geographic scope of the beneficiary's product market?** If the investment project relates to a product market that is national (or narrower) in scope, then the aid is less likely to have an effect on trade between Member States. Otherwise, the presumption is that the investment project will have an effect on intra-EEA trade. The potential impact on competition and trade between Member States is considered lower if the product market is wider than EEA.

2.4.3 Balancing the notification and assessment requirements with potential risks to competition and trade between Member States

We draw the following conclusions with respect to the *ex ante* risk of the notified regional aid negatively affecting competition and trade between Member States to be balanced with the *expected effort* required from the stakeholders in notifying and assessing the case under the RAG 2014.[32]

1. If we find that *ex ante* risk of the (pre-) notified regional aid negatively affecting competition and trade between Member States was likely *low or very low*, we conclude that the expected effort required from the stakeholders in notifying and assessing the case under the RAG 2014 *does not seem to be balanced* with the *ex ante* risks.

2. If we consider the *ex ante* risk of the (pre-) notified regional aid negatively affecting competition and trade between Member States was likely *moderate, high or very high*, we conclude that the expected effort required from the stakeholders involved in notifying and assessing the case under the RAG 2014 *seems to be balanced* with the *ex ante* risks.

   A higher effort could be expected in case of investments by large enterprises in 'c' regions because of the additional requirements of paragraph 15 RAG 2014. Nevertheless, we do not make a distinction because, first, the *ex post* statistics on effort spent in decision cases show that the effort spent anyhow varies quite substantially across cases due to the specifics of each case that usually become known only during the course of the assessment. Second, we consider the required effort in notifying and assessing a case substantial, regardless of whether it concerns an investment by a large enterprise in a 'c' or 'a' region. Hence, in case of a moderate *ex ante* risk to competition and trade, the required effort in notifying and assessing the case should be regarded balanced regardless of whether the investment is made by a large enterprise in a 'c' or 'a' region.

   Because the *ex ante* expected effort in notifying and assessing a case under the RAG 2014 is assumed to be the same for all cases, the determining criterion for assessing the balancing is the *ex ante* risk of the aid negatively affecting competition and trade between Member States. If the *ex ante* risk is assumed to be low or very low, we conclude that the expected effort and *ex ante* risk are unbalanced. If the *ex ante* risk is assumed to be moderate, high or very high, we conclude that the expected effort and *ex ante* risk are balanced.

[32] We take into account the expected effort for reaching a decision and not the actual effort that was spent on a case. That is, we do not judge whether the actual effort spent on a particular case was in balance with the risks to competition and trade or not. Rather we assess whether - given the expected effort - it was right or wrong that certain cases had to be notified and needed assessment.

2.4.4 Reliability of case studies

As all scientific methods, case studies have both advantages and disadvantages. Case studies are said to be an intensive analysis, the purpose of which is to get a picture in all its complexity and with all relevant aspects.

However, case studies focus on particular units only. These units can be of different kinds and must not necessarily be representative. Hence, case studies cannot provide insights into causality or the general picture. This is particularly true when the number of reviewed cases is low.

In addition, the case studies in this report are based primarily on public information and thus some answers to efficiency questions may be incomplete. For example, the answer to question what happened to an investment project in case of withdrawal of an aid notification would be more revealing if it was answered directly by the firms that were seeking to receive the aid.

2.5 EXPERT INTERVIEWS

2.5.1 Process and selection of experts

Five interviews were conducted with experts providing location advice for investors. The total number of experts interviewed is ten, coming from five consultancies: CONWAY, Deloitte, Ernst and Young (EY), FDI Centre and PricewaterhouseCoopers (PwC).

The interviews were based on the guide with questions. Both the guide and the list of contacted experts were approved by the Commission in advance.

The detailed description of each experts' background as well as full transcripts of the interviews can be found in Appendix 3.

2.5.2 Reliability of expert interviews

Interviews allow gathering qualitative information in a conversation with experts on relevant topics. They facilitate a discussion of all aspects and their full complexity. Experts can provide in-depth insights on facts and share their experiences and views.

The drawback is that interviews are skill and time intensive, so that the number of interviewed experts is typically low and the experts are not selected randomly. Thus, an interview may help identifying effects or possible causes, but it not useful to measure the effects or causes nor to get a general picture.

The quality of collected information strongly depends on the skills of the interviewers. They should not suggest or influence answers, stay consistent across interviews, and ensure confidentiality if required. This can be supported by the use of interview guide discussed in advance of the interviews.

3. LITERATURE REVIEW

The purpose of this section is to present the existing relevant literature on the legal and political context of the RAG 2014, enterprise investment and location decision making, global mobile investment trends, attractiveness of the EU for mobile investments, and relocation/delocalisation trends. This literature has been previously reviewed by Combes and Yepersele in 2012. The authors examined from both a theoretical and empirical point of view, the extent to which regional policy can reduce the disparities in economic activity between regions belonging to an integrated trade area, such as the EU.[33] Given the review of Combes and Yepersele published in 2012, this assessment focuses on the most recent studies published after 2011.

The first subsection reviews papers that describe and elaborate the underlying economic and legal principles of the RAG 2014. A number of these papers have focused on the significant changes that the RAG 2014 introduced in terms of the treatment of large investment projects (Junginger-Dittel 2014, Todino and Zanazzo 2013, Wishlade 2013, and Friederiszick and Tosini 2013). Another focal point has been the stricter requirements as regards the criterion for incentive effect (Verouden 2015, and Merola and Donzelli 2014).

The second subsection presents studies on investment incentives and investment location decision making. The robust conclusion that can be drawn from this literature is that the investments and location decisions are primarily driven by investment motives, which subsequently determine which location factors are important. (Carril-Caccia and Pavlova 2018, and EPSON 2020 Cooperation Programme). Independent of the investment motive, many of the studies, however, quote the availability of skilled workforce as one of the main location factors (EPSON 2020 Cooperation Programme, Villaverde and Maza 2015, and Dziemianowicz et al. 2018).

The focus of subsection 3 is the literature that scrutinises investment trends. The overarching observations are that the global FDI is growing after the 2008 depression and the share of emerging market economies (EMEs) in both global outward and global inward FDI is increasing. The share of mergers and acquisitions in total global FDI is also growing and transactions in the service sector continue to dominate the total global FDI. (Carril-Caccia and Pavlova 2018, and EPSON 2020 Cooperation Programme). In terms of FDI towards EU, the share of state-owned companies in the number of acquisitions and their assets has tripled over the past ten years and also foreign investment funds and private equity firms account for an increasing number of acquisitions (Commission document on FDI in the EU).

The literature on the impacts of regional aid on the EU's ability to direct investments to disadvantaged regions of the EU is reviewed in the fourth subsection. The empirical evidence suggests that aid has an impact on the decision making of small and sometimes even medium-sized firms, but there is little evidence that aid would affect the incentives of large firms. (Ramboyer and

[33] Combes and Yepersele (2012) conclude that if the goal of State aid is to reduce disparities among regions via redistributive policies, the policies have to targeted particular regions and particular firms. In particular, one should target regions where some agglomeration already takes place (Devereux et al., 2007); regions that are at the limit of being eligible for aid (Becker et al., 2010); regions that are initially less distressed and sectors in which relocation costs are lower (Mayer et al., 2011); and regions that have a good market access (Briant et al., 2011). Moreover, the authors find that when all the activity is agglomerated out of a region, firms enjoy an agglomeration rent in the other locations and therefore the subsidies needed to relocate industry there is large. Finally, Combes and Yepersele (2012) quote both Criscuolo et al. (2012) and Mayer et al. (2011) who show that small firms are more responsive to subsidies. This is again coherent with the literature showing that large firms can benefit more from economic density making them less willing to move to less dense regions.

Reynaerts 2019, Decramer and Vanormelingen 2016, Martini and Bondonio 2012 and Criscuolo et al. 2019.)

The fifth subsection collects and summarises the content of various studies by national authorities and institutions in six EU Member States. The final subsection concludes by discussing the policy implications that can be drawn from the literature.

Some of the papers reviewed use data that have been generated under the old RAG 2007, or focus on questions that are less relevant in terms of assessing the functionality of the RAG 2014. Nevertheless, these papers are also included in the review in order to provide a holistic view on all available literature related to regional aid and on its functionality therein.

All references can be found in Appendix 1.

3.1 LEGAL AND POLITICAL CONTEXT

After the launch of the State aid Modernisation initiative in 2012 and after the adoption of the RAG 2014 for the period 2014-2020, several papers have been written which analyse the underlying economic and legal principles of the new guidelines and compare them with the previous guidelines. This section provides an overview.

Wishlade (2017) is a very clear, compact but comprehensive presentation of the current regional aid framework and its background. Furthermore, Friederiszick and Merola (2016) provide a detailed description of the regional State aid control in Europe from both a legal and economic perspective. The analysis in the paper extends all the way back to the first comprehensive reform of regional aid in 1998.

Verouden (2015) is a good example of a study with a narrower focus on the RAG 2014. It thoroughly discusses the changes that the State aid modernisation initiative in 2012 brought to the guidelines. Specifically, the paper describes and elaborates on the stricter requirements as regards the incentive effect criterion in the compatibility assessment of aid and in the introduction of an *ex post* evaluation requirement for large aid schemes.

Selected aspects of the RAG 2014 for the period 2014-2020 are analysed from a legal perspective by Merola and Donzelli (2014). They claim that, although the provisions in the guidelines seem to promote administrative efficiency, predictability as well as a refined economic approach, they still maintain some of the system's old weaknesses. Specifically, they argue that under the RAG 2014, the burden of submitting a pre-notification and a notification to the Commission, for both the Member State concerned and the beneficiary is likely to increase: due to the removal of market screens, the number of notifications and the number of refined assessments is expected to increase. In addition, the sophistication of the common compatibility criteria in the RAG 2014 (as compared with the criteria for the in-depth assessment of regional aid under the 2009 LIP Guidelines) will render the collection and provision of data even more onerous. In fact, not only will more aid measures be notified and subject to *ex ante* controls, but the *ex post* evaluation will also increase the burden, including at the level of national authorities.

The RAG 2014 introduced major changes to the treatment of large investment projects. As a result, it is hardly surprising that several papers have focused on reflecting and elaborating these changes (*e.g.*, Junginger-Dittel 2014, Todino and Zanazzo 2013, and Wishlade 2013). In addition, Friederiszick and Tosini (2013) study all large investment projects notified under the RAG 2007 with the goal of assessing whether the market screens applied under those guidelines were appropriate or effective. The authors find that these screens manage to identify

problematic cases – *i.e.* cases with a below average expected aid effectiveness and aid measures targeting specific industries. However, the authors also find that the market screens were affected by a severe implementation problem and, hence, did not help to shorten phase I investigations.

Along with academic papers, the evaluation reports prepared for the Commission provide valuable background information, and typically have a broad focus. A good example of such studies is the evaluation report of the RAG 2007 by Ramboll and Matrix from 2012, which was solely based on case studies. Also based on case studies is the report by Oxera (2017), which develops an analytical framework for the *ex post* assessment of the effect of State aid on competition. This framework is then used in four different case studies, where only one specifically involves specifically regional aid. Based on the case studies Oxera concludes that the impact of the aid may vary according to the relative amount of the aid, the breadth of the aid, and frequency of the aid. Given the narrow methodological approach (a selection of case studies), a generalisation of these results is difficult.

3.2 ENTERPRISE INVESTMENT LOCATION DECISIONS

This subsection focuses on the literature that discusses the location decision making of firms from global, European and regional perspectives. At the high level, the literature is unanimous in that the location decision-making of a firm is ultimately driven by the investment motive. The investment motive determines the factors, such as availability of workforce or infrastructure, which the firm then takes into account when deciding which region to locate.

3.2.1 Global perspective

Carril-Caccia and Pavlova (2018) suggest that investments and location decisions are driven by four major motives: (i) access to promising new markets; (ii) access to new, complementary resources and capabilities; (iii) access to natural resources; and (iv) efficiency gains. The latter may be driven by lower labour costs or higher productivity. As to factors attracting or deterring investment irrespective of their motives, the authors list both institutional quality and macroeconomic stability.

Carril-Caccia and Pavlova (2018) further argue that MNEs from emerging economies (EMNEs) and MNEs from advanced economies might have different motives for undertaking FDI. Emerging countries' MNEs seek to acquire technology and managerial skills and to access highly qualified labour. Moreover, if natural resources are concerned, EMNEs appear to be more willing to operate in host countries with low institutional quality than MNEs from advanced economies.

Lastly, Carril-Caccia and Pavlova (2018) comment that whilst FDI and exports are often seen as substitutes, they should actually be considered as complements. That is, MNEs often complement their exports by owning subsidiaries abroad. The authors provide three possible explanations for this. First, by means of vertical FDI, MNEs distribute and optimise their production across borders. Second, FDI can also serve as a tool for enhancing the market penetration of exports. Third, MNEs also invest abroad in order to supply the host country and third countries directly with their products. For a formal model of the first mentioned effect, see Krautheim, 2013.

In a recent article Davies et al. (2018) consider how the factors affecting greenfield investments differ from those affecting mergers and acquisitions. By analysing a large transaction level dataset from both the US and Europe, the authors find, on the one hand, that mergers and acquisitions are more affected by geographic and cultural barriers and are more sensitive than greenfield

investments to short-term changes, such as a currency crisis. On the other hand, greenfield investments are more driven by long-term factors, such as origin-country technological and institutional development or comparative advantage. According to the authors, these empirical facts are consistent with the facts that mergers and acquisitions involve transfer of ownership for integration or arbitrage reasons while greenfield investments rely on firms own capacities, which are linked to the origin countries attributes.

Corcoran and Gillanders (2015) examine the effect that a country's business regulatory environment has on FDI, focusing on the 2004-2009 period. The authors use the World Bank's "Ease of Doing Business" - ranking to capture the costs that firms face when operating in a country. They find that the Doing Business rank affects the FDI the country receives, but there is evidence that this is driven by the trade rank component, which is a proxy for trade costs. This relationship is particularly strong for middle income countries, but not for the world's poorest region, Sub-Saharan Africa, or for the OECD. Overall, in terms of the total FDI that a country attracts, the country's ease of trading across borders seems to matter. However, US FDI also responds also to the business environment that a country finds itself in.

3.2.2 European perspective

Two scientific reports on the drivers of intra and extra-European FDI have been published within the framework of the ESPON 2020 Cooperation Programme, partly financed by the European Regional Development Fund. Both of these reports are from 2018.

According to these reports, different investors, independently of whether they are European or not, place emphasis on various location factors, depending on their motive for undertaking FDI. Investors motivated by market access value different factors than those seeking access to certain resources or special competences. The report groups the various factors to policy FDI drivers and fundamental FDI drivers. The former group includes regional drivers that can be influenced by policy in the short to medium term, while the latter group includes drivers that are difficult for policy makers to influence within this timeframe.

For both policy and fundamental FDI drivers, those that help attract investors from other European countries are the same as the ones attracting investors from outside Europe. The policy FDI drivers listed in the report include strong industry clusters, labour abundance, a higher share of the workforce with a tertiary education, good accessibility, and a high level of innovation. The fundamental FDI drivers are FDI concentration, population density and market size, while border regions and the dominance of incumbent firms deter investors. Regarding financial investment incentives, the authors conclude that regions that allow for the use of these incentives are more likely to host both European and non-European owned firms. It is important to note, however, that the result is only indicative, as the Study does not analyse or take into account the extent to which such investment incentives are actually used.

Jones et al. (2018) study the impacts of the fifth EU enlargement on the FDI in Europe. In particular, they focus on the effects of border costs on FDI location. They count data for 35,105 FDI projects located in 25 European countries over the period 1997-2010. The paper finds that EU membership had a substantial effect on the FDI in the Central and Eastern European Countries, more than doubling the number of the projects locating in these countries compared to before the commencement of the accession negotiations. The FDI effect varies with the liberalisation of a country, so that the increase in FDI location is three-times greater for the more-liberalised Central and Eastern European Countries. However, the net effect of FDI location for the EU is much smaller as 60% of the

projects in the Central and Eastern European Countries at membership were diverted from the "old" EU.

In an earlier paper, Jones et al. (2014) compare the motives for FDI in the "old" versus "new" EU. In particular, the paper examines three main motives for FDI: market-seeking, resource-seeking and efficiency-seeking through economies of scale, which is captured by expansionary investment. The Study uses data on cross-border investment projects that were implemented in the EU between 1997 and 2010. According to the results, investment in the "old" EU is predominantly resource-seeking, whereas in the "new" EU it is market-seeking as well as access to the European Single Market. On the third motive, the results show that the expansions are subject to market-access and resource-seeking motives and therefore, are not simply about seeking efficiency by adding scale to existing operations.

Finally, Villaverde and Maza (2015) study the determinants of inward FDI in the 260 EU NUTS 2 regions between 2000 and 2006. The authors find that economic potential, labour market characteristics, technological progress and competitiveness exert a significant impact on FDI location patterns. By contrast, the role of market size and labour regulation is minor.

3.2.3 Regional perspective

Moving to studies with a more specific regional focus, Dziemianowicz et al. (2018) consider the influence of selected location factors on the changes in the number of incoming foreign companies in Polish NUTS 5 level regions between 2008 and 2014. Their specific focus is on factors that local authorities can control. They show that only a few such factors have an impact on the firms' location decision. Amongst the few, the researches list agglomeration as measured by the concentration of a combination of diverse high-quality services and traits important to entrepreneurs and residents. The other two important factors are supra-local cooperation in terms of relationships with supra-local centres of growth, and labour markets.

Jirásková (2013) scrutinises which soft location factors are important in attracting FDI in service versus manufacturing sectors in the Czech Republic. She finds that the availability of information and communication technologies as well as the image of the region are more important for the service than for the manufacturing sector. By contrast, cooperation with the government, availability and quality of research facilities, the quality of employment offices, as well as tradition and history of the locality are more important for manufacturing than for service sector. Factors such as the presence of foreign companies, economic situation of the region, leisure time opportunities or quality of the area are equally important to both sectors.

Blomkvist and Rian (2016) focus instead on Chinese outward FDI in Europe. They find that the main motives for Chinese investment in Europe are market-seeking and strategic asset-seeking. Moreover, there are large differences amongst European countries in attracting Chinese investments. This latter argument is also brought up by Clegg and Voss (2012) who argue that the commercial EU China FDI relationship is foremost a relationship between individual Member States and China. They provide evidence that the intensity of business relations between individual States and China stimulates Chinese investment. Clegg and Voss (2012) also point out that investment promotion agencies in the Member States perform an important facilitation function, reducing the information and transaction costs to Chinese inward investors. The existence of investment promotion bodies at the sub-national level testifies to the importance attached to inward investment and to the willingness to commit resources to attract it.

Amighini et al. (2013) study how the host country determinants of Chinese outward direct investments differ between state-owned and privately-owned firms. According to the results, private firms are attracted by large markets and host country strategic assets and are averse to economic and political risks when choosing investment locations abroad. Whereas, state-owned or controlled enterprises follow the strategic needs of their home country and invest more in natural resource sectors, being largely indifferent to the political and economic conditions in the host countries.

De Beule and Den Bulcke (2012) consider the location determinants of Chinese and Indian greenfield investments. They show that Chinese and Indian multinational companies prefer large open markets, which are similar to their own in terms of GDP per capita, political environment and regulatory environment. However, while patents seem to attract Chinese investors, Indian investors target less innovative markets, although investors from both countries seek to avoid highly competitive environments in terms of trademarks.

3.3 INVESTMENT TRENDS

This subsection reviews the literature on investment trends. Overall, the total FDI is growing after the decline during the Great Recession and the share of EMEs in both global outward FDI and global inward FDI is growing. The share of mergers and acquisitions in total global FDI is also growing and in terms of sectors, the transactions in the service sector continue to dominate the total global FDI.

Carril-Caccia and Pavlova (2018) report that between 2000 and 2016, the share of FDI stock in global GDP increased from 22% to 35%. Moreover, since the beginning of the 2000s, EMEs have gained prominence both as a source of and as a destination for FDI (see also E&Y 2016). Until the beginning of the Great Recession, almost 90% of outward FDI flows came from advanced economies. However, by 2014 EMEs represented 41% of global outward FDI. Similarly, for inwards FDI, while advanced economies attracted between 60% and 70% of total inward FDI flows prior to the Great Depression, by 2014 the share of EMEs was 56%.

The authors also find that the share of mergers and acquisitions out of the total FDI is growing, particularly in advanced economies. In 2016, both in EU and in the other advanced economies, mergers and acquisitions made up to around 80% of total inward FDI flows. Furthermore, the total global FDI is also dominated by a relatively small number of very large deals. In 2016, nearly 21,000 FDI projects took place, with a volume of almost USD 1.8 trillion. Out of these projects, 215 merger and acquisition deals accounted for 55% of the total volume.

Carril-Caccia and Pavlova (2018) also find that the sectoral distribution of FDI has remained fairly constant between 2003 and 2016 and during this period, 70% of international mergers and acquisitions were in the services sector, followed by manufacturing (24%) and the primary sector (6%). In the case of greenfield investments, the distribution between services and manufacturing was 50.4% and 48.2% respectively, while the primary sector lagged far behind.

Focusing specifically on FDI in EU, Carril-Caccia and Pavlova (2018) state that both inward and outward FDI towards and from the EU decreased after 2007, though they have somewhat rebounded since 2015. In addition, intra-euro area FDI plunged in 2012. For non-euro area EU economies, this trend has been even more severe: in 2008, eurozone countries accounted for 70% of total inward FDI into non-eurozone EU countries, but by 2014 that share had fallen to 50%. As like for the rest of the world, the share of FDI from EMEs has significantly increased since 2008 (especially in the euro area), with the top three investors being China, Singapore and Brazil. FDI from EMEs into the EU is mostly driven by a desire to access EU markets and to acquire technologies and brands.

A report from the ESPON 2020 Cooperation Programme finds that the UK, Germany and the Netherlands are the main destinations for extra-European FDI due to their light tax regime. Also Luxembourg and Cyprus receive large FDI inflows. However, in general, there is a clear tendency for FDI to flow to large countries.

The ESPON 2020 Cooperation Programme report also states that the mature economies in the EU15 accounted for around 82% of total extra-European FDI towards Europe during 2003-2015, irrespective of whether FDI is measured in value or in number of projects. Mergers and acquisitions accounted for more than 70% of the total value of FDI inflows towards Europe during 2003-2015, and the pattern of mergers and acquisitions across regions thus resemble to a large extent, the pattern of total FDI. Most notably, mergers and acquisitions mainly take place in urban, capital city metropolitan regions and more developed regions. Greenfield investments account for the remaining 30% and they are more evenly spread out across different territorial groups of regions.

In terms of sectors, the ESPON 2020 Cooperation Programme report clarifies that FDI in the service sector is more concentrated in the urban, capital city metropolitan, and more developed regions. FDI in the manufacturing sectors is more evenly spread out across regions.

According to the 2019 Commission document on FDI in the EU, there has been a continuous rise in foreign ownership over the last ten years, which was mostly due to acquisitions of increasingly large, listed companies. In terms of countries of origin, the advanced economies such as the US, Switzerland, Norway, Canada, Australia, Japan, remain well ahead and still control more than 80% of all foreign-owned assets. However, there is a clear trend in terms of emergence of "new investors" and an increase in the diversity of countries of origin, with China standing out in terms of number of recent acquisitions.

Related to the FDI from emerging economies, the Commission document states that those are typically concentrated in a much more limited number of sectors. However, in a number of subsectors, emerging economies are becoming increasingly visible. Moreover, the so-called "offshore investors" control 11% of foreign-owned EU companies and a significant share of foreign-owned assets (4%) in the EU.

The document also points out that foreign ownership is remarkably high in a number of sectors that are at the heart of the EU economy, such as oil refining (67% of total assets of the sector), pharmaceuticals (56%), electronic and optical products (54%), insurance (45%) or electrical equipment (39%). While state-owned companies represent only a small proportion of foreign acquisitions, their share in the number of acquisitions and their assets have grown rapidly over the last years. Russia, China and the United Arab Emirates stand out in this respect with 18 acquisitions in 2017, three times more than in 2007. Another noticeable development is the "financialisation" of FDI, in the sense of foreign investment funds and private equity firms accounting for an increasing number of acquisitions. This segment is heavily dominated by the US, followed by the Cayman Islands and Switzerland. Finally, a rise of individuals as ultimate owners in an increasing number of acquisitions is also found. These hold mainly Swiss, US, Russian, Norwegian and Chinese passports. Although these represent only 5% of the total number of deals, between 2007 and 2017, the number of acquisitions involving individuals or families has increased from 31 to 197.

3.4 THE IMPACT OF REGIONAL AID ON THE EU'S ABILITY TO DIRECTLY INVEST IN DISADVANTAGED REGIONS OF THE EU

This subsection reviews the literature that has focused on estimating the impacts of regional aid in the EU.[34] The empirical results seem to suggest that aid has an impact on the incentives of small and sometimes even medium-sized firms, but there is little evidence that aid would affect the incentives of large firms.

Ramboer and Reynaerts (2019) study the effectiveness of Flanders' main industrial policy programme on small and medium-sized enterprises, aiming to support economic development in lagging municipalities. The data used for the estimation range from 1994 to 2007, thus covering two regional aid framework periods. The authors find strong evidence for a 10% effect on manufacturing employment, largely explained by jobs safeguarded in declining industries. However, they do not find evidence that the aid has positive impact on company creation or demand for blue collar workers.

Decramer and Vanormelingen (2016) also study the impacts of this same programme from 2004 to 2009. They find a positive effect on firm-level investment, employment, output and productivity for the companies that were granted the subsidy, but only for small companies. However, the effect is small relative to the cost of the subsidy, which was estimated to equal to EUR 500,000 per job across all undertakings that received the aid.

Another recent paper by Brachert et al. (2018) uses company-level data to study the effects of the single largest investment subsidy programme in Germany. They consider grants allocated to undertakings in East German regions over the period 2007 to 2013. The authors find positive short- and medium- term effects on company employment and the effects on company turnover remain significant and positive only in the medium-term. Gross fixed capital formation responds positively to the program funding only during the mean implementation period of the projects but becomes insignificant afterwards. Finally, the effect of the program funding on labour productivity remains insignificant throughout the whole period of their analysis.

Bondonio and Greenbaum (2014), also use company-level data to estimate the impacts of the European Regional Development Fund ("ERDF") and co-sponsored, national and regional programs on employment. The dataset is from Northern Italy and covers the years between 2000 and 2003. The authors find no significant difference between the employment impacts of ERDF co-funded and national or regional programs. Whereas, regardless of the funding body, the absolute per-undertaking employment effects of the programs are increasingly larger the higher the economic value of the incentives. Interestingly, the results indicate that the most generous incentives come with a much higher cost per each additional new job. Moreover, the absolute per- undertaking employment effects of soft loans are similar to those of capital grants, but, because soft loans cost much less, they are more effective from a policy perspective.

Instead of direct grants, Ambroziak (2016) studies the impacts of income tax exemptions on the social and economic development in Special Economic Zones ("SEZs") in Poland. The data range from 2005 to 2013. They find that regional State aid in the form of an income tax exemption was of a relatively higher importance to the poorest regions, while its significance was much lower in better developed areas in Poland. Moreover, the intensity of regional State aid granted to entrepreneurs in SEZs had a positive influence on the social and economic development of the poorest and sometimes less developed regions in Poland,

[34] Economic policies targeted at particular regions serve equity-efficiency trade-offs. Kline and Moretti (2014) illustrate this formally in a simple theoretical spatial equilibrium framework, which is useful in understanding the effects of regional policies on national and regional welfare in the presence of worker and firm mobility.

while the more developed regions with SEZs did not record better or much better results compared to regions without SEZs.

In the Final Report to DG Regional Policy, Martini and Bondonio (2012) evaluate the impacts and cost-effectiveness of enterprise support policies in Italy. First, they focus on the role of the geographic level at which the aid is granted. In particular, they use data from a program conducted at the national level (Law 488/92), within which non-repayable grants of the order of over EUR 400,000 are granted. This dataset covers years from 2000 to 2004. At the regional level, the focus is on a single Italian region (Piemonte) in which 25 different investment support measures are available to SMEs. The value of the support is on average EUR 10,000 and the dataset ranges from 2005 to 2009. The researchers find that the regional level program is always clearly more cost effective than the national level program in terms of jobs created, extra sales, and investment.

Second, Martini and Bondonio (2012) study how the impacts of the aid vary by policy instruments. They show that soft loans and interest rate subsidies are more cost-effective in creating employment and promoting additional sales than non-repayable capital grants. For investment outcomes, results are suggestive of a better cost-effectiveness for repayable subsidies. Yet, due to the fact that investment data are only available for corporate SMEs, the small sample size makes the differences in the impacts not statistically significant.

Third, the authors focus on the impact of the economic value of the grant. They find that the cost per job created increases steadily with the size of the grants up to the threshold of the fourth quartile (about EUR 500,000) after which it increases dramatically. Sales impact estimates display a pattern very similar to employment. Estimates on the aid impact on investment do not yield conclusive findings because balance sheet data were available only for corporate companies, sharply decreasing the sample size.

Fourth, the researchers ask how the impact of aid varies by the companies' size. They find a robust result according to which the impact was consistent and significant for micro companies, small companies and medium companies, but not for large companies where the impact was insignificant or negative. For each of the variables examined (employment, sales and investment) the impact was similar across the first three classes – it is only for large companies that the impact disappears.

Finally, the authors address the question of how the impact varies by North-South location and between manufacturing and services. They discover that for micro and small companies the impact of aid on employment is not statistically different between Northern-Central and Southern Italy. For medium and large companies, instead, the impact of aid on employment is either negative or not statistically different from zero in Southern Italy, while it is positive in Northern-Central Italy. The cost of generating each additional euro of sales is 2.5 and 4.5 times higher in Southern Italy than in Northern-Central Italy for all sizes of the assisted firms. For investment outcomes, finally, the differential cost of generating each additional euro of investment between Northern-Central and Southern Italy is either not statistically different or slightly higher in Northern-Central Italy.

Cerqua and Pellegrini (2014) also examine the effects of Law 488/92, the main Italian regional policy, on employment, investment, turnover and productivity. In addition, they address the question of whether the aid crowds out private investment. They find robust evidence of a positive and statistically significant impact of the aid on employment, investment, and turnover. Yet, the effect on productivity is mostly negligible. The new subsidised capital is additional but non-complementary with the owner-financed investment.

In another paper from 2017, Cerqua and Pellegrini use Law 488/92 to study agglomeration effects. Here their analysis refers to the period of 1995–2001. The findings show that the impact on investments, turnover and employment is positive and large, but it is negative on total factor productivity ("TFP"). However, the employment growth is partially determined to the detriment of the companies which have not received aid. The presence of a modest spatial crowding out, where subsidized regions attract employment from neighbouring areas is also reported in De Castris and Pellegrini (2012).

Moving to studies that focus on maximum aid ceilings, Criscuolo et al. (2019) study the impacts of area's maximum investment subsidy on manufacturing employment. In particular, the authors study the period between 1997 and 2004 during which the Regional Selective Assistance (RSA) program was the main business support scheme in Great Britain. The authors find areas eligible for higher subsidies significantly increase manufacturing jobs and reduce unemployment. An exogenous ten-percentage point increase in an area's maximum investment subsidy stimulates about a 10% increase in manufacturing employment. This effect, however, exists only for small undertakings, large companies appear to accept subsidies without increasing activity. Moreover, the authors find positive effects on investment and employment for incumbent firms but no effect on TFP.

Ambroziak (2015) looks at the impacts of changes in maximum aid intensities in the Visegrad Group Countries that is, Czech Republic, Hungary, Poland and Slovakia, after their accession to the EU. Based on descriptive statistics and linear correlations, Ambroziak does not find a clear connection between maximum aid intensities and changes in unemployment rate, and the ratio of GDP per capita to the EU average. Podsiadlo (2016) also studies the linear relationship between the expenditures on aid and GDP per capita and finds statistically significant correlation between two of six out of 28 EU Member States.[35]

The results from this subsection suggest that the regional aid in the EU has had a positive effect on the incentives of small and sometimes even medium-sized companies, but little effect on the incentives of large companies. This is in contrast with the results obtained in a study from the US by Slattery (2019), who finds empirical evidence that states use subsidies to help large firms to internalise the positive spillovers they have on the states. In particular, the positive spillovers, in the form of the number of indirect jobs created by large companies, would have decreased by 32% had the incentive spending to them been eliminated. However, this difference may be driven by the fact that neither the granting nor the magnitudes of the subsidies are regulated in the US as they are in the EU. Given the weak regulation, it is not surprising that based on 30 different studies from the US, Bartik (2018a) concludes that for at least 75% of the incentivised undertakings, the undertakings would have made similar investment decisions without the aid.

It also seems that regional aid has had an impact on employment, particularly on the manufacturing sector. This is in line with the results from a simulation model of incentives by Bartik (2018b), which was calibrated using US data. According to the results, the increased employment rates and wages due to local job creation are distributed progressively: the bottom three income quintiles have a percentage gain in income of about three times that of the top two income quintiles.

[35] For descriptive study on how the RAF 2014 has affected the attractiveness of Polish regions to investors, see Ambroziak (2014). For a descriptive study on the impacts of regional aid on the created jobs in Slovak Republic, see Fabus and Csabay (2018).

3.5 STUDIES BY NATIONAL AUTHORITIES AND INSTITUTIONS

This subsection summarises the content of the studies made by national authorities and institutions in six EU Member States. The institutions that conduct these studies, the scope and depth of the studies as well as the research topics covered vary a lot between these countries.

3.5.1 Germany

The ifo Institut in Dresden published two studies on regional State aid. The study "*Optionen einer Weiterentwicklung der Indikatorik für die von der EU abgegrenzten Regionalfördergebiete nach 2020*", ordered by the German Ministry of Economics in 2017, considers the future regional aid maps for Germany in the light of economic development in the EU and Brexit. Under the current rules for eligibility maps only 18.8% of German population will be living in eligible areas in the next funding period. To increase this share, the study proposes changes in the methodology to identify the socioeconomic criteria for non-predefined 'c' areas, *e.g.* higher population threshold level, increased weights of GDP per capita and unemployment rate, national averages instead of EU averages.

The study "*Strategien für die bestmögliche Ausstattung mit und Nutzung von Fördermitteln nach 2020*" from 2018 notes that there is a gap between the regional needs for support and the subsidies offered and suggests the use of additional socioeconomic criteria in determining the non-predefined 'c' areas, *e.g.* the share of elderly population or the age of workforce. The Ministry of economy in the Free State of Thuringia also ordered a study analysing the current use of State aid for the regional development and developing general suggestions for the next funding period, which would benefit Thuringia.[36] These include the simplification of State aid rules.

3.5.2 Italy

In 2016, the Prime Minister's Office published two reports that discuss the allocation of resources during the RAF 2007 and how the allocation could be improved in the future. The reports stress that the main issue during the RAF 2007 was not the shortage of financial resources but the way in which they were used. In particular, one main problem was that an important part of the allocated resources was not made available because of delays and bureaucratic difficulties. For this reason, the reports place particular emphasis on the rapid transition between "funds allocated" to "funds available for immediate investment."

In 2016, the Interministerial Committee on Economic Planning published a resolution on allocating resources to a region. In the resolution, it is established that resources should be transferred to the administrations responsible for the interventions by means of advances equal to 10%, interim payments up to 85% and final balance of 5% of the amount allocated for each operation. The resources allocated are recalled if no legally significant obligations are undertaken by 31 December 2019. Moreover, in the twelve months following the closure of each intervention, the authority responsible for the intervention has to submit an evaluation on the effectiveness of the aid.

[36] Evaluation of the use of funds within the framework of the joint task "Improvement of the regional economic structure" (GRW) in Thuringia for the period 2011 - 2016. Commissioned by the Thuringian Ministry for Economic Affairs, Science and Digital SocietyBrachert, Matthias; Brautzsch, Hans-Ulrich; Dettmann, Eva; Giebler, Alexander; Haug, Peter; Heimpold, Gerhard; Meyborg, Mirja; Schnabl, Esther; Schneider, Lutz; Stahlecker, Thomas; Titze, Mirko; Zenker, Andrea. December 2017.

3.5.3 Netherlands

The Dutch national government published an interdepartmental policy report on subsidies in 2017.[37] The report deals extensively with *ex ante* and *ex post* evaluations, although it does not focus on any particular subsidy scheme or set of rules specifically. On *ex ante* evaluations, the study finds that departments have built in checks and balances that ensure that multiple parties deliberate on a potential subsidy. However, an *ex ante* analysis of the effectiveness and efficiency of the subsidy is usually not conducted. Concerning *ex post* evaluations, the study concludes that the extent to which subsidies are evaluated *ex post* has increased substantially in the period 2012–2015 but that about 25 or 30% of subsidies are not evaluated. The study also finds that most *ex post* evaluations do not make statements about the effectiveness and efficiency of the subsidy. The report makes several policy recommendations. These include, but are not limited to: make the implications for individual subsidies more explicit when evaluating subsidies more broadly (*e.g.*, a subsidy policy or framework law); publish all subsidy evaluations on a central website; build dedicated expertise and share it between departments; ensure selection of high-quality external evaluators; introduce 'another pair of eyes' principle for *ex ante* evaluations; create guidelines for *ex ante* evaluations; and differentiate extent of *ex post* evaluations by subsidy amount.

A mid-term evaluation of regional investment aid in Groningen was conducted in 2017.[38] The report is not freely accessible, but the accompanying news article reports that the evaluation is positive about the limited administrative load and the available support from the Groningen and national governments. It also claims that EUR 10 million in regional investment aid has generated 410 direct and indirect jobs in the region, but it is not clear what the counterfactual scenario considered is.

An evaluation in 2018 of regional aid in Drenthe granted the year before, including regional investment aid,[39] recommends focusing the regional investment-aid scheme more strongly on SMEs. The evaluation is based primarily on stakeholder interviews and previous relevant reports. Amongst other things, it suggests limiting the scheme's maximum subsidy amount and intensity for large companies further, but not excluding large companies altogether. This is based on the interviewees' opinion that too large a share of the 2017 subsidies was granted to large enterprises, while subsidies are thought to have less influence on large companies' decisions. The interviewees nevertheless did not favour excluding large enterprises entirely. The study also suggests decreasing the minimum investment threshold for which SMEs can apply for subsidies.

3.5.4 Poland

The Polish Competition Authority has been publishing reports including detailed information about regional State aid since 1996.[40] Combining the information from these reports, it is possible to follow the time development of regional State aid in Poland in several categories. The following figure shows the development by the type of aid granting authority.

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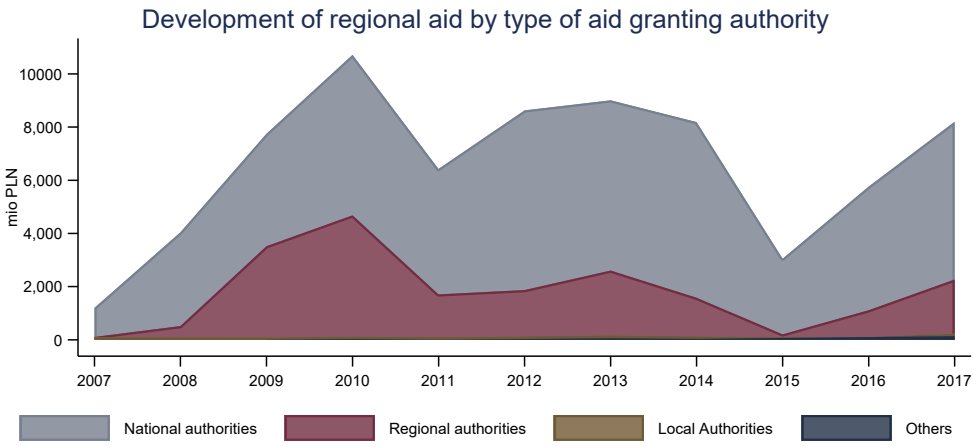
[37] 'IBO Subsidies: Robuust en proportioneel'. Ministerie van Financiën (2017). http://www.rijksbegroting.nl/system/files/12/rapport-ibo-subsidies.pdf, accessed on 27/06/2019.

[38] 'Regionale Investeringssteun Groningen zorgt voor ruim 400 banen'. Decisio (2017). https://decisio.nl/nieuwsblog/2017/regionale-investeringssteun-groningen-zorgt-voor-banen, accessed on 27/06/2019.

[39] Evaluatie Bedrijvenregeling Vierkant voor Werk (BRVvW) 2017. PNO Ondernemingen B.V (2018). https://www.gemeenteraademmen.nl/brieven-aan-de-raad/brieven-college/brieven-controller/Documents/brieven-actie/download/brieven-document/46023.html, accessed on 27/06/2019.

[40] https://www.uokik.gov.pl/raporty_i_analizy2.php, accessed on 7/6/2019.

Figure 27: Development of regional aid by type of aid granting authority



Source: E.CA Economics based on The Office of Competition and Consumer Protection (UOKiK) - Poland

National Authorities: ARP, Bank Gospodarstwa Krajowego, Bank Ochrony Środowiska, Dyrektor Instytutu Nafty i Gazu
Dyrektor Władzy Wdrażającej Programy Europejskie, Minister Gospodarki, Minister Rozwoju, Minister Skarbu Państwa, NFOŚIGW
Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej, Organy podatkowe, Organy skarbowe i celne
Polska Organizacja Turystyczna, Prezes Polskiej Agencji Rozwoju Przedsiębiorczości
Prezes Zarządu Narodowego Funduszu Ochrony Środowiska i Gospodarki Wodnej

Regional Authorities: Beneficjenci regionalnych programów operacyjnych niebędący j.s.t., Marszałkowie województw
Prezesi Zarządów Wojewódzkich Funduszy Ochrony Środowiska i Gospodarki Wodnej, Regionalne Instytucje Finansujące
WFOŚIGW, Wojewódzkie Fundusze Ochrony Środowiska i Gospodarki Wodnej

Local Authorities: Prezydenci i burmistrzowie miast oraz wójtowie gmin, Prezydenci, burmistrzowie oraz wójtowie gmin, Starostowie powiatów

Others: Pozostałe podmioty udzielające pomocy, Przedsiębiorcy, Władza Wdrażająca Programy Europejskie

According to this data, it is mainly national and regional authorities who grant regional State aid in Poland. The national authorities have a larger share in most of the years, up to 100% in 2015. The national authorities are ministries of national government, agencies for promotion of regional development, tax authorities and State owned banks.

3.5.5 Spain

Boscá et al. (2016) study the impacts of FEDER[41] funds granted between 2014 and 2020 on both economic and employment growth. They estimate an increase of the GDP equal to EUR 26 billion in 2020 as a consequence from the funds, as well as 240,000 jobs created during those years. The increase in GDP and the creation of employment is likely higher in the areas with stronger economic downturn.

A presentation by DYRECTO consultores (2014) considers the incentive effect of FEDER funds. According to the presentation, between January and August 2014, 69 projects had been granted regional aid, out of which 61 took place in industry and 8 were related to tourism. The total value of the investments is predicted to equal EUR 1,207 million and the objective is to create 1,465 jobs. During the same time period, the value of subsidies granted by the Ministry of Finance (Ministerio de Hacienda) was 82% of the total value of subsidies granted in 2013, and almost double of the value of subsidies granted in 2012. Valencia, Extremadura and Murcia were the regions that were granted the highest amount of subsidies in absolute terms. Finally, out of the 8 investment projects that were related to tourisms, 50% of the investment funds were used on modernisation of hotels.

[41] Fondo Europeo de Desarrollo Regional.

3.5.6 Czech Republic

The Czech Ministry of Industry and Trade published a mid-term evaluation report for its investment incentives scheme under GBER "Investment incentives in the Czech Republic" in September 2018.[42] The report used several evaluation methods: comparison of characteristics and output indicators for firms who were supported by investment incentives and non-beneficiaries, counterfactual analysis and case studies. It provides statistics on the development and distribution of State aid spent, effects on job creation, value-added and labour productivity overall and compared to the control group. The report comes to the following conclusions. Compulsory job creation is mentioned as the requirement hindering companies from applying for State aid, since the available pool of labour in the Czech Republic has been reduced strongly in recent years. The scheme is designed for manufacturing investments and is difficult to use for innovation, it could be improved by better addressing high value-added activities. The process of aid granting is transparent and works well for firms. Based on counterfactual analysis, positive effects of investment State aid on the number of jobs and value added were calculated, while no effect on labour productivity was found.

3.6 CONCLUSIONS

The economic literature appears unanimous in that, a priori, companies' investment decisions are driven by the investment motives, which vary from market or a resource access to efficiency gains. Depending on the motive, the significance of different location factors is underlined. (Carril-Caccia and Pavlova 2018, and EPSON 2020 Cooperation Programme 2018a and 2018b.) However, irrespective of the motive or industry in question, many studies quote the availability of skilled labour force as a factor to which undertakings firms always pay attention. (EPSON 2020 Cooperation Programme 2018, Villaverde and Maza 2015, Jirásková 2013, and Dziemianowicz et al. 2018).

After the 2008 recession, the global FDI has been growing and the share of EMES in both global outward FDI and global inward FDI is growing. The share of mergers and acquisitions in total global FDI has also grown and the transactions in the service sector have continued to dominate the total global FDI. (Carril-Caccia and Pavlova 2018, EPSON 2020 Cooperation Programme, and Commission document on FI in the EU)

The empirical evidence on the impact of regional aid is mixed. Overall, the evidence points in the direction that regional aid in the form of direct grants is likely to affect the employment and investments of small and sometimes even medium-sized firms. There is little evidence that aid would affect the incentives of large firms. (Ramboyer and Reynaerts 2019, Decramer and Vanormelingen 2016, Martini and Bondonio 2012, and Criscuolo et al. 2019.) However, each of the studies mentioned above has focused only on one region and the data for the studies have been collected during the RAG 2007. Moreover, some of the papers study schemes that are specifically targeted only for SMEs. Yet, the small impact of direct grants on the incentives of large enterprises is in line with the views of many of the interviewed experts, who stated that large firms are less sensitive to direct grants because of their relatively good ability to get credit and are more interested in tax breaks. Unfortunately, there is no research done on the impact of tax exemptions on firms of different sizes.

The evidence on whether State aid can increase productivity is very limited: Decramer and Vanormelingen (2016) find a positive effect on productivity of small companies, but effect is small relative to the cost of the subsidy. Brachert et al.

[42] Available in Czech at https://www.mpo.cz/assets/cz/podnikani/dotace-a-podpora-podnikani/investicni-pobidky-a-prumyslove-zony/investicni-pobidky/2019/3/Hodnotici_zprava_v_polovine_obdobi_final.pdf (accessed on 9 August 2019)

(2018) do not find that the single largest investment subsidy program in Germany would have had any impacts on labour productivity. Likewise, Cerqua and Pellegrini (2014) conclude that the effect of Law 488/92 on productivity was negligible. Finally, Criscuolo et al. (2019) find that maximum aid ceilings do not affect total factor productivity.

The literature suggests that regional State aid has had a positive impact on both employment and investment, at least at the level of SMEs and on the manufacturing sector. Subsequently, at least to some extent, State aid has succeeded in its ultimate goal to promote the economic development of the disadvantaged regions of the EU. To ensure that the development continues, the less developed regions have to move up the value chain to activities with a higher skill, technology and innovation content (Commission 7th report on economic, social and territorial cohesion, 2017).

4. EFFECTIVENESS OF REGIONAL STATE AID

A regional State aid measure is effective when it achieves its planned outcome, which typically is additional investment in a region, directly and indirectly created new jobs, improved local economic development, *etc.* That is the aid must have an incentive effect in attracting investment to a region. These effects are likely to differ for different types of aid programmes.[43]

This chapter assesses the effectiveness of the RAF 2014, in particular by addressing the following questions:

- To what extent has the regional aid framework allowed the aid to have a real incentive effect?
    - What has been the relative importance of regional State aid granted within the current legislative framework for investment location decisions by companies compared to other location factors?
    - Have enterprises taken account of the aid in their financial analysis or did they consider it as a qualitative plus?
    - To what extent do answers to questions a and b differ when analysed by sector, enterprise size (SMEs and LE), investment area ('a' areas vs. 'c' areas), maximum aid intensities applicable in the investment area, or type of investments (*e.g.* greenfield, expansion, diversification).
- To what extent has the modulation of maximum aid ceilings (between different types of areas and between large, medium-sized and small enterprises) been appropriate?
    - To what extent did the decrease of the maximum aid ceilings introduced in 2014 have an effect on the level of investment?
    - To what extent is there any evidence that some of the 'a' areas do not have sufficient budgetary capacity to offer the maximum amount of aid allowed under the current maps?
    - To what extent is there any evidence that regions did not attract certain large investment projects because the maximum aid allowed under the regional aid framework was too low due to the scaling down mechanism?
    - In cases where enterprises applied for aid in a certain region but finally decided not to invest in that region, where did the investment go?
- What has been the impact of the other restrictions on aid to large enterprises in 'c' areas (eligibility of projects) introduced in 2014 on regional aid expenditure, levels of investment and regional development?

The evidence used to answer the above questions comes from a mix of expert interviews, the survey of aid granting authorities, descriptive statistics,

[43] Some programmes are very local in nature, *e.g.* enterprise or empowerment zones targeting job creation in suburban areas. Others are broader, *e.g.* business development, attraction and retention programmes. Some State aid with effects on regional development is covered by other aid guidelines, *e.g.* cluster promoting programmes may be covered by R&D guidelines. Funds supporting local infractructure is channelled via EU structural funds. Finally, there are discretionary grants, which have a highly selective character. For details, see Friederiszick and Merola (2016).

econometric evidence and the review of the literature. The conclusions are summarised in Section 9.1.

4.1 INCENTIVE EFFECTS OF STATE AID

This section investigates the incentive effect of State aid. In particular, it compares State aid incentives relative to other factors that determine companies' location decisions, such as labour force availability or labour skills profile. Broadening the concept of incentives, it looks into the link between State aid rules, State aid spent and, ultimately, investment.

Furthermore, it looks into whether companies take potential State aid benefits into their analysis in a quantitative way, such as calculating net present values of aid, or mainly taking it into account in a qualitative way.

It finally investigates whether the above dimensions differ across sector, enterprise size, investment area ('a' or 'c') and type of investment (such as expansion of existing plants or greenfield investment).

The evidence used to answer the above questions comes from a mix of descriptive analysis, expert interviews and a review of the literature.

4.1.1 Importance of regional State aid for investment location

This subsection sheds light on where and how State aid plays a role for firms' investment location decisions, based on expert interviews, descriptive statistics and econometric analysis.

According to the evidence from the expert interviews, investment incentives do play a role in the location decision-making processes, but they are not the key decisive factor. Incentives are one element determining the overall cost level, along with taxes. However, for some investors, the lack of investment incentives can be used as a motive to reject a particular location.[44] This is often the case for investors from China and other Asian countries and from the US, who are used to ask for incentives from local authorities. In terms of magnitude, in one of the interviews the experts estimated that generally, from a total of five to seven factors, the weight given to incentives is at most 15%.

The experts emphasized that the other factors affecting the investment location decision are highly dependent on the industry and the type of investment in question and are therefore impossible to generalise. However, the decision-making process itself is fairly standard: first, a long list of typically 10-20 potential locations is constructed, based on the criteria and objectives given by the company. Subsequently, the long list is reduced into a short list of three to five locations using knock-out variables, for example, availability of workforce, elections taking place in the near future, or local language capabilities. The sites on the short list are then analysed in greater detail. At this stage, the regional State aid kicks in and can shift the investment location to a specific site. This is particularly true in cases where two (or more) regions are very similar in terms of all other factors.

In addition to cash grants and tax breaks, "soft" incentives, such as support for education programs, were highlighted in three interviews, and they were deemed to have growing importance. Regarding support for education programs, in four interviews, availability of skilled workforce was listed as the most important factor when firms decide where to locate. One of the interviewees stated that companies

[44] For example, in one of the interviews the interviewees were able to recall one case where the investor had said that they would not go to a region where there were no incentives.

even organise mini recruitment fairs during the first site visit in order to assess the quality of the available workforce.[45] In connection with this, replacing cash benefits with measures supporting investors' access to workforce was suggested. Such measures could include, for example, funding of educational programs and vocational trainings in the region to provide employees with the skill profile required by individual investors.

Transparency, stability of policies and incentives, and predictability at regional or local level were deemed to gain more and more importance in three interviews. Investors were said to take into account that if the next local election is taking place soon, the incentive offer may not be valid for long. Such a risk factor is seen as a red flag that may lead to removal of the location from the long or short list. In addition to this, all interviewed experts stated that the lack of transparency and predictability related to the application process and eligibility for aid itself is a major obstacle for seeking access to State aid and subsequently for investments.

Last, in one of the interviews the experts stated that incentives play a smaller role in intra-EU investments, which are nowadays driven more by market access than by costs. Companies moving from outside the EU are said to ask for investment incentives more frequently.

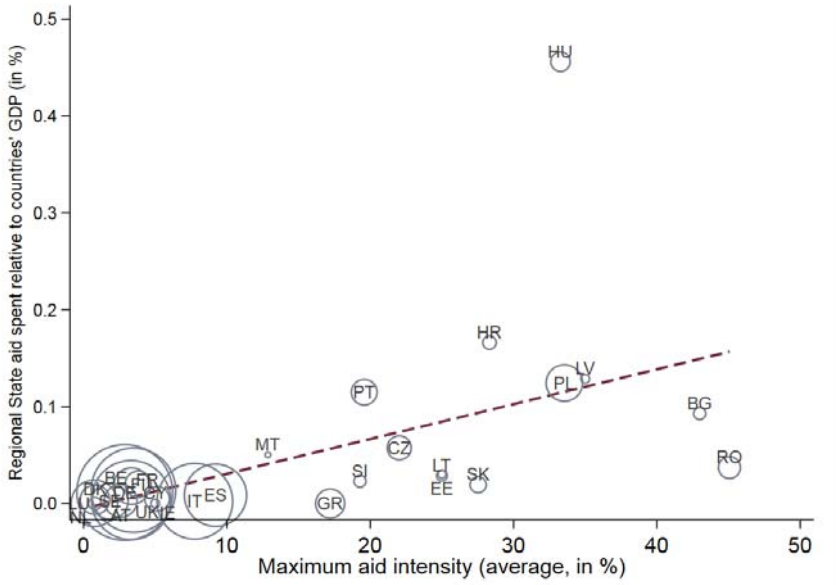
Considering the incentive effect more broadly, we empirically assessed whether the RAF 2014 allowed for the aid to have a real incentive effect. We looked at the following two questions at country-level:

- Whether the regional aid rules actually link into actual aid spent.
- If so, whether changes in the RAF 2014 provided firms with incentives to invest in an area.

Regarding the first question, as shown in Figure 28 below, the descriptive analysis at an aggregate country-level of analysis shows a positive relationship between the average maximum aid intensities and the aid spent relative to GDP. Member States with a higher maximum aid intensity typically spend more regional State aid relative to their GDP than Member States with a small maximum aid intensity.

[45] One of the interviewees also explained that behavioural incentives, with which authorities try to affect the behaviour of firms once the location decision has been made, are becoming also more and more common.

Figure 28: Regional State aid spent (as % of GDP) and maximum aid intensities across Member States under the RAF 2014



Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).
Notes: (i) Average maximum aid intensity weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed red line indicates the fitted (linear) relation. (iv) Regional State aid spent under the RAF 2014 throughout the period 2014-2017.

The econometric analysis of investment at regional level shows a causal effect of lowering the maximum aid intensities on firms' level of investment. We find that the larger the reductions in maximum aid intensities between the two regional aid frameworks for a region (NUTS 3), the larger negative effects on total investment in the region. In particular, we observe that the negative impact on total investment is strongest within 'c' areas that worsened their attractiveness, and this is particularly true for large enterprises. This is discussed in more detail in section 4.3, which also reconciles our results with previous studies that at first sight might indicate other effects.

4.1.2 Accounting for State aid in financial analysis (versus a qualitative plus)

This subsection sheds light on whether firms account for State aid in the financial analysis of investment projects or rather treat it as a qualitative plus. The information was collected in expert interviews.

The experts agreed that investment incentives are seen as one element determining the overall cost level, along with taxes. According to one of the interviewed experts, in the long list phase of a location decision process, an overview of the available aid in alternative locations is often sufficient. However, according to all interviewees, the short list phase of this process involves detailed analysis of project financials and the available incentives therein. Such analysis is considered to be particularly important for capital-intensive investments.

According to one of the interviewed companies, a forecast of net present value (NPV) or of internal rate of return (IRR) is usually being carried out. The company itself uses IRR cash flow models, one cash flow model per location, in order to estimate the operational costs per location. In these calculations, labour cost and its predicted growth are very relevant factors. However, some large companies like to conduct the financial forecasting themselves.

Another company elaborated that, as a part of their advice, they typically compare the predicted one-off investment cost and ongoing costs for the next 10 years across alternative locations. Such costs include, for example, wages, cost of natural resources and utility cost, which are however not possible to predict for ten years ahead in Europe, contrary to the US. To this end, in order to make cost predictions for investments within Europe, the company typically looks at the development of the cost in the past and extrapolates it into the future. The investment incentives are taken into account in this calculation.

Related to difficulties in making detailed financial analysis and predictions, another interviewee pointed out that sometimes it is hard to predict also the level of incentives, as in Europe the authorities may not be able to quantify what they can offer. This is again in contrast to the practice in the US, where the investor typically receives an offer letter with a specific value number in it. The magnitude of aid may be hard to predict, because it is difficult to quantify future revenue and cost streams. According to the expert, this problem typically arises with labour- rather than capital-intensive projects. Therefore, the role of investment incentives in financial analyses may be larger in capital-intensive than in non-capital-intensive projects.

As to the different types of financial incentives, one of the interviewees stated that location decisions for setting up corporate headquarters, as well as for projects with high profit margins, usually lead to a preference for tax breaks. These are, however, more risky for the investors, because they must make orderly profits to benefit from the tax breaks. For this reason, start-up companies without own capital or with risky projects usually favour upfront cash payments. Moreover, as one of the experts pointed out, the utilisation of tax benefits becomes difficult and subsequently their impact decreases in countries or regions where corporate income tax is low or decreases.

4.1.3 Investment location: differences by sector, firm size, investment area, maximum aid intensity and type of investment

How State aid matters for investment location decisions may differ by sector, size of firm, investment area (and maximum possible aid given therein), and type of investment. The sections below provide some evidence for each of these dimensions, based on expert interviews and a literature review.

4.1.3.1 Sector and type of investment

According to the interviewed experts, the sector and industry, along with the investment motive, affect the factors and criteria that are important to the investor when making the location decision. For example, one of the interviewees stated that for the chemical industry, which is typically characterised by huge investments, the financial business case is the driving motive. For corporate office locations, the availability of skilled labour and the expatriate environment are decisive. Related to the different needs of different sectors and industries, a Hungarian expert stated that during the last ten years, the type of investments attracted by Hungary has been moving from low value-added manufacturing projects looking for low employment cost to high value-added manufacturing with sophisticated technology looking for high quality, educated workforce.

This statement is in line with the message given in the 2017 Commission's 7th report on economic, social and territorial cohesion. In particular, the report states that to ensure continuous convergence of the less developed regions with the rest of Europe, these regions "*will have to move up the value chain to activities with a higher skill, technology and innovation content, especially because globalisation and technological change could quickly undermine their economic performance*." (p. xii).

Another expert said that subsidies are of high importance in capital-intensive industries, such as chemical or automotive, but less for labour intensive industries, where taxation might be more important.

In two interviews, the experts further pointed out that some industries or sectors seem to be more prone to location trends. The examples brought up included the location of numerous shared service projects to Cracow ten years ago, the move of IT operations in the Baltic States, operations moving from the UK to Amsterdam very recently, shared services moving to Prague and Brno, or manufacturing moving to Spain and Portugal. As discussed in the previous subsection, these trends are prevalent and driven by the bandwagon effect, which does not necessarily coincide with rational decision-making.

Whilst the experts said little on the differences between mergers and acquisitions versus greenfield investment, the issue has been recently studied by Davies et al. (2018), who find that mergers and acquisitions are more affected by geographic and cultural barriers, whereas greenfield investments are more driven by factors such as origin-country technological and institutional development or comparative advantage.

4.1.3.2 Firm size

The experts stated that the location decision-making process itself is very similar between large and small companies. However, the variables and criteria of choice likely differ, as well as the resources used for the decision-making process. According to the experts, large companies (LE) may have their own staff carrying out the analysis and their investment location process is more data driven and analytical. Small and medium companies (SME) make location decisions rarely, or even once in lifetime. Typically their CEOs make these choices themselves, which can be "chaotic, intuitive or opportunistic".

As to the differences in preferences over different types of aid, the experts see that SMEs typically prefer cash grants, because they are more cash-constrained and need to reduce the initial investment cost. Because of limited resources, SMEs are not, for example, able to train employees themselves and hence such services must be offered. Subsequently, SMEs may in general be more receptive to incentives than LEs. The fact that SMEs are more responsive to aid than LEs is consistent with the results from the literature review, where certain subsidy programmes are mentioned as having significant impact only for small firms.[46]

LEs with long-term perspective and financial resources are more interested in tax breaks than SMEs, who are less able to accept risk, which increases when payments take place in the future. However, since LEs typically have better access to credit, they are less interested than SMEs in public funding in the form of low interest loans. The interviewees also had the view that LEs negotiate the incentives tougher as they have more experience with such negotiations and better acknowledge the potential impact of their investment on the region.

In one of the interviews, location trends were also brought up. That is, in some industries companies look at others in the industry and follow. In such cases, the dynamic is driven by bandwagon effects, which does not necessarily coincide with rational decision-making, nor is dependent on investment incentives. Such a behaviour creates hubs, which may lead to an increase in cost level. Small and medium-sized firms with fewer resources to tackle the increasing cost level are therefore less eager to follow such trends.

[46] See, for example, Decramer and Vanormelingen (2016); Martini and Bondonio (2012); and Criscuolo at al. (2019).

The relative risk for SMEs is larger and therefore they require a more sound choice. Moreover, in a hub, large companies change the business environment by driving up wages and poaching skilful labour from other companies. The mid-sized companies do not necessarily have the resources to deal with the increasing cost level and therefore are more willing to look for secondary, cheaper locations.

According to the experience of one of the interviewees, young companies tend to differ from others by moving more quickly taking advantage of their less complicated corporate structure which would otherwise slow down the process. Young companies also tend to be less interested in incentives, but more in the availability of skilled workforce.

The interviewees also concur that both the absolute and the relative importance of State aid depends very much on the characteristics of the investing company, such as company size and age. Related to this, two of the interviewed experts emphasised the need for authorities to understand and tailor the aid into a form that is helpful for the investor. For example, large company, with financial resources making a labour-intensive investment, plans more long-term and may prefer tax breaks. One of the interviewed experts said that cash as a less risky form of aid is preferred over tax benefits, particularly among Asian investors.

4.1.3.3 Investment area and investment type

The interviews confirmed the view from the literature, according to which the location decision-making process critically depends on the investment motive, notably whether the investment is made for expansion, optimisation of supply chains, or other strategic reasons (see, for example, Carril-Caccia and Pavlova 2018, or ESPON 2020 Cooperation Programme reports). The specific area characteristics that are important vary from one case to the other. Therefore, it is not possible to draw general conclusions on the impacts of investment area.

Yet, Cerqua and Pellegrini (2014) touch on this topic when they study the differences in employment impacts of Law 488/92 between North and South Italy. The authors are not able to find any differences for small firms, but for medium and large firms the employment effect of the program is positive in Northern Italy, whereas no effect is observed in Southern Italy.

Moreover, according to the experts, the impact of State aid varies by investment or investor origin. For example, one of the interviewees stated that for non-EU investors it is very important to get a "VIP" treatment by the local authorities. He recalled an incident where a project was dropped completely just because the municipality governor was not friendly to the potential investor. Particularly Asian investors were told to expect a one-stop shop providing them with all needed information via a single investment agency. This description is in line with the message from Gless and Voss (2012). As an interesting exception, one of the experts mentioned Japanese investors, who culturally do not negotiate incentives. The experts also told that the State aid rules in the EU sometimes surprise US investors, who are used to negotiate good deals with local authorities without being restricted by the rules corresponding to those in EU.

4.1.3.4 Maximum aid intensity

According to the experts, maximum aid intensities are typically reported at the long list phase of the location decision-making process. However, at the short list phase, a more detailed analysis on the available aid is made. To this end, at this stage, it is not frequent to drop a location because of too low maximum aid intensity.

The experts explained that maximum aid intensities confuse investors, as many of them think that maximum aid intensity depicts the actual magnitude of aid that

they are going to get. In fact, many of the interviewees reported that the level of actual subsidies is generally close to the maximum aid intensity. These comments concur with the findings from literature, where statistically significant impact of the maximum aid intensity on employment, GDP per capita and economic activity has been established.[47]

4.2 EFFECT OF MODULATION OF MAXIMUM AID CEILINGS

This section investigates the effect of the modulation of maximum aid ceilings in the RAF 2014. In particular, it will zoom in on how these changes had a differential impact on different areas and different size classes of companies (large versus medium sized and small).

There are several aspects this section will expand on. First, it will look at how the decrease of maximum aid ceilings had an impact on the level of investment.

Second, it provides some evidence on whether some of the 'a' areas do not have sufficient budgetary capacity to offer the maximum amount of aid allowed.

Third, it looks into the question whether some large investment projects were not obtained due to the scaling down of the aid ceiling.

Finally, it investigates where projects went to if they applied for aid in a particular region, but in the end did not invest therein.

The different pieces of evidence that are provided come from surveys of aid granting authorities, expert interviews, descriptive analysis and econometrics evidence.

4.2.1 Effect on the level of investment

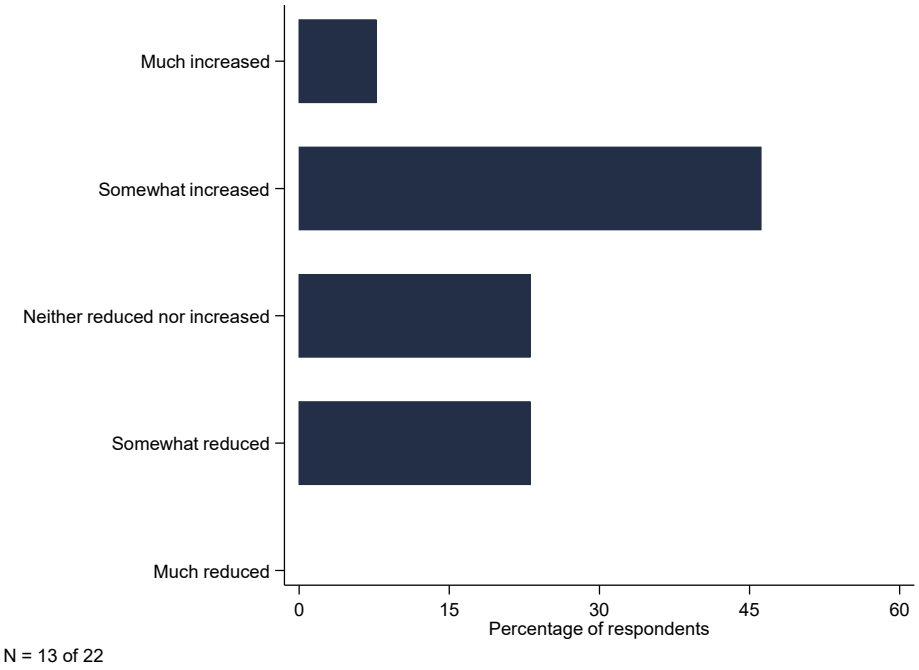
This section looks at whether there have been changes on the level of investment due to the change of maximum aid ceilings in some regions. We provide evidence based on aid granting surveys, econometrics evidence and expert interviews.

4.2.1.1 Evidence from the survey

First, aid-granting authorities reported their perception of the effect of the change of maximum aid ceilings in 2014 on the level of investment in their region. The replies differed by region types. More than half of the authorities representing 'a' regions consider that investments in their region has increased since 2014.

[47] See, Criscuolo et al. (2019); and Ambroziak (2015).

Figure 29: Compared to the time period before 2014, did you observe a change in the level of private-sector investments in your region since the new RAG was introduced in 2014? (Question 9, 'a' regions)

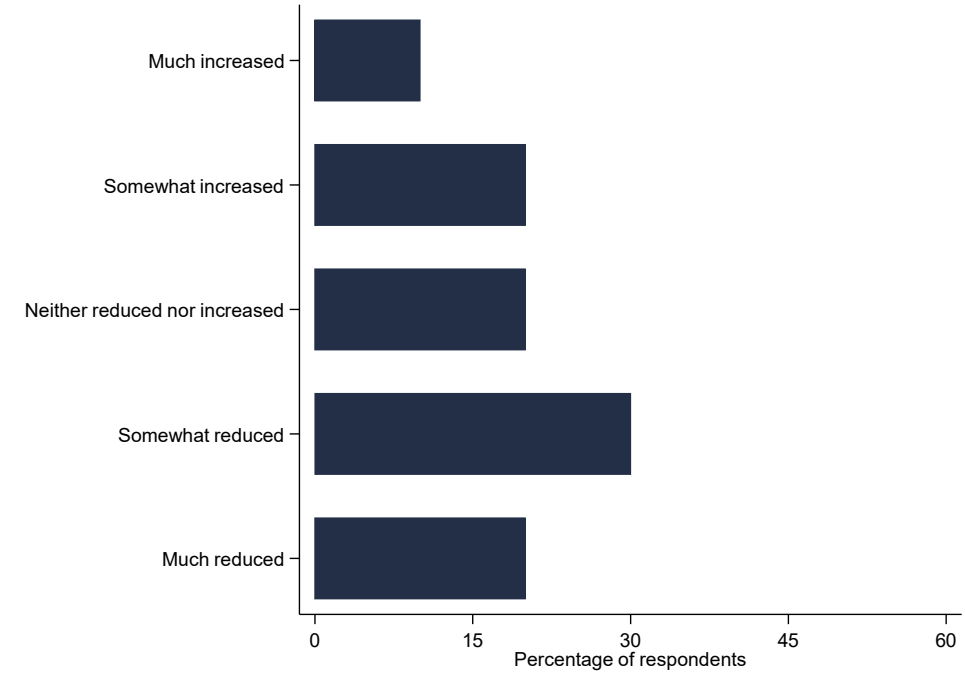


Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

This is in contrast with authorities representing 'c' regions, about half of which consider the private sector investment levels to have dropped, as shown in the following figure.[48]

[48] The authorities representing 'ac' regions have a mixed view on the change of the private-sector investment levels since 2014, many increased or reduced investment.

Figure 30: Compared to the time period before 2014, did you observe a change in the level of private-sector investments in your region since the new RAG was introduced in 2014? (Question 9, 'c' regions)



N = 20 of 27

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

Responding authorities from nine Member States, responsible for all types of areas ('a', 'c' and both 'a' and 'c'), reported that the major change introduced in 2014 was the change in the regional map or reduced aid intensities compared to the previous period.[49] Several of these authorities experienced changes in the regional aid map, as they deal with regions that changed from 'a' to 'c' (Romania, Spain) or 'c' to non-assisted (Czech Republic, Hungary, Slovakia), or joined the EU in the period concerned (Croatia). Examples of detailed responses are the following.

- A Czech authority wrote that: "*the most significant issue for us was a reduction of aid intensity from 40 to 25% and also exclusion of energy sector. These factors caused a reduction of number of submitted projects.*"

- An Estonian authority noted that: "*the aid intensity based on regional aid map was significantly lowered compared to the previous period (from 50% to 25% for large companies).*"

- A Spanish authority further reported that: "*The change of designation of the region of Galicia: from 'a' region in 2011-2013 to 'c' region predicted in 2014-2020, with the inherent reduction of aid intensities, being adjacent zone Portugal, with higher aid intensities and without limitation to the typology of supportable initial investment for large companies.*"

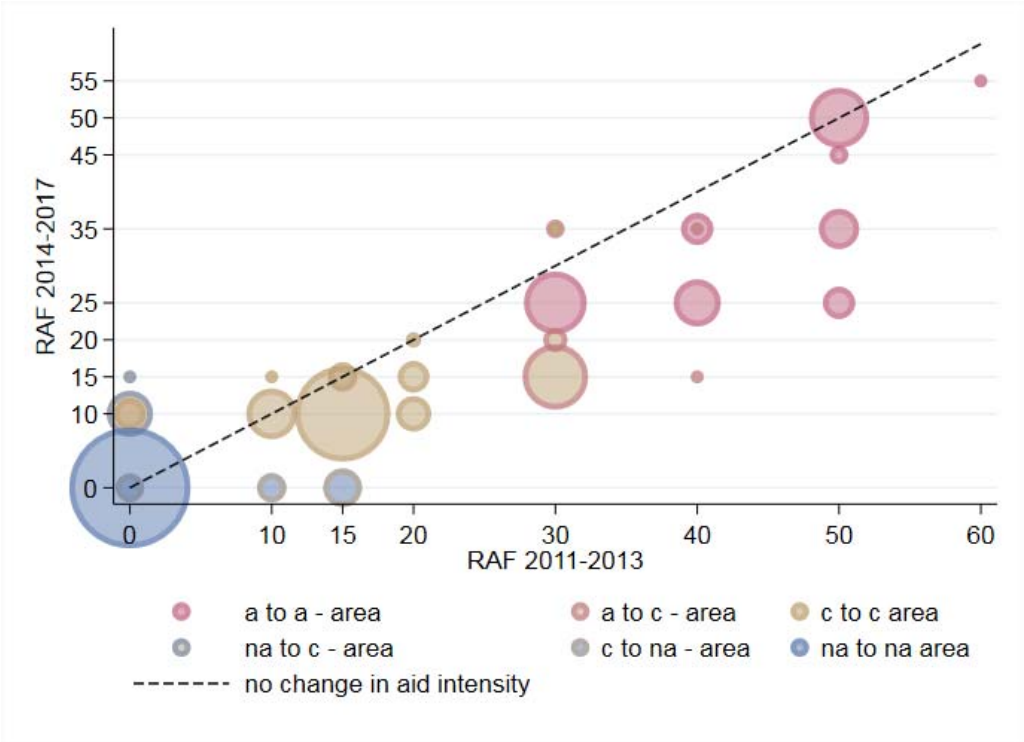
[49] 12 out of the 65 responding authorities did not answer the question on what was the major change introduced the RAF 2014.

4.2.1.2 Evidence from the econometric analysis

The econometric analysis looks at investment changes determined by changes in eligibility, maximum aid ceilings as well as additional restrictions on large enterprises that will be discussed in section 4.3.4. These changes are pictured in Figure 31, which constitutes the basis of our strategies to identify and measure the causal effect of the policy changes on investment. The pictures graphically depicts these changes and makes clear what comparator groups can be used.

The horizontal axis represents the maximum aid intensity (*i.e.*, the aid as % GGE) for each region according to the RAF 2007 for the years 2011-2013, while the vertical axis represents the maximum aid intensity according to the RAF 2014 for the years 2014-2017. The inner colours of the circles represent the different types of regions in terms of aid eligibility during the RAF 2014 for the years 2014-2017: 'a' areas are represented in red, 'c' areas in gold, non-assisted regions in blue. The colour of the border of the circles, instead, represent the types of regions during the period 2011-2013. The size of the dots in the diagram represents how many regions (NUTS 3) are in which category. Regions which have not seen a change in rules are represented on the dashed line. Table 6 then translates the size of the dots in Figure 31 to numbers of areas encountering the specific changes.

Figure 31: Changes in maximum aid intensity and aid eligibility between two RAF periods



Source: Own analysis based on regional aid maps (2007-2013/2014-2020).
Note: (i) The term "na" refers to non-assisted area. (ii) The figure includes outermost regions. (iii) The change in the NUTS codification between NUTS 2003 (codification used for the RAF 2007) and NUTS 2010 (codification used for the RAF 2014) make it impossible to identify changes for the following regions NUTS 3 regions: DED43, FI1B1. (iv) Croatia is not presented in the figure, as it is a Member State of the EU only since July 2013 and, consequently, not concerned by the RAF 2007.

The econometric analysis entails two steps. The first step, discussed in this section, aims at measuring the effect of the changes of the maximum aid

intensities on investment, whereas the second step (discussed in Section 4.3.4) aims at identifying the effect of additional restrictions on LEs imposed in 'c' areas.

First, we compare the evolution of investment in 'a' and 'c' regions where the aid ceilings were reduced (*i.e.* regions below the 45 degree line) to 'a' and 'c' regions that did not change the rules (*i.e.* regions on the 45 degree line above the origin).

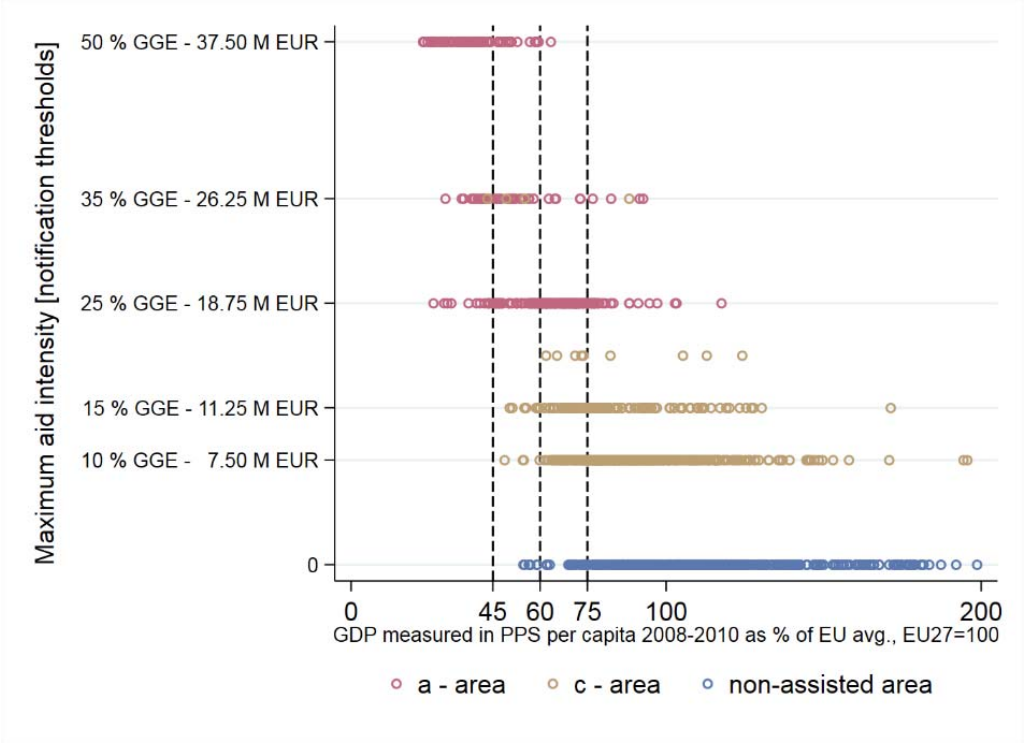
To make sure that control and treatment areas are comparable, we further refine the control group depending on whether a region was an 'a' or 'c' area before the introduction of the new RAF in 2014. Therefore we partition the data in two groups. In the first group, we compare 'a' areas that did not face a decrease in maximum aid intensity (the control group) to areas that faced a decrease, distinguishing between those areas that remained 'a' areas and those that switched to 'c' areas between the two regional aid frameworks. In Figure 31 these are areas with red borders. In the second group, we compare 'c' areas that did not face a change in aid intensities (control) to areas that faced a decrease aid intensities distinguishing between those that stayed 'c' areas and those that became non-assisted areas (treatment). In Figure 31 these are areas with yellow borders.[50] Notice that, by solely focusing in this step on 'c' areas and comparing 'c' areas where maximum aid ceilings decreased to 'c' areas where they did not, we filter out the potential confounding effect of the introduction of additional restrictions on LEs. Indeed, both treated and control 'c' areas are subject to this additional policy change and, therefore, they are comparable along this dimension. To identify the effect of additional restrictions on LEs imposed in 'c' areas, we introduce a second step in our analysis that will be discussed in section 4.3.4.

Because the adjustments in eligibility and maximum aid intensity are decided at the European and Member State levels, these changes can be considered exogenous to investment in the NUTS 3 regions, especially in 'a' areas where virtually automatic criteria apply based on GDP (or other indicators such as employment) and are focused on NUTS 2 regions.

As shown in Figure 32, within the two groups (red dots for 'a' areas and yellow dots for 'c' areas), regions which face similar economic conditions – *i.e.* are comparable in terms of GDP per capita in PPS to EU average — are subject to different regional aid rules when focusing on NUT 3 areas. This lies at the heart of our identification strategy. Moreover, in our empirical assessment we control for observable regional characteristics, NUTS 3 fixed-effects, as well as overall investment trends at the NUTS 2 level. Finally, In Appendix A10.4.1 we show that, within 'a' and 'c' regions the development of investment for large, medium and small firms in control is parallel to the development in treated areas (the common trend assumption is satisfied).

[50] As shown Table 35 in Appendix A10.4.1, we have 85 control regions in 'a' areas (from Bulgaria, Hungary, Poland, and Romania) and 314 treated regions in 'a' areas (from Belgium, Bulgaria, Czech Republic, Estonia, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and UK). The control 'c' regions are 57 (from Belgium, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden, and UK) while the treated 'c' regions are 306 (from Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Hungary, Ireland, Italy Netherlands, Portugal, Spain, Sweden, and UK).

Figure 32: the RAF 2014 rules to GDP measured in PPS per capita to the EU average at the NUTS 3 level



Source: Own analysis based on regional aid maps (2007-2013/2014-2020) and Eurostat.
Note: The regional aid framework designates regions as `a' areas based on GDP per capita to EU average at the NUTS 2 level, while the figure reports values at the more disaggregate NUTS 3 level. The graph does not cover neither outermost regions, nor regions for which GDP measured in PPS per capita was not provided by Eurostat for 2008-2010. We are not in the possession of the original data that was actually used to establish regional aid maps at the time. For purpose of visual clarity it restricts values on the x-axis to values be below 200.

All these steps make the control groups and, thus, the estimation of the treatment effect more reliable such that the estimated coefficients can be interpreted as the causal impact of the treatment (*i.e.* change of maximum aid intensity or eligibility) on investment: *i.e.*, the additional change in investment that the treated regions observed compared to the control groups. In Appendix 10 we provide a formal description of the econometric model and discuss our identification strategy in more detail.

Table 9 shows the results for this analysis. The unit of observation is a NUTS 3 region and the dependent variable is the aggregated business investment at the regional level as a percentage of GDP. Aggregated regional investment is defined as the sum of the investment of all firms active in that particular region either in total or partitioned by firms' size classes.[51] The first column reports estimates obtained by using all companies together, while the second, third and fourth columns report estimates for the investment of large, medium-sized, and small companies, respectively.

To increase the efficiency of our estimates, we pool 'a' and 'c' areas together and use interactions instead of subsamples. For each sample, the first three rows report the coefficient estimates that measure the investment changes in 'a' areas: while the estimates in the first row measure the evolution of investment in 'a' areas that did not face changes in aid ceilings after 2014 (the control group), the

[51] In Appendix 9 we discuss in depth the construction of all variables used in the econometric analysis. Firm-level investment is defined as the difference between total asset between the current and the previous year. Data on total assets is sourced from Amadeus provided by Bureau van Dijk.

second row reports the estimated effect for 'a' areas facing a decrease in maximum aid ceilings, and the 3rd row reports the estimates for the areas that moved from 'a' to 'c' areas. The estimates reported in the last three rows measure the evolution of investment in 'c' areas. Similarly as above, row 4 reports the estimates measuring the investment changes in 'c' areas where there was no change in maximum aid ceilings (the control group); row 5 reports the estimates measuring the investment changes in 'c' areas where there was a decrease in maximum aid ceilings; and the last row reports the estimates measuring the investment changes in 'c' areas that were not eligible for aid anymore after 2014 (*i.e.*, areas that moved to non-assisted areas, labelled 'na').

Table 11: Regressions on investment to GDP (in %) at the NUTS 3 level, distinguishing between large, medium and small enterprises – specification M4

	All	Size L	Size M	Size S
Control group: a areas with no change in aid intensity				
post	0.35	0.16	-0.0039	0.20
	[-1.62,2.32]	[-1.69,2.00]	[-0.24,0.23]	[-0.079,0.48]
post × Treat (a to a area with decrease in aid intensity)	0.28	0.011	0.17	0.10
	[-2.01,2.56]	[-2.11,2.13]	[-0.24,0.57]	[-0.22,0.42]
post × Treat (a to c area with decrease in aid intensity)	0.27	0.12	0.16	-0.018
	[-2.10,2.63]	[-2.10,2.35]	[-0.27,0.59]	[-0.38,0.35]
Control group: c areas with no change in aid intensity				
post × Sample (c)	4.08**	2.78*	1.21***	0.093
	[0.97,7.19]	[-0.26,5.81]	[0.48,1.95]	[-0.55,0.74]
post × Treat (c to c area with decrease in aid intensity)	-1.09	-0.90	-0.35	0.16
	[-3.41,1.22]	[-3.22,1.42]	[-0.95,0.24]	[-0.38,0.71]
post × Treat (c to na area with decrease in aid intensity)	-3.13**	-3.22**	-0.38	0.46
	[-6.02,-0.25]	[-6.35,-0.079]	[-1.05,0.29]	[-0.26,1.18]
Fixed effects	yes	yes	yes	yes
Clustered SE	yes	yes	yes	yes
NUTS2 trends	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes
Observations	4,288	4,288	4,288	4,288

95% confidence intervals in brackets
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).

When comparing investment growth changes in 'a' areas and in 'c' areas, it appears that almost all effects take place within the 'c' areas. Indeed, no significant effect can be measured for 'a' areas (first three rows). Thus, it appears that, on average, total business investment to GDP in such areas was not affected by the decreases in maximum aid intensity and/or changes in eligibility status. Furthermore, when looking at the first column that reports the sum of the investment of all firms, there are some significant effects in the 'c' areas. Specifically, in 'c' areas that did not change their maximum aid ceilings investment increased by on average 4.1 percentage points (in addition to the 0.35 percentage point increase observed for the control group). However, the investment growth was, on average, smaller by 1.1 percentage point in 'c' areas that decreased maximum aid ceilings and smaller by 3.1 percentage points in 'c' areas that became not eligible, compared to the 'c' areas for which there was no change in maximum aid intensities. Only in the latter of the two treatment groups, the effect is statistically significant. Since the overall effect for the treated areas is the sum of the three effects ('*post*' + '*post*' × *Sample(c)* + '*post* × *Treat*'), these differences in growth rates do not compensate the overall positive effect. This implies that, on average, total business investment to GDP in 'c' areas increased after 2014.

It is not possible to cleanly identify whether the large negative effect implied by the change from a 'c' area to a non-assisted one is due to the change in eligibility *per se* or by the implicit reduction of maximum aid intensities to zero. Yet, by comparing the two coefficients, we can tentatively say that the reduction of maximum intensities alone – which is identified by the '*post* × *Treat (c to c area with decrease in aid intensity*' – had a weak negative effect on investment (by 1.09 percentage point on average). This negative effect is then reinforced by the

additional restrictions due to the loss of eligibility status – which is identified by the '*post* × *Treat (c to na area)*'. The effect of the latter restrictions is the difference between the two coefficients: 3.13 - 1.09 = 2.04 percentage points. We will get back to this point in section 4.3.4 where we will expand on this finding and more directly verify whether the restrictions on investment for LEs also affected overall investment in 'c' areas.

In general, and consistently with the other pieces of evidence discussed in this Study (see section 4.1), this result shows that there are drivers of investment decisions that affected all 'c' areas which are not related to aid. Moreover it implies that investment increased in 'c' areas despite the remodulation of aid intensity and additional restrictions on LEs.

When we distinguish between large, medium-sized, and small companies (columns 2 to 4), one can see that effects are exclusively driven by large companies. The overall effect for large companies in 'c' areas where aid ceilings did not change is + 2.88 percentage points, and the negative effect on investment for large companies in regions that moved from 'c' to non-assisted is -3.22 percentage points Therefore, in this case, the cumulative effect for 'c' areas that became non-assisted after 2014 (*i.e.* the sum of the coefficients from row 4 and row 6) is negative and significant.

We stress that our identification strategy is clean to answer the specific question of modulation of aid ceilings. Especially when looking at 'c' regions, this specification allows us to cleanly differentiate the effect of the modulation of the maximum aid intensities from the confounding effect coming from additional restrictions to 'c' areas that will be discussed below.

To assess whether outliers drive our results, we run several robustness checks. To begin with, the results reported in the table above exclude outliers, *i.e.* the smallest and largest 1% of observations. Furthermore, we run additional analyses where we drop countries for which the quality of the Amadeus data may be disputable due to a high percentage of limited financial information reported. Also in those cases our conclusions remain valid and robust.

Our results are partially novel when comparing to the existing literature. Indeed, there is some evidence that SMEs respond more to (changes in) the State aid rules than LEs do (*e.g.* Criscuolo et al. 2019, Martini and Bondonio 2012, Decramer and Vanormelingen 2016). However, the adopted approaches in these papers often differ from ours in several dimensions. First, we use a sample including all EU countries, while previous studies focused on single Member States (the UK, Italy, and Belgium (Flanders) respectively). To this extent, our approach is more in line with the cross-country approach of Becker et al. (2010, 2012), who assessed the impact of the EU Structural Funds. By contrast with the latter, however, we do not only focus on the different behaviour around the threshold defining eligibility for the structural funds (which is a value of GDP below the 75% of the EU average). This leads to the second main difference. For this part of the analysis, our identification solely focuses on regions that were eligible pre-reform as it zooms in on the identification of the effect of the modulation of aid ceilings. We therefore compare 'a' regions that did not face any change (control), with 'a' regions that reduced the maximum aid intensities or 'a' regions that became 'c' regions. Similarly, we compare 'c' regions that did not face any change (control), with 'c' regions that reduced the maximum aid intensities or 'c' regions that became non-eligible regions. Finally, our sample period is also different. The variation that we use is around the introduction of the RAG 2014, while previous studies focus on the RAG 2007.

As a potential caveat of the analysis presented above, it is mostly based on three years of data after the introduction of the RAG 2014. Data for the last year in our sample (2016), however, is of lower quality than for the years before. To confirm

our results, the same exercise should be repeated with one or two additional years of data. This would also be a possibly better timeframe to more precisely assess the effect of a major change in regulation. Of course, one has to also be careful not to extend the analysis to a too large time period, because it might become more difficult to assess the causal nature of the nexus between policy changes and investment, as other confounders could then play a more important role.

4.2.1.3 Evidence from the expert interviews

Interviewed experts provided insights on the investor's perspective regarding the maximum aid intensity and its modulation across regions.

The experts were aware of "forum shopping" where investors prefer to go to regions with relatively high maximum aid intensities. For example, in the recent years investments by automotive OEMs shifted from Eastern Germany to Eastern Europe because of higher available incentives. In turn, Eastern Germany is considered as an attractive alternative to the rest of Germany, where there is no regional State aid. This type of focusing on a region with higher maximum aid intensities is done at the initial investment decision stage (longlist). At the later stage of comparing locations for a specific project, it is not frequent to drop a location because of too low maximum aid intensity – this still happens, but not very often. The reason may be that the locations considered in the short list are all in the area with a similar aid intensity.

The experts agreed that the concept of maximum aid intensity confuses investors: when investors look at the map, they believe they will get the maximum aid level and have difficulties to understand that this is only a theoretical maximum. Maximum aid intensity may be used as an initial target and steers expectations to the upper limit.

The level of actual subsidies is generally close to the maximum aid intensity. The expert from Hungary noted that reaching the maximum aid intensity level with cash would be unusual, as the typical State aid package has about 30% cash and 70% tax benefit. The share of cash could be higher for big, flagship investments when there is strong competition from other regions/countries. Also Hungarian schemes give the possibility to complement cash subsidies with tax benefit to reach the maximum aid intensity. Investors can submit requests for tax benefit up to the max intensity, but the utilisation depends on project's profitability and cash availability.

One expert noted that the regional State aid policy is rather restrictive. Maximum aid intensities are too low to bring a real change to the industry. In a concrete example of a capital intensive project in regions of Western Europe, there was a gap between the required and actual profitability after including State aid. To bridge the gap, the European Investment Bank was involved rather than turning to another location with higher maximum aid intensity.

In three interviews, the experts said that the maximum aid intensities are reported already at the early stages of the project. In the long list phase, such framework conditions suffice and it may happen that a region is dropped from the list due to relatively low maximum aid ceilings. In another interview the experts stated that regional maximum aid intensity and cash levels provided by the granting authorities do not only play a role when the long list is reduced into a short list, but they can also serve as the final factors to choose one site over another.

As long as the maximum aid intensity is close to the actual amount that companies receive, this is compatible with the view that at the final stage, when regions are very close to each other with respect to all other factors, the amount of aid can be the decisive factor that tilts the decision for one region over another.

4.2.2 Limits in budgetary capacity in 'a' areas

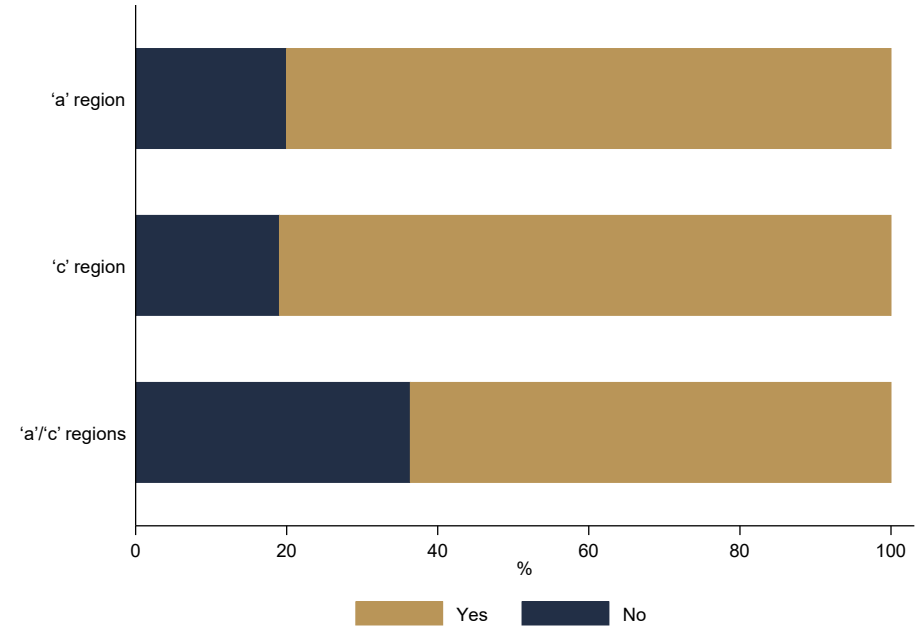
This section addresses the specific question to what extent there is evidence that aid-granting authorities in 'a' areas do not have sufficient budgetary capacity to offer the maximum amount of aid allowed under the current maps. The analysis of this question is based on (i) the replies received from the aid-granting authorities to the survey prepared specifically for the purpose of this report, and (ii) expert interviews conducted specifically for the purpose of this report.

4.2.2.1 Evidence from the survey

The majority of responses by aid-granting authorities does not support the view that 'a' areas have insufficient budgetary capacity to offer maximum aid amounts as they would be allowed for these regions under the existing regional State aid framework.

In their responses to the questionnaire, only a small percentage of aid granting authorities (20%) noted that they have insufficient budget available for granting the maximum amount of regional State aid allowed in their respective 'a' or 'c' regions. For authorities representing both 'a' and 'c' areas, the share of responses reporting insufficient budget reached approximately 35%.

Figure 33: Is your budget available for regional State aid sufficient to grant the maximum amount of aid allowed for your regions? (Question 19, by region type)



N = 47 of 63

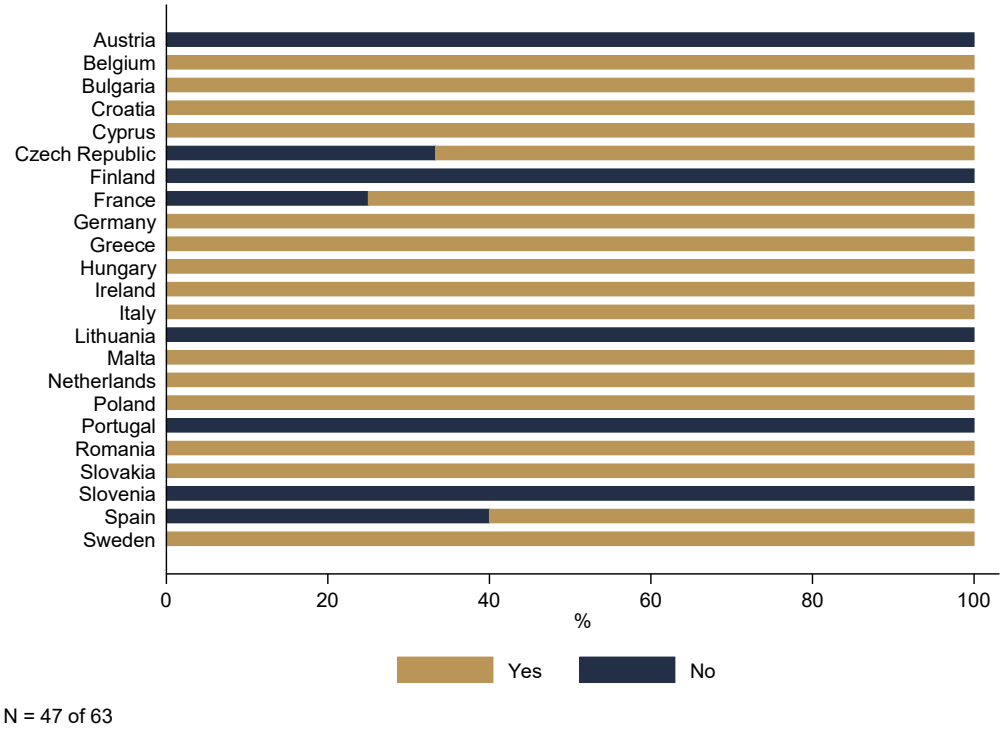
Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

The percentage of cases in which financial support was denied due to insufficient budgets in comparison with all cases in which support was denied by the aid-granting authorities is therefore rather small (approximately 9%). The main obstacles in attracting investors are general economic conditions, lack of skilled workforce, high investment cost, and high operating cost. The administrative effort required and poor availability of regional State aid as an obstacle for aid-

granting authorities to attract investors was indicated by more than 25 aid-granting authorities.

As shown in the figure below, those aid-granting authorities having reported budgetary restrictions preventing them from granting maximum amounts of regional aid come from the following eight EU Member States: Austria (1 'c' area authority), Czech Republic (1 'a' area authority), Finland (1 'c' area authority), France (2 'c' area authorities), Lithuania (1 'a' area authority), Portugal (1 'c' area authority), Slovenia (2 'c' area authorities), and Spain (1 'a' area authority and 1 'c' area authority). In Portugal, however, the authority clarified that there is no budget as such: tax incentives are granted in accordance with the criteria established by the law. There is therefore no real budget limitation.

Figure 34: Is your budget available for regional State aid sufficient to grant the maximum amount of aid allowed for your regions? (Question 19, by Member State)



N = 47 of 63

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

Most authorities reporting an insufficient budget indicate using alternative measures to attract investors despite the lack of resources.

The Czech authority mentioned that they promote a positive image (high standards of living, level of education, quality of health care system, monetary stability, bank system) in order to attract investments. Austria, Finland and France also mentioned non-cost related factors, such as coaching and counselling, offering help for recruiting and training employees, promoting the regional ecosystem, a good innovation environment and a competent working force. Slovenia reported information, promotion, and counselling, as well as the preparation of tenders for loans for eligible costs that are excluded from the RAG 2014 and GBER, but are essential for the development of the region. Spain mentioned the specific Decree 184/2017 on aid for large investment projects as well as specific rules for speeding up procedures: Law 7/2018 on large leisure

facilities in Extremadura (LEGIO), and Law 8/2019 for a more agile administration. In addition, Spain reports personalised technical accompaniment and the availability of suitable industrial land to facilitate contacts with financial institutions and venture capital.

4.2.2.2 Evidence from the expert interviews

Experts did not provide examples of projects not located in 'a' regions due to budgetary limits for authorities. One expert stated that it was a challenge to attract investment to 'a' regions and that a restrictive State aid policy was not helpful for this purpose.

4.2.3 Maximum aid for large investment projects

This section addresses the specific question to what extent there is any evidence that regions did not attract certain large investment projects because the maximum aid allowed under the regional aid framework was too low due to the scaling down mechanism. The analysis of this question is based on (i) the replies received from the aid-granting authorities to the survey prepared specifically for the purpose of this report, and (ii) expert interviews conducted specifically for the purpose of this report.

4.2.3.1 Evidence from the survey

The first thing that comes out of the survey is that the vast majority of responding authorities (38 out of 48) answered that they have never encountered a situation where they received an application to support a large investment project (above EUR 50 million) with regional aid, but the company finally decided not to invest in that region.

For the few authorities that did find themselves in such a situation, its frequency varied significantly. Specifically, this situation was reported to have arisen:

- less than 5 times for 5 of them (Belgium, Finland, France, Malta, Spain);
- between 10 and 15 times for 2 of them (two French regional authorities);
- approximately 100 times since 2014 for one of them (one French national authority).

Overall, in approximately 1/3 of these situations the authority was unaware of what happened, in approximately 1/3 of these situations the investment was made in another 'a' region, and the remaining 1/3 was split between other 'c' regions and regions outside the EEA.

In relation to Malta, three projects were stopped, but this was unrelated to regional aid rules. According to the Maltese authority, this is mainly due to Malta's specificities: Malta is an island, all goods have to be transported via sea, the small size of the immediate market and the lack of proximity to other larger markets.

The majority of the remaining authorities explained that they lost the project because of the limitations related to the grant of regional aid to large undertakings in 'c' regions. They mentioned that the projects finally materialised in other EU Member States (*e.g.* Poland, Hungary, Spain) or in third countries (Morocco, Turkey). A French authority gave two very detailed examples of such situation.

- **Example 1**: an American investor who wanted to manufacture packaging for new markets. The amount of the project was EUR 61 million. The company had several choices of location: either in France ('c' area), Poland ('a' area) or Great Britain. The investment was not eligible in a 'c' area,

because it concerned an extension of capacity. Therefore, no regional aid could be granted in France ('c' area), while it was possible in Poland ('a' area). Poland was able to grant EUR 31 million while France was not in a position to grant any regional aid. The file is still in progress but a move to Poland seems to be the company's first choice. As part of this investment, 65 additional jobs will be created in 3 years. These 65 jobs will probably be created in Poland (Member State with a saturated employment market) and not in France (high unemployment rate). In addition, the authority noted that a French site already existed where there are 25 jobs that were now threatened by relocation and a very high risk of closure of the French site. However, a relocation with the use of State aid is considered incompatible with the RAG 2014.

- **Example 2**: a large Korean company (battery manufacturing) wanted to make an investment in the EU in an assisted area (project to create a battery site for electric vehicles). The initial investment was EUR 1.3 billion of investment and the company planned to create more than 1,000 jobs. The company had several choices of location: Poland or France. In this case, there was a significant rate differential between France (10% maximum) and Poland (50% maximum), even if a notification procedure could be envisaged by France. The maximum adjusted regional aid amount was therefore EUR 47 million for France and EUR 120 million for Poland. The Korean company decided to invest in Poland because of the rate differential even though this Member State is experiencing great difficulties in finding local labour and has to rely mainly on workers from Ukraine (*i.e.* not an EU Member State).

According to some authorities in 'c' regions, rules regarding large investments need to be reviewed in order to avoid the investments from locating in another region. The limitations may even result in existing investment being relocated in the next step without using State aid - see above an example in which the envisaged investment in France would have been an "extension of capacity", while in Poland it would be an "initial investment", which results in the investor likely locating its new investment and possibly relocating its existing investment to Poland later, even if it would not be possible to grant State aid for the relocation.

In this regard, suggested amendments include for example reviewing regional maps taking into account unemployment rate, aligning mid-cap status to that of SMEs by allowing them to benefit from regional aid not only for initial investment.

4.2.3.2 Expert interviews

One expert emphasised that when bargaining with local or regional governments, large investment projects by large companies and multinationals have a much better bargaining position than mid-scale or small companies. Large companies have teams dedicated to negotiating incentive schemes around the world, so that they are much more aware of economic contributions and impacts that they can make. The State aid rules in Europe limit this negotiating power by restricting the list of regions that can potentially make an offer. Mid-scale companies leave a lot of room to the negotiating partners and do not use their negotiation position fully. For authorities, negotiations are mostly about jobs or CO2 reduction, which are major priorities for governments.

4.2.4 Projects for which no regional aid has been granted

This section addresses the specific question of where the investment was made, in cases where companies applied for aid in a certain region but finally decided to invest elsewhere. The analysis of this question is based on (i) the replies received from the aid-granting authorities to the survey prepared specifically for the

purpose of this report, (ii) expert interviews conducted specifically for the purpose of this report and (iii) case studies.

4.2.4.1 Evidence from the survey

In relation to large investment projects, the results of the survey were described above in section 4.3.2. The majority of the responding authorities had not encountered this situation, and for those who did, the projects located in majority in another EU Member State.

Out of the 65 responding authorities, 59 did not answer the question on what happened to the projects to which they denied to grant regional aid. Of the remaining 6 authorities, 4 answered that they did not know what happened to any of the projects after they were denied aid. One Spanish authority responded that each of the 18 projects that were denied aid went ahead in the same region but at a later point in time. Finally, one Bulgarian authority reported that one of the two projects that were denied aid went ahead in the same region in the same scope.

In relation specifically to LEs, 46 out of the 66 responding authorities did not answer the question on how many times they wanted to support a project but were not allowed under the RAG 2014 and the GBER.

The remaining 19 authorities answered that they were not allowed to grant regional aid to a total 561 projects of LEs:

- for 398 of these projects the authorities did not know what happened subsequently;
- 106 of these projects went ahead in the same region and with the same scope. The vast majority of these (89) concerned the Slovenian Regional Development Fund, which apparently approved a loan without State aid;
- 3 of these projects went ahead in the same region at a later point in time;
- 12 of these projects went ahead in the same region with some adjustments (size reduction *etc.*);
- 10 of these projects went ahead in another EU 'a' region;
- 9 of these projects went ahead in another EU region but the authority did not know whether it was an 'a' or a 'c' region;
- 15 of these projects went ahead in another region outside the EU;
- 7 of these projects went ahead in the same region but under other (non-regional) State aid rules which resulted in a reduction of their size; and
- 1 of these projects was cancelled.

4.2.4.2 Evidence from expert interviews

Interviewed experts did not provide any information about projects, which applied for State aid, but finally decided not to invest.

4.2.4.3 Evidence from case studies

Case studies can provide insights on investments which first have been notified under the RAG 2014 and for which the notifications then were withdrawn (see

Appendix 3 for details). Many of them were pursued without State aid, suggesting the lack of incentive effect:

- Out of six notifiable investments in 'a' regions, one notification was withdrawn and the investment was pursued without regional aid. Thus, *ex post*, this case would likely not have been found compatible with the RAG 2014 as the aid likely did not create an incentive effect. The remaining five investments in 'a' regions got an approval decision.

- For ten out of eleven notifiable investments by large enterprises in 'c' regions the notifications were withdrawn, for one of them after an opening decision. Five of them were pursued without regional aid. For the other five, it is not clear whether they were pursued, but likely not. For two cases there are indications that the regional aid notifications had been withdrawn because of mergers, in which the companies had been involved, which happened in parallel. For the other cases, we could not find the information whether these investment projects went through without aid. Since the investment projects were small, the investors might have not published information on them even if they were pursued.

4.3 RESTRICTIONS ON LARGE ENTERPRISES IN 'C' AREAS

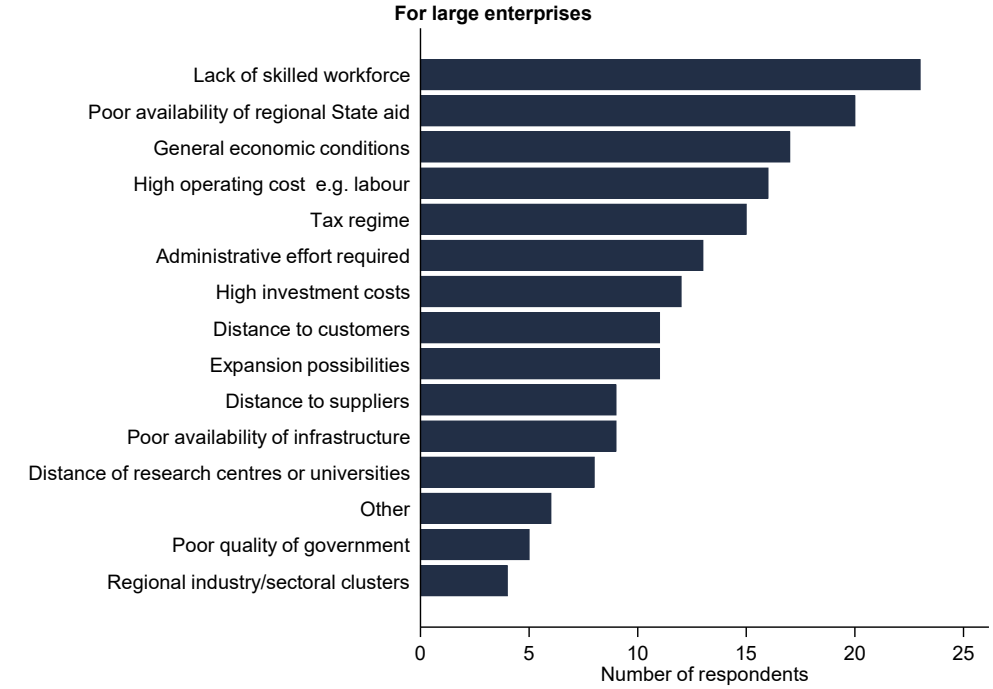
This section looks at what has been the impact of the restrictions on aid to large companies in 'c' areas (eligibility of projects) introduced in 2014. In particular, it exhibits evidence regarding whether that it resulted in shifts of investments to other areas (non-assisted areas, 'a' areas or outside the EU) or have led enterprises to abandon investments.

There is quite some evidence from the survey with granting authorities, from case studies with companies, as well as from the econometric analysis that the State aid restrictions in 'c' areas on large enterprises deter investment. Indeed, it seems that this is generally one of the most important factors that make it difficult to attract investments from large enterprises.

4.3.1 Evidence from the survey

Aid-granting authorities reported that poor availability of regional State aid is generally one of the most important factors that make it difficult to attract investments from large enterprises. As shown in Figure 35, for large enterprises, it is the obstacle reported second-most often by authorities. For SMEs, on the other hand (Figure 36), poor availability of regional State aid is not in the top ten most common replies. Rather, authorities mainly reported other obstacles, such as general economic conditions, administrative effort required and high investment costs.

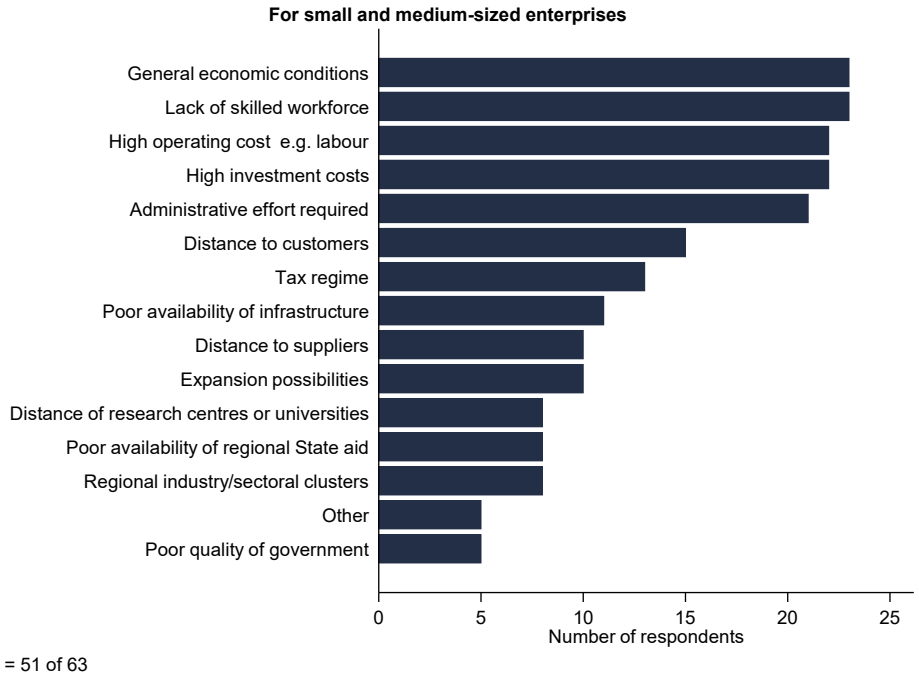
Figure 35: Are any of these factors particularly relevant to attract investment of some types of enterprises or investments to your region? – For large enterprises (Question 5)



N = 51 of 63

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

Figure 36: Are any of these factors particularly relevant to attract investment of some types of enterprises or investments to your region? – For small and medium-sized enterprises (Question 5)



Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

Authorities were asked how many times, since 2014, they wished to support an investment, but were not allowed to grant regional State aid under the current framework. Out of the 47 respondents, 24 authorities reported having been in this situation. Most commonly, these authorities perceive the main issue to relate to the rules applicable to large companies in 'c' regions: 14 authorities considered this causes their region to lose out on many investments.

According to some authorities in 'c' regions, rules regarding large undertakings need to be reviewed in order to keep investments in their region. Suggestions mentioned include a review of the regional map taking into account unemployment rates and alignment of mid-cap status on those of SMEs by allowing them to benefit from regional aid not only for initial investment into a new economic activity.

For instance, a Belgian authority wrote:

> "*The fact that large enterprises should invest in 'new activities' is considered to be very difficult to apply in practice and also politically unwanted. It is difficult to explain to enterprises which say they are going to invest in a totally new activity or innovative change in their work flows or processes that this is not a 'new activity' as there is e.g. not a change in NACE code.*"

In the same vein, a Maltese authority stated:

> "*The reduced support to large enterprises has resulted in investments being channelled to 3rd countries (especially for companies already present in the region). Furthermore non-SMEs that are not global in nature and that have employment that is in the region of 1500 FTE [full-time equivalent] could*

have increased investment and carried out further innovations if aid to these enterprise had not been reduced due to the revised regional classification."

A Spanish authority further reported:

"*In the case of large companies, only new ones can be subsidised or the diversification of existing establishments. A diversification, such as described in the RAG, is difficult to implement, and companies are trying to centralise the current establishments to be more efficient and not to create new sites. These facts hinder the implementation of the RAG.*"

Another Spanish authority additionally referred to the fact that being classified as a 'c' region adjacent to an 'a' region brings discrepancies in terms of State aid to large companies.

When asked about a time when they received an application to support a large investment project with regional State aid, but the company finally decided not to invest in their region, a French authority gave a detailed example of an American investor planning an investment in packaging manufacturing which was not eligible in the 'c' area in France because the investment was an extension of the existing capacity (see example 1 in section 4.2.3.1).

4.3.2 Evidence from the case studies

The case studies show that large enterprises often struggle with the restrictions on receiving aid for investments in 'c' areas. The additional requirements of paragraph 15 RAG 2014 state that regional aid to large enterprises cannot be regarded to be compatible with the internal market, '*unless it is granted for initial investments that create new economic activities in these areas, or for the diversification of existing establishments into new products or new process innovations'* (paragraph 15 RAG 2014). Moreover, the notification is required for all such investments, including those below the notification thresholds. Even if the aid amounts were low, indicating low *ex ante* risks to competition and trade between Member States, the effort expected in notifying and assessing the cases involving the evaluation of the novelty of products or processes might have been so high, that the Member States withdraw the notifications.

Whereas only one out of six notifiable investments by large enterprises in 'a' areas was withdrawn, ten out of eleven notifiable investments by large enterprises in 'c' areas were withdrawn. The one investment by a large enterprise in a 'c' area that was pursued until a decision and not withdrawn, comprised an aid budget of EUR 32.9 million ([Hamburger Rieger]), which can be considered high compared to other 'c' area cases but low compared to 'a' area cases.

4.3.3 Evidence from expert interviews

Interviewed experts were primarily concerned about the transparency of eligibility criteria, the burden and costs associated with the application process and the level and depth of confidential internal information that the beneficiaries would have to provide to the aid granting authorities. They also noted reputational risk: if a company gets a grant, the market could see it as evidence of financial constraints. These concerns refer not only to large enterprises in 'c' areas, but regional State aid cases more generally. The practice of presenting all beneficiaries in a public database by the Commission may thus be concerning for some beneficiaries who do not want to show to the market that they have financial constraints.

Only one expert specifically mentioned examples of constraints on State aid eligibility for large enterprises in 'c' areas. She has seen two or three cases where a large company wanted to extend existing capacity, but could not do so with

State aid because it was located in a 'c' region. As a result, they increased the capacity in their other locations, mostly in other countries.

4.3.4 Evidence from econometric analysis

To address how additional restrictions on large enterprises in 'c' areas affect their investment, we propose a second empirical methodology that solely focuses on those 'c' areas that did not face a change of the maximum aid intensity (*i.e.* 'c' areas located on the dotted 45 degree line in Figure 31 that describes our identification strategy). These areas – which were the control areas for the methodology discussed in section 4.2.1.2 — are now considered to be the treated ones as they were affected by only one policy change after 2014: the imposition of additional restrictions for LEs. The control areas are chosen among those regions that were non-eligible both before and after 2014 (those areas located in the origin of the diagram in Figure 31). To make sure that the control regions are comparable to those in the treatment group, we use a propensity score matching procedure to account for selection on observables. This approach allows selecting those non-assisted regions that are as similar as possible to the 'c' regions along a list of observable characteristics (GDP per capita at NUTS 3 level, population density, country of location…).In this additional empirical assessment, we do not need to care about the potential confounding effect of the change in maximum aid intensities since none of the treated and control areas was affected by these changes. In this sense, this analysis is complementary to the analysis presented in section 4.2.1.2.

This approach is to verify whether and how the additional restrictions imposed on 'c' areas impacted large enterprises. Furthermore, if our identification strategy is correct, we should only measure an effect for LEs but not for SMEs, as these companies were not directly affected by the restrictions.

The most important element of our approach is to be able to match treated 'c' areas with similar non-eligible regions through the matching procedure. This is a challenge in a cross-country setting such as ours. Our empirical strategy relies on the choice of non-assisted areas that had *ex ante* the same attractiveness for regional investments in terms of observable characteristics as those assigned as `c' areas and which have seen no change in maximum aid intensities between the RAF 2007 and the RAF 2014. The variables used in this procedure include growth-trends and levels at the NUTS 3 regional level provided by Eurostat: employment rate, GDP in PPS per capita, as well as labour productivity in terms of GDP in PPS per-worker. In particular, we focus on average values of these variables in the period 2008-2009, *i.e.*, the two last years prior to the time period of our analysis. By choosing a period well before the treatment, we are more confident of including only variables that are unaffected by the treatment and, thus, avoid spurious correlation. We perform a nearest-neighbour propensity score matching procedure with replacement (se Appendix A10.5.2 for an in-depth discussion).We retain 41 treated 'c' regions and 37 matched control non-eligible regions.[52]

The matching procedure works well as, after we implemented it, treated and control areas are statistically indistinguishable along those observable dimensions used for the matching procedure, while this was not the case before the matching. Similarly, as in the previous empirical assessment, we verify the existence of a common trend for investment to GDP. Results suggest that trends were similar in 2011, 2012, but control regions observed a sharp reduction of investment to GDP in 2013, while treatment regions did not. This drop seems to be driven by

[52] In the treatment group we have regions from Belgium, Finland, France, Germany, Italy, the Netherlands, Spain, Sweden and the UK, whereas among the controls we have regions from Belgium, France, Germany, Italy, the Netherlands, Sweden, and the UK.

investment rather than changes in GDP. We will come back to this point when discussing our results.

Table 12 reports our main results. As discussed above we report separately results for large firms (first and third columns) and compare these to results on small and medium firms (second and fourth columns). The first two columns show our main results based on a sample including all years in the analysis. While investment in non-assisted, control areas increased by 8.8 percentage points, we find a negative and significant effect in areas facing additional restrictions on large enterprises ('c' areas) by approximately 6 percentage points as compared to the control group. The overall effect for these areas is the sum of the two and approximatively equal to 2.8 percentage points. This implies that investment in 'c' areas increased notwithstanding the additional restrictions on large enterprises. Yet, this increase would have been much larger, had these restrictions not been imposed. Note that this effect is almost identical to the effect we measured for the same areas by means of the previous econometric strategy and reported in Table 11 in section 4.2.1.2. This is reassuring. Indeed, we can now convincingly argue that 'c' areas that did not face changes in the maximum aid intensities observed an increase in investment by large firms, but this increase would have been even larger had the RAG 2014 not imposed additional restrictions on them in 'c' areas.

As reported in the second column, the effect on investment by small and medium firms is also increasing in control areas but it is not significantly different in treatment regions. This implies that small and medium enterprises in 'c' areas are not affected by the additional restrictions on large enterprises, as one would expect. This additional result reinforces that are identification strategy is able to correctly identify the effect of restrictions on aid to LE's in 'c' areas. Also in the case of medium and small firms, the results mimic those obtained by means of the previous analysis reported in Table 11 in section 4.2.1.2: the sum of the coefficients is approximatively 1.5 percentage point, which is very close to the estimates for the control group reported in Table 11.

Table 12 Regressions on investment to GDP (in %) at the NUTS 3 level, distinguishing between large and medium and small enterprises – propensity score matching

	All years		Excl. 2013-2014	
	Size L	Size S&M	Size L	Size S&M
post	8.80***	2.12***	14.9*	4.22**
	[3.56,14.0]	[0.80,3.45]	[-1.06,30.9]	[1.00,7.44]
post × *Treat*	-6.00**	-0.61	-5.83	0.36
	[-11.9,-0.055]	[-2.73,1.50]	[-16.0,4.36]	[-2.00,2.72]
Fixed effects	yes	yes	yes	yes
Clustered SE	yes	yes	yes	yes
NUTS2 trends	yes	yes	yes	yes
Observations	468	468	312	312

95% confidence intervals in brackets

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).

As discussed above, while treated and control areas show parallel trends in terms of investment to GDP for 2011 and 2012, in 2013 we observe a sharp drop in investment in control areas, which goes up again in 2014. Therefore, as a robustness check, we drop the years 2013 and 2014 from the sample. This clearly comes at a cost of substantially limiting the number of observations in our estimation, and consequent loss of predictive power. The two last columns of Table 12 present our results. While the effects of the restrictions on investment made by large enterprises is no longer significant, it remains similar in size. Although being much larger than in the previous estimates, the confidence interval is much skewed at the right, thus indicating that the effect is largely negative. These results are therefore comparable to those obtained using the full sample, although losing some significance due to having fewer years and, thus, less observations.

Additional findings on the effect of restrictions on aid to LE's in 'c' areas on regional development as measured by gross value added (GVA) provided at the fine-grained NUTS 3 level by Eurostat suggest that the restrictions caused a reduction in regional development of 2 percentage points as compared to the control areas (see Appendix).

Our identification is careful to control observable characteristics. Not only do we control for several regional drivers of investment as well as fixed-effects and trends, but we also compare regions that are similar to each other. Furthermore, the convergence of results across specifications and the adherence of the results to *a priori* set expectations give us confidence on the causal nature of our findings.

Some caveats remain. First, our identification strategy is based on a small number of regions, as there are only few 'c' regions that did not experience changes in the maximum aid ceilings (74 as provided in Table 6). The small number issue is then partially exacerbated due to the difficulty of finding good matches based on a reasonable number of observable characteristics (we can only match 43 out of the 74 regions). We applied several specifications for our matching procedure that robustly lead to qualitatively similar results to those reported. Nevertheless, the precise point estimates have to be taken with caution.

Second, the evaluation exercise is mostly based on three years of data after the introduction of the RAG 2014. Data for the last year in our sample (2016), however, is of lower quality than for the years before. To confirm our results, the same exercise should be repeated with one or two additional years of data. This would also be a possibly better time frame to more precisely assess the effect of a major change in regulation. Of course, one has also to be careful not to extend the analysis to a too large time period, because it might become more difficult to assess the causal nature of the nexus between policy changes and investment, as other confounders could then play a more important role.

5. EFFICIENCY OF REGIONAL STATE AID

In this chapter, we review the regional State aid cases that were notified to the Commission in the period between December 2014 and November 2017 in order to assess the extent to which the RAF ensures that the Commission treats the most distortive cases (Question 4). Specifically, we were asked to answer the following questions:

- To what extent was the risk of negatively affecting competition and trade associated with the (pre-) notified regional aid balanced with the effort required from the stakeholders involved in notifying and assessing the case under the RAG?

- What happened to the projects related to (pre-) notified regional investment aid cases that were subsequently withdrawn? To what extent were those investment projects carried out? Did those projects receive other types of aid?

The evidence from the case studies is supplemented by evidence from the survey. The conclusions are summarised in Section 9.2.

5.1 EVIDENCE FROM CASE STUDIES

In this section, we will summarize our assessment on the two efficiency questions derived from the case studies. For a detailed description of the individual assessments as well as the source of the available market characteristics, see the respective case studies in Appendix 4.

5.1.1 Balancing of competition distortions with administrative effort

For answering the question whether the *ex ante* risk of the aid negatively affecting competition and trade between Member States is balanced with the effort required for notifying and assessing the case under the RAG 2014, we first assess the expected amount of effort required by reviewing the effort spent in cases that were pursued to at least an opening decision or a decision not to raise objections. We then assess the potential risks of the aid to competition and trade between Member States for all cases from an *ex ante* perspective. Finally, we compare the potential risk of distortion of competition and trade between Member States from an *ex ante* perspective to the expected amount of effort required.

5.1.1.1 Effort required as a result of notification and assessment

To assess the effort expected from the stakeholders involved in notifying and assessing the case under the RAG 2014, we make use of the average effort spent on regional aid cases that led to an opening decision or a decision not to raise objections since 2014. That is, we expect for each case to be notified and assessed under the RAG 2014 that the effort that will be spent roughly corresponds to the average effort spent in past cases.

Out of the 22 reviewed cases, seven cases have an opening or no objection decision: two cases are for investments by large enterprises in 'c' regions and five cases for investments in 'a' regions. For one 'a' region case, Jaguar Land Rover, an opening and final decision was issued. The number of observations is generally low. When calculating the average notification effort we therefore look at the two 'c' region and four 'a' region cases with an opening decision or a decision not to raise objections together but exclude the one 'a' region case with an opening and final decision.

Table 13 summarises the effort spent in assessing these notified cases to a decision. While the Commission has provided the number of hours they spent on

each of these cases, the number of hours spent by the beneficiary and notifying authority is not available. For assessing the effort spent by the beneficiary and notifying authority, we therefore consider the number of meetings and requests for information ("RFI") questions, as the parties would have to dedicate additional time in preparing for the meetings and compiling documents and responses to the RFIs. Finally, the number of additional DGs consulted by the Commission on a particular case shows the complexity of the administrative process in the Commission's assessment.

Table 13: Summary of effort by stakeholders on cases with a decision

	Beneficiary	Incentive effect	Aid budget (EUR million)	Commission hours	Number of meetings	Number of RFI questions	DGs consulted
'a' region– opening and final decision	Jaguar Land Rover	Scenario 2 (non-EEA)	129.8				
	Average		**129.8**				
'a' region– one decision only	MOL Petrolkémia	Scenario 2 (same MS)	131.0				
	Mondi SCP	Scenario 2 (non-EEA)	46.0				
	BorsodChem	Scenario 1	42.0				
	STMicro-electronics	Scenario 2 (non-EEA)	18.3				
	Average		**59.3**				
'c' region (LE) – one decision only	Hamburger Rieger	Scenario 2 (same MS)	32.9				
	[…][53]	Scenario 1	4.2				
	Average		**18.6**				
Average 'a' and 'c' regions – one decision only			**45.74**				

Source: Based on information provided by the Commission.

The Commission spent on average […] on cases leading to an opening or no objection decision ('a' and 'c' region cases taken together). We consider this a substantial effort on average.

Due to the specific characteristics of each case, the amount of effort spent varies strongly between cases. For example, if the notifying authority is experienced in notifying cases to the Commission, the process is likely more straightforward and requires less effort overall.[54] If, on the other hand, the case raises substantial concerns, for instance about a relocation (per paragraph 122 of RAG 2014), the case likely takes additional effort to scrutinise. Thus, we have to take into account

[53] This beneficiary requested to be anonymous.

[54] […]

that each case may have specific differences that affect the amount of effort needed by the parties.

Focusing on the six cases with an opening decision or a decision not to raise objections only, *i.e.* excluding the Jaguar Land Rover case, the table shows that the two cases involving investments in 'c' regions required substantially more effort from the stakeholders than the four cases in 'a' regions. On average, approximately […] times as many hours were spent by the Commission for the two notifications of investments by large enterprises in 'c' regions, as opposed to the four cases involving investments in 'a' regions. The two 'c' region cases also had, on average, […] more RFI questions than the four 'a' region cases ([…] vs. […]). In terms of meetings, the average for the two 'c' region cases is similar, albeit slightly higher, than that for the four 'a' region cases ([…] instead of […] meetings). The difference in effort spent is likely related to the additional requirement for investments by large enterprises in 'c' regions based on paragraph 15 of the RAG 2014, *i.e.* that the investment must be for new economic activities or new product/ process innovations.[55]

Moreover, the effort required in coming to a final decision seems to be significantly higher than for coming to a no objection decision: the Commission spent almost […] times as many hours assessing the Jaguar case reaching a final decision compared to the four 'a' region cases, in which the Commission reached a no objection decision. This effort included […] meetings between the parties and over […] RFI questions by the Commission.

5.1.1.2 Potential risks of the aid to competition and trade between Member States from an *ex ante* perspective

Table 14 provides an overview of the *ex ante* risk of distortion of competition and trade between Member States across cases. It also states what happened to the investments in cases in which the notification was subsequently withdrawn. The cases are sorted by type of region and aid budget.

[55] Per the RAG 2014, large enterprises requesting aid for investments in 'c' regions are less likely to be affected by investing in a less developed region and the aid is unlikely to have an incentive effect. As such, investments by large enterprises in 'c' regions can only be for new economic activities or new product/ process innovations and must be notified, unless the investment involves the setting up or acquisition of a new establishment or diversification into a new activity (Commission's Impact Assessment on RAG).

Table 14: Overview of effort and potential effects on competition and trade between Member States

Case ID	Region	Aid budget (EUR million)	Aid intensity/ max (with scaling down)	Geo-graphic market	Market concentration	Competitive position of the beneficiary	Market in decline	Other	*Ex ante* risk of competition and intra-EEA trade distortion	What hap-pened to the investment?
SA.48382 - MOL Petrolkémia	a	131.0	15%/ 50% (19.3%)	EEA-wide	Moderately to highly concentrated	Not active before investment	No	Entry into new product market	High	Pursued with regional aid (approval decision)
SA.45359 - Jaguar Land Rover	a	129.8	9.2%/ 25% (9.2%)	At least EEA-wide	Moderately to highly concentrated (6 players with at least 10% market share in 2016)	Between [...] and [...]	No	Concern that the Member State granted additional State aid in the form of infrastructure improvements and land sale below market value	Very high	Pursued with regional aid (approval decision)
[...]	a	49.6	9.7%/ 25% (10.5%)	At least EEA-wide	Moderately concentrated	Strong overall […]	No	Possible relocation concern	High	Pursued (in part) without regional aid
SA.45584 - Mondi SCP	a	48.8	15.4%/ 35% (16.5%)	At least EEA-wide	Moderately concentrated	Moderate (CCM: <10%)	No	Possible relocation concern	High	Pursued with regional aid (approval decision)

Case ID	Region	Aid budget (EUR million)	Aid intensity/ max (with scaling down)	Geo-graphic market	Market concentration	Competitive position of the beneficiary	Market in decline	Other	*Ex ante* risk of competition and intra-EEA trade distortion	What hap-pened to the investment?
SA.49580 – BorsodChem	a	41.6	29.3%/ 50% (31.4%)	At least EEA-wide	Highly concentrated	Weak (in EEA)	No	Currently imports the intermediate product its parent company from China	Moderate	Pursued with regional aid (approval decision)
SA.44547, SA.44305 – STMicro-electronics	a	18.6	12%/ 25% (12%)	At least EEA-wide	Fragmented to moderately concentrated	Downstream: Depends on the segment (strong in some segments). Upstream (wafers): small.	No	Intermediate product - would increase vertical integration of STM	Moderate	Pursued with regional aid (approval decision)
[…]	a	18.2	19.2%/ 25%	At least EEA-wide	Fragmented	23rd in Europe	No	Currently imports the product from South Korea; 80% of sales go to two main customers (related companies)	Low	Pursued with regional aid (GBER)
SA.43624 - Hamburger Rieger	c	32.9	9.1%/ 20% (9.1)	At least EEA-wide	Moderately concentrated	Strong	No		High	Pursued with regional aid (approval decision)

Case ID	Region	Aid budget (EUR million)	Aid intensity/ max (with scaling down)	Geo-graphic market	Market concentration	Competitive position of the beneficiary	Market in decline	Other	*Ex ante* risk of competition and intra-EEA trade distortion	What hap-pened to the investment?
[…]	c	4.6	14.8%/ 15%	At least EEA-wide	Fragmented	Market leader	No	Relocation concern (reduction in activity in another EEA location in the year prior to notification)	Low	Pursued without regional aid
[…]	c	4.2	8.3%/ 10%	Regional (250 km catch-ment area)	Moderately concentrated, EEA-wide	EEA-wide market leader (top 5, 10%-20%)	No	Received aid for a related activity within two years; the catchment area of the investment location includes multiple other MS	Moderate	Withdrawn after opening decision; Pursued without regional aid
[…]	c	2.6	5.9%/ 10%	At least EEA-wide	Concentrated	Market leader	No		Moderate	Pursued without regional aid
[…]	c	2.1	6%/ 10%	At least EEA-wide	Potentially moderately concentrated	Possibly moderate	No	Intermediate product	Low	Pursued without regional aid
[…]	c	0.9	10%/ 10%	At least EEA-wide	Highly concentrated	Weak (4%)	Likely no		Very low	Likely pursued with regional aid (GBER)

Case ID	Region	Aid budget (EUR million)	Aid intensity/ max (with scaling down)	Geo-graphic market	Market concentration	Competitive position of the beneficiary	Market in decline	Other	*Ex ante* risk of competition and intra-EEA trade distortion	What hap-pened to the investment?
[…]	c	0.87	5%/ 10%	National	Highly concentrated	Market leader	No	Unclear if, due to regulatory requirements, the specified investment could take place in another country	Low	Pursued without regional aid
[…]	c	0.6	6%/ 10%	At least EEA-wide	Fragmented	Moderate	No		Very low	Unclear
[…]	c	0.5	4.9%/ 10%	Regional (250 km catch-ment area)	Moderately concentrated, EEA-wide	EEA-wide market leader (top 2)	No	The 250 km catchment area of the investment location does not include another MS	Low	Likely not pursued for external reasons
[…]	c	0.2	7.2%/ 15%	At least EEA-wide	Moderately concentrated	Weak	No		Very low	Likely not pursued for external reasons
[…]	c	0.2	5%/ 10%	National	Fragmented	Unknown	Likely no		Very low	Not pursued for external reasons
[…]	c	0.1	5%/ 10%	Unknown	Fragmented	Unknown	Likely no		Very low	Unclear

Case ID	Region	Aid budget (EUR million)	Aid intensity/ max (with scaling down)	Geo-graphic market	Market concentration	Competitive position of the beneficiary	Market in decline	Other	*Ex ante* risk of competition and intra-EEA trade distortion	What hap-pened to the investment?
[…]	c→a	0.8	5%/ 10%	Regional (200-600 km catch-ment area)	Moderately concentrated	Moderate (8%)	No	Catchment area does not overlap with other Member States	Low	Pursued with regional aid (GBER)
[…]	c→a	0.3	9.8%/ 10%	At least EEA-wide	Fragmented	Top 10	Likely no		Very low	Pursued with regional aid (GBER)
[…]	c→a	0.2	4.9%/ 15%	At least EEA-wide	Fragmented	Top 20	Likely no		Very low	Pursued with regional aid (GBER)

Source: Own research using publicly available sources.

5.1.1.3 Balancing

With respect to the first efficiency question of whether the *ex ante* risk of the regional aid negatively affecting competition and trade between Member States was balanced with the expected effort required from the stakeholders involved in notifying and assessing the case under the RAG 2014, we draw the following conclusions:

1. **In all six notifiable[56] cases concerning investments in 'a' regions the expected effort was balanced with the *ex ante* risk:** We find that for the six cases concerning investments in 'a' regions notifiable under the RAG 2014, the *ex ante* risk of the aid to competition and trade between Member States was at least moderate. Hence, the expected effort of notifying and assessing these cases under the RAG 2014 was balanced with the *ex ante* risk. This assessment is predominantly based on the at least moderately high aid budgets in these cases, which range between EUR 18.6 million and EUR 131 million.

2. **In three notifiable cases concerning investments by large enterprises in 'c' regions the expected effort was balanced with the *ex ante* risk:** In three cases concerning investments by large enterprises in 'c' regions, we find at least a moderate *ex ante* risk of the aid to competition and trade between Member States. We conclude that the expected effort of notifying and assessing these cases under the RAG 2014 was balanced with the *ex ante* risk. This assessment is confirmed by the fact that in two out of three cases, the notification was withdrawn and the beneficiaries nonetheless pursued, at least in part, the investment projects without regional aid (in the remaining case the aid was approved by the Commission). Thus, *ex post*, these withdrawn cases would likely not have been found compatible with the RAG 2014 as the aid likely did not create a substantive incentive effect. What is more, the fact that these cases were later on withdrawn suggests that the projects might not have been notified in the first place if the criteria of paragraph 15 RAG 2014 had been more clear or straightforward.

3. **In eight notifiable cases concerning investments by large enterprises in 'c' regions the expected effort was unbalanced with the *ex ante* risk:** In eight cases concerning investments by large enterprises in 'c' regions, we find low or very low *ex ante* risk of the aid to competition and trade between Member States. We conclude that in these cases the expected effort of notifying and assessing the cases under the RAG was imbalanced with the *ex ante* risk of the aid to competition and trade between Member States. This assessment is confirmed by the fact that in all eight cases the notification was withdrawn and in five out of the eight cases it is unclear whether the beneficiaries pursued the investment projects without regional aid or the projects were dropped for external reasons. In these cases, it seems disproportionate to invest the required effort in establishing whether the aid was compatible with the RAG 2014. This is because even if the assessment showed that the aid was not compatible with the RAG 2014, the negative effects on competition and trade between Member States would likely be rather low, in particular due to the relatively low aid budgets. Nonetheless, the assessment would require a very high amount of effort from the stakeholders. Indeed, the regional aid authority of one country indicated to us that due to the effort required in notifying cases, they will no longer support regional aid for investment projects under EUR 50 million that require notification. It cannot be excluded that for this type

[56] "Notifiable" investments are those that required notification under the RAG 2014. These are distinguished from the cases that were notified and then withdrawn once it was realized that the aid could be put in place under GBER.

of cases, the projects would not have been notified if the criteria of paragraph 15 RAG 2014 had been more clear or straightforward.

4. **In all five cases that could be put in place under GBER the expected effort of notifying and assessing the cases under the RAG 2014 would have been imbalanced with the *ex ante* risk:** In five cases the aid was eventually put in place under GBER, in two cases because they were erroneously notified under the RAG 2014 and in three cases because the region status changed from 'c' to 'a' region during the assessment and before aid granting. In all of these cases we conclude that the *ex ante* risk of distortion of competition and trade between Member States were low or very low. Hence, the expected effort required to notify and assess them under the RAG 2014 would not have been balanced with the *ex ante* risks. This assessment is primarily based on the low aid budgets in these cases: in the four cases notified in 'c' regions the aid budgets were below EUR 1 million; in one case, […], the investment was to be undertaken in an 'a' region and the aid budget was EUR 18.2 million.

   In the two cases, which were erroneously notified under the RAG 2014([…] and […]), no effort was in fact required as the regional aid was eligible under GBER. Due to this error and/ or misunderstanding, a substantial amount of unnecessary effort was exerted by both the Commission and the parties. That the Commission and parties went through a significant amount of effort before it was realised that this aid could be granted under GBER suggests that the GBER requirements may not be clear to the Member States and beneficiaries. The Commission has indicated that it is the responsibility of the Member State's aid granting authority to check whether a case could be eligible under GBER, and, if so, to ensure compliance with GBER rules.

5.1.2 Withdrawn projects

Table 14 above provides an overview of what happened to the investments in cases in which the notification was subsequently withdrawn. The following conclusions can be drawn:

1. **One investment out of six notifiable investments in 'a' regions (17%) was withdrawn and pursued without regional aid:** Five out of the six cases concerning investments in 'a' regions were pursued until a decision, and all of these cases were ultimately approved by the Commission. In the one case, for which the notification was withdrawn, the beneficiary pursued the investment without regional aid. Thus, *ex post*, this case would likely not have been found compatible with the RAG as the aid likely did not create a substantive incentive effect.

2. **Ten out of eleven notifiable investments by large enterprises in 'c' regions (91%) were withdrawn:** Ten out of eleven cases concerning notifiable investments by large enterprises in 'c' regions were withdrawn, one of them after an opening decision. This compares to one out of six cases concerning investments in 'a' regions that were withdrawn. In the two 'c' region cases that were pursued until a decision, the aid budgets were EUR 32.9 million (Hamburger Rieger) and EUR 4.2 million ([…]), which can be considered high compared to other 'c' region cases. In the latter case, the notification was eventually also withdrawn after the opening decision. Hence, regional aid notifications for investments in 'c' regions usually get withdrawn if the aid budget is very low or low, lying below the notification thresholds. An explanation could be the additional requirements of paragraph 15 RAG 2014, which make a notification nevertheless necessary. Paragraph 15 of the RAG 2014 states that regional aid to large enterprises in 'c' regions cannot be regarded to be compatible with the internal market, "*unless it is granted for initial investments that create new economic activities in these*

areas, or for the diversification of existing establishments into new products or new process innovations." Accordingly, only large projects with large investment costs (often requiring higher aid amounts) are likely to meet those additional requirements of paragraph 15 RAG 2014.[57]

a. **Four out of five investments with aid budgets above EUR 1 million were withdrawn and pursued without regional aid:** In four out the five cases concerning notifiable investments by large enterprises in 'c' regions with aid budgets above EUR 1 million, the notification was withdrawn and the beneficiaries nonetheless pursued, at least in part, the investment projects without regional aid. Thus, *ex post*, these cases would likely not have been found compatible with the RAG 2014 as the aid likely did not create a substantive incentive effect.

   Five out of six investments with aid budgets below EUR 1 million were withdrawn and likely not pursued without regional aid: For two cases ([…] and […]) there are indications that the regional aid notifications had been withdrawn because of mergers, in which the companies had been involved, which happened in parallel. For the other cases, we could not find the information whether these investment projects went through without aid. Since the investment projects were small, the investors might have not published information on them even if they were pursued.

3. **There is only limited information available on whether projects for which the notification has been withdrawn received other types of aid:** Various sources of information reveal that some of the beneficiaries in the withdrawn notification case have received monetary aid around the time of the withdrawals. However, it remains unclear from these sources whether the monetary aid concerns the same investment projects for which the notifications were withdrawn:

   a. […]

We also checked information provided by the Spanish authorities for all of the withdrawn projects in Spain but could not find any indications of regional aid or support beyond what is listed above (Dirección General de Fondos Europeos, 2019e).

5.2 EVIDENCE FROM THE SURVEY

In the survey, the aid granting authorities reported the resources they used to deal with regional State aid.[58] For the majority of the authorities (52%), the number of employees involved in regional State aid matters is below 10. Another 38% of the authorities have between ten and 49 employees and only 10% of the authorities have more than 50 employees dealing with regional State aid.

When investments require aid budgets not too far from the notification threshold, the authorities may adjust the aid amounts down to avoid the notification altogether. A few aid granting authorities reported that indeed they or the beneficiary reduced the requested regional State aid budget for an investment project just below the notification thresholds in order to avoid the administrative burden related to notifying the measure to the Commission. This concerns five Member States: Austria ("only in a few cases"), Belgium (3 cases), France (45

[57] In "fundamental change" cases of 'a' regions, it is also required that the projects have an effect on the entire production process. But these projects fall under GBER and hence do not undergo the scrutiny of the Commission.
[58] 58 (out of 63) authorities replied to the relevant question.

cases), Portugal (1 instance) and Slovakia (4 instances). 45 authorities stated that this has never happened to them, while 11 have not answered.

5.3 EVIDENCE FROM EXPERT INTERVIEWS

The interviewed experts provided insights in their perceived administrative burden related to notifying State aid at the Commission.

The experts were of the view that the notification and review procedure for an investment State aid case by the Commission is too long for the investment decision process and lacks transparency. They consider the level and depth of confidential internal information that the beneficiaries have to provide to the aid granting authorities in case of notification as very high. Beside the lengthy and burdensome notification process, there is the risk of losing the whole State aid budget if the aid is prohibited. Without notifying State aid, investors can get the amount up to the notification threshold without any risk, which would be an important advantage.

Investors face difficulties with the simple finding of the responsible authority or person in charge with some decision power in a local or national authority. Often, they are not aware of the decision-making process when involving the Commission. Investors would appreciate a contact person who could offer all necessary information. Even if this is not an issue related to the RAG 2014 directly, it shows that investors perceive the regional aid as a burdensome and intransparent support measure.

Notification thresholds strongly discourage investors, but most of the time the amount of aid is very clearly above or below the threshold, so there is no space for manoeuvre. For larger projects with the State aid budget close to the threshold, the project is likely to be structured to avoid the notification. This can even lead to reducing the size of the project to some extent. Two experts remembered cases where the authorities reduced the incentive amount to avoid notification to the Commission. Since 2014, investors in Hungary have not gone above the notification thresholds unless the investment was very large (but this was rare in the recent period). Moreover, there was a rush in December 2013 to finalise regional State aid contracts with authorities. Investors wanted to avoid uncertainty about the scope of the new guidelines, the decreasing regional maximum aid intensity and they wanted to avoid the obligation to notify to the Commission. In December 2013, an unusually high number of agreements between aid granting authorities and investors were signed, as companies were willing to speed up the usually 6 to 12 months administrative procedure of the cash grant.

6. RELEVANCE OF REGIONAL STATE AID

One of the aims of the regional aid is to bring convergence in wealth and economic development between European regions. This can be achieved by supporting the location of investments in the disadvantaged areas, by incentivising new investments within the EU and by attracting FDI to the EU's disadvantaged areas. This chapter assesses the relevance of regional State aid by examining whether regional aid helps to attract FDI to the EU's disadvantaged areas (Question 5):

- To what extent has the availability of regional investment aid been a relevant factor for enterprises to locate their investment in the EU's disadvantaged areas compared to other regions globally and compared to other factors?

- Is there a difference in this respect across the sectors or depending on the size of the enterprise?

First, we present evidence from descriptive analyses using UNCTAD country-level data on FDI flows. As the FDI data used does not contain details with respect to the industry and enterprise size, differences across these dimensions are not analysed. Next, we present evidence obtained from the expert interviews with location consultancy experts and the survey of aid granting authorities. The conclusions are summarised in section 9.3.

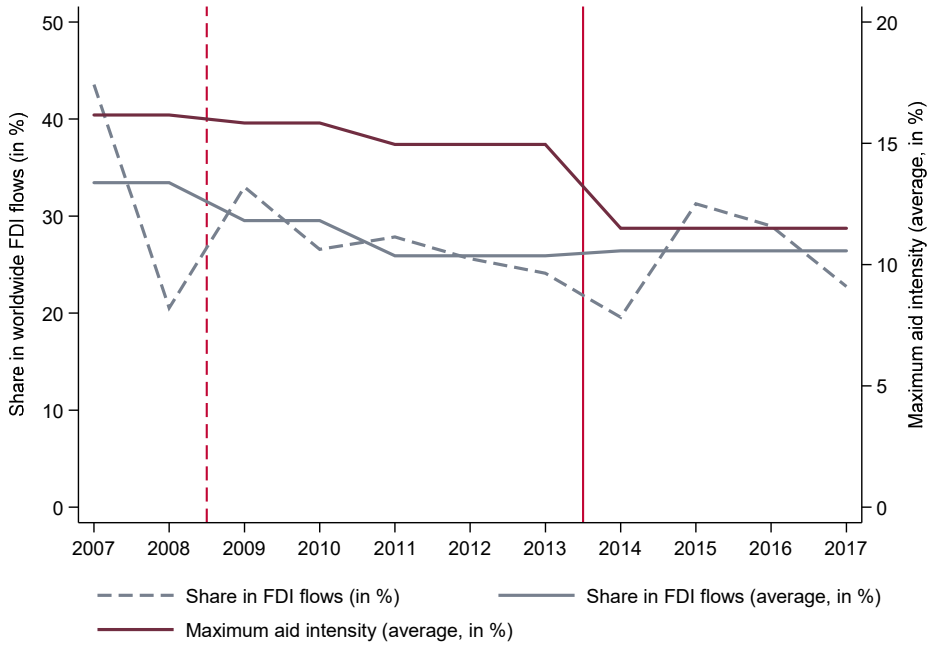
6.1 EVIDENCE FROM DESCRIPTIVE ANALYSIS OF FDI DATA

To analyse whether the availability of regional aid has been a relevant factor in attracting FDI into the EU's disadvantaged areas, we first describe and compare the evolution of FDI flows and regional State aid eligibility and intensity measures. The transition from the RAG 2007 to the RAG 2014 was characterised by a significant decline in regional aid intensity. As such, it is interesting to see what happened to FDI inflows during this transition. Comparing the evolution of FDI inflows and aid eligibility and intensity measures therefore provides first insights into the relevance of regional aid.

To analyse the impact on the EU's disadvantaged areas, we first present descriptive analyses for the EU28 as a whole. By aggregating both information on aid eligibility and FDI flows to the EU28 level, a summary is obtained of the trends in FDI flows and aid eligibility of the underlying regions. In a second step, we also provide insights into the developments at the country level, which provides a more detailed summary of evolution for each Member State separately. Analyses at a more disaggregate level (*e.g.* by region) were not feasible as the FDI data only contains information at the country level.

The following figure compares the development of FDI flows to the EU28 (as measured by the share in world FDI inflows) to the development of the average (maximum) aid intensity for the period 2007-2017. FDI flows fluctuate significantly from year to year, but such (short-term) fluctuations are not necessarily informative of (long-term) trends in FDI flows. To filter the effect of these fluctuations, the average share in FDI flows has been added for different periods that are of interest.

Figure 37: Development of FDI flows and maximum aid intensity



Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020)
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the 2007-2013 RAG. The dashed red line indicates the end of the 2007-2008 financial crisis.

During the period 2007-2017, the (average) maximum aid intensity in the EU28 decreased significantly from 16.2%[59] in 2007-2008 (start of the RAG 2007), to 15.8% in 2009-2010 (phasing out of areas that were only transitionally covered in 2007-2008), to 15.0% in 2011-2013 (mid-term review of the RAG 2007) and 11.5% in 2014-2017 (start of the RAG 2014). Therefore, the largest decrease in the (average) maximum aid intensity during the period 2007-2017 occurred when the RAG 2014 was introduced.

During the same period, the share of the EU28 in worldwide FDI inflows initially developed in a similar way. During the financial crisis of 2007-2008, the share in worldwide FDI flows was 33.4%. The share decreased thereafter to 29.5% in the period 2009-2010 (before the mid-term review) and 25.9% (after the mid-term review). Interestingly, the average share in FDI inflows slightly increased to 26.4% during the period 2014-2017. This contrasts with the sharp drop in the average maximum aid intensity that occurred when the RAG 2014 was introduced.

Overall, the (average) maximum aid intensity and the EU28's share in FDI inflows have therefore both decreased during the period 2007-2017. Such a co-movement (or correlation) does not necessarily indicate that the decrease in FDI inflows was caused by the reduction in aid intensities. In fact, the largest decrease in the (average) maximum aid intensity, which occurred when the RAG 2014 was introduced, was followed by a slight increase in FDI inflows. This opposite contemporaneous development is likely to be driven by other factors beyond the scope of this study. FDI may also lag behind the (changed) regional State aid rules, such that only after a longer period the effects of the reduced aid eligibility

[59] This number is an approximation, as the underlying (NUTS 3) data used for this analysis does not contain detailed information the transitionally covered areas.

may become apparent. However, both in 2015 and 2016 (respectively one and two years after the introduction of the RAG 2014), the share in FDI flows was still considerably higher than in the years preceding the introduction of the RAG 2014. Only in 2017 did the share of FDI flows decrease close to the 2013 level.

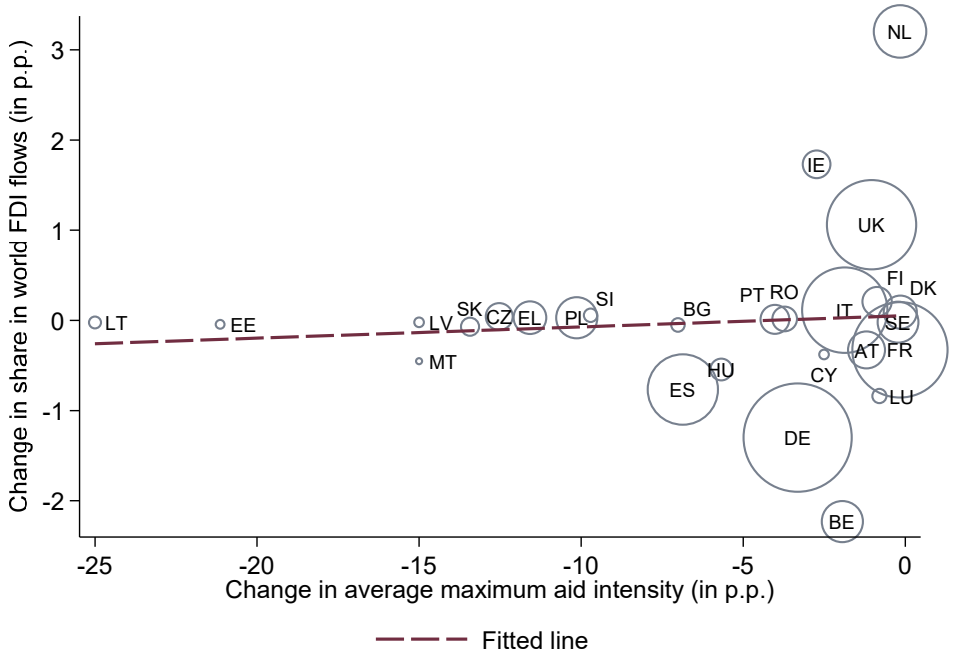
The previous figure showed the development of FDI and aid eligibility at the EU28-level. Insights that are more detailed can be obtained by analysing individual Member States. As indicated in section 2.1.5.2, there is a negative relation between the (average) maximum aid intensity and the share in FDI inflows, which illustrates that regional State aid targets precisely those Member States with less developed regions. This negative relation should not be interpreted as being informative on the effect of maximum aid intensity on FDI inflows, as there are many other factors that differ across countries. Similar to the analyses at the EU28 level, we will therefore primarily focus on differences in the evolution over time.

Member States vary significantly in terms of the *level* of aid eligibility, as well as in terms of the *evolution* of eligibility over time. Not all Member States were affected equally by the introduction of the RAG 2014. In some Member States the (average) maximum aid intensity was reduced more than in others. From this perspective, insights on the relevance of FDI can be obtained by analysing and comparing the development of maximum aid intensities and FDI flows for each of the Member States. In this respect, Appendix 5 provides figures showing the development of FDI flows and aid eligibility separately for each of the 28 EU Member States.

The following figure summarises the development for each of the Member States (excluding Croatia)[60] during the period 2009-2017. The financial crisis period of 2007-2008 is excluded, as this period is not likely to be representative of general (long-term) trends. The figure shows for each country the *change* in (i) the (average) maximum aid intensity and (ii) the share in world FDI flows in 2014-2017 (after the introduction of the the RAG 2014) relative to 2009-2013 (the RAG 2007). The economic size of each country is reflected by the size of the circle, which is proportional to the country's GDP.

[60] Croatia is excluded from the overview, as it was not an EU Member State throughout the entire period 2007-2017 (accession on 1 July 2013).

Figure 38: Changes in maximum aid intensity and FDI flows (2014-2017 vs. 2009-2013)



Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensities weighted by regional population. (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed red line indicates the fitted (linear) relation.

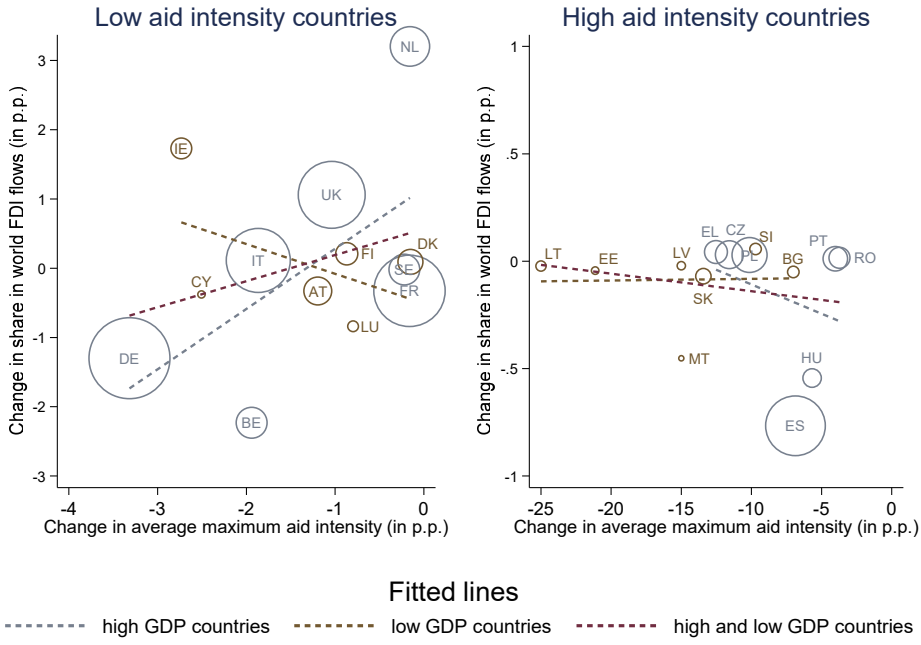
As can be seen from the figure, the change in the (average) maximum aid intensity from 2009-2013 to 2014-2017 varies significantly across Member States. The Member States that experienced the largest decrease in the (average) maximum aid intensity are Lithuania (-25 percentage points, reduced from 50% to 25%), Estonia (-21.1 percentage points, from 46.1% to 25%), Latvia (-15 percentage points, from 50% to 35%) and Malta (-15 percentage points, from 30% to 15%). By contrast, the (average) maximum aid intensity decreased by only (approximately) 0.2 percentage point in Denmark (from 0.94% to 0.79%), the Netherlands (from 0.91% to 0.75%), France (from 3.64% to 3.48%) and Sweden (from 2.06% to 1.84%).

On average, countries that experienced a larger decrease in the (average) maximum aid intensity also experienced a larger decrease in the share of FDI flows. This relation is depicted by the dashed red line, which indicates the fitted linear relation. The observed relationship is, however, quite weak, as there is a large dispersion of countries around the fitted relation (correlation coefficient of 0.09).

Member States differ in several important ways other than maximum aid intensities that can also have an effect on the development of FDI flows. For example, Member States differ substantially in terms of overall economic size (*e.g.* as measured by GDP). Countries with a higher GDP might have a larger share in (worldwide) FDI flows to start with. Countries also differ significantly in the overall economic development. Such differences in terms of development will give rise to differences in the initial (average) maximum aid intensities (*i.e.* before the introduction of the RAG 2014), such that the same change in the (average) maximum aid intensity can have different effects (depending on the maximum aid intensity prior to the change).

Ideally, a cross-country comparison only compares countries that are quite similar. However, there are many ways in which countries differ, such that it is not possible to compare countries that are similar in terms of all relevant factors. The following figure therefore shows sets of countries that are more comparable in at least two factors: (i) initial maximum aid intensity (as measured by the (average) maximum aid intensity in 2009-2013) and (ii) GDP. In particular, countries are split into two groups of (average) maximum aid intensities ('high' and 'low') and further segmented according to their GDP within the (average) maximum aid intensity groups ('high' and 'low' GDP countries).

Figure 39: Changes in maximum aid intensity and FDI flows (2014-2017 vs. 2009-2013) – by country groups



Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensities weighted by regional population (ii) The size of the circle is proportional to the GDP of each Member State. (iii) The dashed lines indicates the fitted (linear) relations for the different groups of countries.

Countries with a high initial (average) maximum aid intensity (figure on the right) experienced the largest decline in their average maximum aid intensity (ranging from -3.7 percentage points for Romania (RO) to -25 percentage points for Lithuania (LT)). For these countries, there does not appear to be a clear relation between changes in the (average) maximum aid intensity and the share in FDI inflows. Irrespective of the change in the (average) maximum aid intensity, most countries experienced a similar change in the share of FDI flows. This is true for both countries with a relatively low and high GDP (fitted lines in gold and grey, respectively).

Among the countries with a low initial (average) maximum aid intensity (figure on the left), the average relation between changes in FDI flows and aid intensity is positive and more apparent. Furthermore, this positive relation is driven by those countries that have a relatively high value of GDP (BE, DE, FR, IT, UK, NL). These countries experienced a relatively small decrease in their (average) maximum aid intensity (ranging from -0.2% (NL, FR, SE) to -3.3% (DE)). From this perspective, it is therefore surprising to find a stronger relationship compared

to the low (average) maximum aid intensity countries, which experienced larger reductions in the (average) maximum aid intensity. This suggests that the observed positive relationship might be caused by other factors that are not related to the change in the (average) maximum aid intensity.

In this respect, the UNCTAD World Invest Report (WIR) explains that a number of large FDI swings for the aforementioned countries were caused by volatile intercompany transactions of multinational enterprises.[61,62,63] The volatile nature of these transactions indicates that they are likely to be driven by short-term motives (*e.g.* tax optimisation), rather than reflecting long-term investments. The observed positive relation could therefore be the consequence of multinational enterprises redistributing profits for (short-term) fiscal reasons.

Overall, the purely descriptive analysis of FDI data (both at the EU28 and Member State level) therefore does provide indications of a clear relation between the (average) maximum aid intensity and (share in worldwide) FDI inflows.

An alternative way of analysing the country-level FDI and eligibility developments is by using regression analyses techniques. Under certain assumptions, such techniques allow isolating the effect of the (average) maximum aid intensity on FDI from other factors. The power of such statistical analyses depends largely on the available data, both in terms of quantity (number of observations), as well as the extent to which relevant "variation" is present (*i.e.* changes in aid eligibility that are unlikely to coincide with changes in other relevant factors). Both aspects are limited in the current setting (small number of observations at a highly aggregated level), such that the results should be interpreted from this perspective.

In Appendix 5, we report the results of a (fixed effects) regression analysis that analyses the relation between (i) the share in FDI flows and (ii) the (average) maximum aid intensity, but controls for differences across countries that are constant over time. This regression analyses therefore differs from the econometric analysis carried out to analyse the effectiveness, which focuses on the level of investment overall (and not the relative share in world investment). The results from these analyses indicate a positive, but not statistically significant relation. From a statistical point of view, we cannot therefore exclude that the maximum aid intensity has no impact on the share of FDI flows.

6.2 EVIDENCE FROM EXPERT INTERVIEWS

According to the interviewed experts, regional State aid has played a role in attracting investment to the disadvantaged regions of the EU. However, as has thus far been established, investment incentives are not typically the determinant factor in the location decision-making process, but can tip the decision at times when two locations are similar in terms of all other characteristics. However, one of the interviewees was able to recall a case where a Chinese investor said they

[61] "*Along with divestment, another factor explaining the large decline in 2012, particularly in Europe, was the increasing and highly volatile transfer of funds executed by TNCs to manage their retained earnings. One of the countries where such transfers of funds appear to have had a large bearing on FDI flows is Belgium*" (UNCTAD 2013, p. 97).

[62] "*European FDI flows have fluctuated considerably from year to year. Among the major economies, Germany saw inflows more than double from USD 13 billion in 2012 to USD 27 billion in 2013. In contrast, inflows to France declined by 80 per cent to USD 5 billion and those to the United Kingdom declined by 19 per cent to USD 37 billion. In all cases, large swings in intracompany loans were a significant contributing factor*" (UNCTAD2014, p.114).

[63] "*Some of the largest swings in FDI flows in 2014 were caused by rapid changes in the volume or even direction of intracompany loans. A reversal in intracompany loans from USD 8 billion to –USD 28 billion accounts for the large decline of inflows to Germany (table II.9). A similar reversal in intracompany loans to Ireland reduced total inflows to just USD 7.7 billion (compared with USD 37 billion in 2013). By contrast, a large increase in intracompany loans boosted inflows to the United Kingdom* (UNCTAD 2015, p.88).

would not go to a region where there were no incentives. Another expert also told that a customer from China might ask the experts to find an investment location with maximal cash incentives.

The experts also highlighted the differences in the relevance of regional State aid for investors from different origins. In particular, they agreed that American and Canadian companies use competition with investment incentives between regions more, as it is a common thing in the US, where there is a lot of competition between states. Investors coming in from Asia and Australia tend to be much more focused on the relationship than only on the business case. Many of the experts said that when an Asian client comes in, one has to make sure that they meet up with political representatives and they meet everyone at highest possible levels, as building trust is most important.

One of the experts contrasted the EU to Singapore, which has a ready-made standard global trader incentive package, which commodity-trading companies can sign. It gives them, for example, some fiscal and education benefits and staff relocation services, in order to make the relocation easier. Thus, it contains both fiscal and soft incentives.

When it comes to intra-EU investment, the experts saw incentives to play a smaller role. Intra-EU investments were more seen to be driven by market access reasons, not so much by costs.

Last, as has already been mentioned, the experts acknowledged that small enterprises are typically more cash constrained, and therefore might be more sensitive particularly to direct cash grants. However, the experts had different opinions on whether the relevance of regional aid vary between sectors. Whilst one of the experts stated that there are little differences between the industries concerning the interest in State aid, another expert said that subsidies are of high importance in capital-intensive industries such as chemical or automotive, but less so for labour intensive industries, where taxation might be more important.

6.3 EVIDENCE FROM SURVEY OF AID GRANTING AUTHORITIES

The survey of aid granting authorities indicated that the authorities in most cases are uninformed on what happened to investment projects that did not go through in their region.

Authorities were asked about cases where they received an application to support a large investment project with regional State aid, but the company finally decided not to invest in their region. Of the ten authorities that indicated they had encountered this situation (39 had not), three reported that in at least one case, the investment finally went ahead in another region outside the EEA. Specific countries mentioned are Morocco (by a Spanish authority) and Turkey (by a French authority).

When asked about cases where authorities wanted to support an investment, but were not allowed to grant regional State aid under the current framework, 28 authorities reported having been in this situation (whereas 20 indicate that this has not happened). Of these 28, only two indicated that the investment went through in another region outside the EEA.

When bidding against another region with State aid to attract an investor for a large case, twelve authorities indicated that another location was chosen to carry out the investment. In three of these cases, the other region was outside of the EEA, whereas in nine cases the region was from the EEA.

One authority mentioned a case of having lost an investment to a non-EEA country due to special restrictions on large enterprises in 'c' areas.

7. COHERENCE OF REGIONAL STATE AID FRAMEWORK

One of the objectives of the State Aid Modernisation was to ensure consistency and synergy of State aid policy with other EU policies, in particular with the EU Cohesion Policy. State aid policy and EU Cohesion policy have a joint objective to ensure effective spending when EU and national funds are used for providing direct financial support to companies.

The purpose of this chapter is to assess to what extent has the regional aid framework (RAG and GBER) been complementary to and consistent with the EU structural funds legislation in force (Question 6).

There are five European structural and investment funds ("ESI Funds"):

- the ERDF that promotes balanced development in the different regions of the EU;
- the European social fund ("ESF") that supports employment-related projects throughout Europe;
- the Cohesion fund ("CF") that funds transport and environment projects in Member States where the gross national income per inhabitant is less than 90% of the EU average;
- the European agricultural fund for rural development ("EAFRD") which focuses on resolving the particular challenges facing EU's rural areas;
- the European maritime and fisheries fund ("EMFF") which helps fishermen to adopt sustainable fishing practices and coastal communities to diversify their economies.

The five ESI Funds are regulated by the following pieces of legislation:

- Regulation (EU) No 1303/2013 establishing Common Provisions Regulation on the European structural and investment funds (the "CPR");
- Regulation (EU) No 1301/2013 (the "ERDF Regulation");
- Regulation (EU) No 1304/2013 (the "ESF Regulation");
- Regulation (EU) No 1300/2013 (the "CF Regulation");
- Regulation (EU) No 1305/2013 (the "EAFRD Regulation");
- Regulation (EU) No 508/2014 (the "EMFF Regulation").

In order to evaluate the coherence between the RAF and the ESI Funds provisions, we first carry out a descriptive analysis of the two sets of rules. We then complement it with a more practical approach: (i) an analysis of the State aid Scoreboard data in order to assess the number and importance of co-financed cases and (ii) an analysis of the answers provided to the survey by the aid-granting authorities that are well placed to identify the practical obstacles faced when applying the two sets of rules.

The conclusions are summarised in Section 9.4.

7.1 DESCRIPTIVE ANALYSIS

The descriptive analysis relies on a comparison of the applicable regional State aid framework and ESI Funds provisions with regard to several parameters, in

particular, their objectives, scope of application, criteria for approval. We do not compare them from a procedural point of view as this is more of a practical issue that is dealt with more appropriately by the aid-granting authorities in their responses to the survey.

7.1.1 Objectives

7.1.1.1 Key objectives

Both the ESI Funds and the State aid rules aim at supporting the EU regional policy as set in Article 3 TFEU: "*The Union shall promote economic, social and territorial cohesion, and solidarity among Member States.*"

As regards the ESI Funds, their primary objective is to support the EU cohesion policy, which is the EU's strategy to promote and support the overall harmonious development of its Member States and regions. The EU's cohesion policy is enshrined in Article 174 TFEU and aims at strengthening economic, territorial and social cohesion by reducing disparities in the level of development between the various regions and the backwardness of the least favoured regions. Particular attention is to be paid to rural areas, areas affected by industrial transition, and regions that suffer from severe and permanent natural or demographic handicaps.

The primary mission of the ESI Funds is therefore to strengthen the Union's economic, social and territorial cohesion, which in turn will contribute to the fulfilment of the Europe 2020 agenda, in particular with regard to growth. While each of the ESI Funds pursues one or more targeted goals corresponding to their own priorities, Article 9 of the CPR sets out eleven thematic objectives for the ESI Funds:

"(1) strengthening research, technological development and innovation;

(2) enhancing access to, and use and quality of, ICT;

(3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF);

(4) supporting the shift towards a low-carbon economy in all sectors;

(5) promoting climate change adaptation, risk prevention and management;

(6) preserving and protecting the environment and promoting resource efficiency;

(7) promoting sustainable transport and removing bottlenecks in key network infrastructures;

(8) promoting sustainable and quality employment and supporting labour mobility;

(9) promoting social inclusion, combating poverty and any discrimination;

(10) investing in education, training and vocational training for skills and lifelong learning;

(11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration."

This EU funded intervention might appear at odds with the competition policy purposes. "*While the latter, in particular through the State aid control, aims to limit state intervention in the competition process, to protect the internal market*

from distortions and to contribute to steering public resources towards competitiveness-enhancing objectives, the former pursues socio-economic objectives by wishing to redistribute part of the EU budget in order to reduce economic and social disparities within the EU" (Pantazatou 2016).

However, the competition policy is also one of the tools of the EU Regional policy.

Regional State aid provisions are mainly contained in Article 107(3)(a) and (c) TFEU which empowers the Commission to declare compatible with the internal market: "*(a) aid to promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment, and of the regions referred to in Article 349, in view of their structural, economic and social situation*;" and "*(c) aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest.*"

These objectives are reflected in the RAG 2014 as follows:

> "*The primary objective of State aid control in the field of regional aid is to allow aid for regional development while ensuring a level playing field between Member States, in particular by preventing subsidy races that may occur when they try to attract or retain businesses in disadvantaged areas of the Union, and to limit the effects of regional aid on trade and competition to the minimum necessary*" (paragraph 3 of the RAG 2014).
>
> "*The primary objective of regional aid is to reduce the development gap between the different regions in the European Union. Through its equity or cohesion objective regional aid may contribute to the achievement of the Europe 2020 strategy delivering an inclusive and sustainable growth*" (paragraph 30 of the RAG 2014).

The RAF 2014 therefore aims at promoting the economic development of certain disadvantaged regions, while limiting the distortions of competition and the effect on trade between Member States of the State measures adopted.

It results from the above that, although prima facie ESI Funds could appear at odds with the general prohibition of State aid, the exceptions laid out in Article 107(3) (a) and (c) TFEU and reflected in the RAF overlap with the general objectives of the EU cohesion policy. "*Both policies become complementary on grounds that they address market failures and they pursue, through different standards and methods, the same equity objectives which outweigh the adverse effects on competition*" (Pantazatou 2016).

7.1.1.2 Consistency objective resulting from the 2014 reform

This complementarity is reflected both in the ESI Funds provisions and regional State aid resulting from the 2014 reform.

Article 6 CPR states from the outset that ESI Funds shall comply "*with applicable Union law and the national law relating to its application.*" This includes a general compliance obligation towards State aid rules that is highlighted throughout the CPR, in particular:

- regarding financial instruments: "*Financial instruments shall be implemented to support investments which are expected to be financially viable and do not give rise to sufficient funding from market sources. When applying this Title, the managing authorities, the bodies implementing funds of funds, and the bodies implementing financial instruments shall*

comply with applicable law, in particular on State aid and public procurement" (Article 37(1) CPR);[64]

- regarding public-private partnerships ("PPP"): "*The ESI Funds may be used to support PPP operations. Such PPP operations shall comply with applicable law, in particular concerning State aid and public procurement*" (Article 62 of the CPR);

- in various Articles of the CPR, in particular Articles 61, 65, 71, 131, 137 and 146;

- as part of the general *ex ante* conditions listed in Annex XI of the CPR, Member States should have in place "*arrangements for the effective application of Union State aid rules in the field of the ESI Funds.*"

The same consistency objective appears indirectly throughout the RAG 2014. In the Executive Summary of the Commission's Impact Assessment on RAG, reference is clearly made to "*the need to ensure coherence with the reform of EU Cohesion policy for the period 2014-2020 and to take account of other EU policies within the Europe 2020 Strategy*".

In the RAG 2014 themselves, references to the ESI Funds are made in several places, in particular in paragraphs 31 and 32 that provide:

"*31. Regional aid schemes should form an integral part of a regional development strategy with clearly defined objectives and should be consistent with and contribute towards these objectives.*

32. This would be the case in particular for measures implemented in accordance with regional development strategies defined in the context of the European Regional Development Fund (ERDF), the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development or the European Maritime and Fisheries Fund with a view to contributing towards the objectives of the Europe 2020 strategy."

7.1.2 Scope of application

As regards the scope of application, both sets of rules are applicable during the same time, *i.e.* 2014-2020. This section therefore focuses on the geographic scope of application, the sectoral scope of application and the categories of undertakings to which they apply.

7.1.2.1 Geographic scope of application

Both the RAF and the ESI Funds (with the exception of EMFF)[65] are based on maps of EU regions that have an impact on the level of support that can be granted. However, these maps are not drawn using the same methodology.

As regards ESI Funds, every EU region is able to benefit from ESI Funds' support in the 2014-2020 programming period. The level of support however depends on various criteria.

[64] See also as regards financial instruments and their need to comply with State aid rules: recital 36, Articles 37(2)(a), 37(4), 37(7), 37(8), 37(9), 37(12), 38(4), 42(3), 44(1) of the CPR.

[65] With regards to the EMFF the situation is different. As the EMFF supports the common fisheries policy, financial allocations are determined on the basis of sector-specific criteria such as the size and the socio-economic relevance of the fisheries and aquaculture sector in each region. The level of support does not depend on the GDP per capita.

As regards ERDF, ESF and EAFRD, the level of support depends on each region's position in relation to the average GDP per capita of the EU27. According to Article 90(2) CPR, resources shall be allocated among the following three categories of NUTS 2 regions:

(a) less developed regions, whose GDP per capita is less than 75% of the average GDP of the EU27;

(b) transition regions, whose GDP per capita is between 75% and 90% of the average GDP of the EU27;

(c) more developed regions, whose GDP per capita is above 90% of the average GDP of the EU27.

The classification of regions under one of the three categories of regions shall be determined on the basis of how the GDP per capita of each region, measured in purchasing power parities ("PPS") and calculated on the basis of Union figures for the period 2007-2009, relates to the average GDP of the EU27 for the same period.

As regards the CF, Article 90(3) CPR states that it "*shall support those Member States whose Gross National Income ("GNI") per capita, measured in PPS and calculated on the basis of Union figures for the period 2008 - 2010, is less than 90% of the average GNI per capita of the EU27 for the same reference period.*" The Fund also supports Member States that were eligible for the CF in 2013, but whose nominal GNI per capita now exceeds 90% of the average GNI per capita of the EU27.

As regards the RAF 2014, regional aid maps are drawn for each Member State and approved by the Commission. These regional aid maps indicate the maximum aid intensity per region. The drawing of regional aid maps varies depending on whether it is an 'a' region (Article 107(3) (a) TFEU) or a 'c' region (Article 107(3) (c) TFEU).

As regards 'a' regions, Article 107(3) (a) TFEU refers to "*areas where the standard of living is abnormally low or where there is serious underemployment*" and to "*the regions referred to in Article 349, in view of their structural, economic and social situation.*" According to paragraphs 149-151 of the RAG 2014, the Commission considers that the conditions of Article 107(3) (a) TFEU are fulfilled:

- in NUTS 2 regions that have a GDP per capita below or equal to 75% of the EU27 average (based on the average of the last three years for which Eurostat data are available;
- the outermost regions (Article 349 TFEU).

As regards 'c' regions, according to paragraph 155 of the RAG 2014, the Commission considers that there are two categories of 'c' areas:

- areas that fulfil certain pre-established conditions and that a Member State may therefore designate as 'c' areas without any further justification ("predefined 'c' areas"). According to paragraph 158 of the RAG 2014, the following areas will be considered as predefined 'c' areas:
    - former 'a' areas during the period 2011-2013;
    - sparsely populated areas: NUTS 2 regions with less than 8 inhabitants per km^2 or NUTS 3 regions with less than 12,5 inhabitants per km^2 (based on Eurostat data on population density for 2010).

- areas that a Member State may, at its own discretion, designate as 'c' areas provided that the Member State demonstrates that such areas fulfil certain socioeconomic criteria ("non-predefined 'c' areas"):

    - criterion 1: contiguous areas of at least 100,000 inhabitants located in NUTS 2 or NUTS 3 regions that have a GDP per capita below or equal to the EU27 average, or an unemployment rate above or equal to 115% of the national average;

    - criterion 2: NUTS 3 regions of less than 100,000 inhabitants that have a GDP per capita below or equal to the EU27 average, or an unemployment rate above or equal to 115% of the national average;

    - criterion 3: islands or contiguous areas characterised by similar geographical isolation (for example, peninsulas or mountain areas) that have a GDP per capita below or equal to the EU27 average, or an unemployment rate above or equal to 115% of the national average, or less than 5,000 inhabitants;

    - criterion 4: NUTS 3 regions, or parts of NUTS 3 regions that form contiguous areas, that are adjacent to an 'a' area or that share a land border with a country outside the EEA or the European Free Trade Association (EFTA);

    - criterion 5: contiguous areas of at least 50,000 inhabitants that are undergoing major structural change or are in serious relative decline, provided that such areas are not located in NUTS 3 regions or contiguous areas that fulfil the conditions to be designated as predefined areas or under criteria 1 to 4 (paragraph 168 of the RAG 2014).

It should be noted that, according to paragraph 154 of the RAG 2014, the total coverage ceiling for 'c' areas is obtained by subtracting the population of the eligible 'a' areas from the overall coverage ceiling of Article 148 of the RAG 2014 and that, according to point 162 of the RAG 2014, the total coverage ceiling for non-predefined 'c' areas is obtained by subtracting the population of the eligible 'a' areas and of the predefined 'c' areas from the overall coverage ceiling.

It results from the above that there are some differences between the areas eligible for ESI Funds support and those eligible for regional State aid as the ESI Funds maps are based on EU-averages while the regional State aid maps are based on a variety of criteria and allow the Member States some leeway. This may result in some regions that would qualify for only one type of support, while other regions may qualify for both.

7.1.2.2 Sectoral scope of application

ESI Funds provisions do not exclude certain sectors from their scope of application.

On the other hand, both the RAG 2014 and the GBER contain restrictions as regards the sectors to which they apply.

Articles 1(3) and 13 of the GBER provide that the Regulation does not apply to certain sectors, except for some limited exceptions, in particular, the fishery and aquaculture sector, the primary agricultural production sector, the sector of processing and marketing of agricultural products, the closure of uncompetitive coal mines, the steel sector, the coal sector, the shipbuilding sector, the synthetic fibres sector, the transport sector as well as the related infrastructure and aid for

energy (except, regarding transport and energy, for regional investment aid in outermost regions and regional operating aid schemes).

In the same vein, the RAG 2014 states that "*regional aid to the steel and synthetic fibres sectors will not be considered to be compatible with the internal market*" (paragraph 9) and that the RAG 2014 will apply to "*all sectors of economic activity, apart from the fisheries and aquaculture, agricultural and the transport sector*" (paragraph 10). In addition, the RAG 2014 does not apply to aid granted to airports or in the energy sector (paragraph 11).

7.1.2.3 Categories of undertakings

ESI Funds provisions do not exclude certain undertakings from their scope of application. ESI funding can support both economic activities and non-economic activities of undertakings.

On the other hand, State aid rules apply only to undertakings carrying out an economic activity (provision of goods or services on a market with a certain regularity and duration for the purpose of remuneration). Member States can freely support non-economic activities since such activities fall outside the scope of State aid rules.

In addition, both the RAG 2014 and the GBER exclude from their scope of application the undertakings in difficulty (see Article 1(4) (c) GBER and Article 18 RAG 2014).

7.1.3 Criteria for approval

As regards ESI Funds, pursuant to the principle of shared management, Member States have the primary responsibility, through their management and control system, to implement, control and monitor the operations programmes, while the Commission has to ensure and monitor that Member States are using the ESI Funds in conformity with the objectives of the EU Funds provisions and in accordance with the principle of sound financial management.[66]

As they are in the driving seat, Member States can each set certain criteria for approval for their national operating programmes. They however have to comply with certain common requirements setting out in the CPR, in particular:

- the project must fulfil one of the eleven thematic objectives laid down in Article 9 CPR;
- expenditure is eligible for a contribution from the ESI Funds only if it has been incurred by the beneficiary and paid between the date of submission of the programme to the Commission or from 1 January 2014, whichever is earlier, and 31 December 2023 (Article 65(2) CPR);
- no support by the ESI Funds is granted to projects that have been physically completed or fully implemented before the application for funding under the programme is submitted by the beneficiary to the managing authority, irrespective of whether all related payments have been made by the beneficiary (Article 65(6) CPR);
- support must be provided in the form of grants, prizes, repayable assistance and financial instruments, or a combination thereof (Article 66 of the CPR); specific eligibility rules exist for each form of support (see Articles 67 to 69 CPR);

[66] See Recital 66 and Articles 72 et. seq. of the CPR.

- the project must be located in the programme area, except for some limited exceptions (Article 70 CPR).

Additional eligibility requirements exist for each of the ESI Funds and can be found in the corresponding regulation.

As regards State aid, and as mentioned in Section 1.3.2.1 above, the standard compatibility requirements under the RAG 2014 are as follows:

- contribution to a well-defined objective of a common interest:
    - investment aid schemes: regional aid schemes may be put in place in 'a' areas to support initial investments of SMEs or of large undertakings. In 'c' areas, schemes may be put in place to support initial investments of SMEs and initial investment in favour of new activity of large undertakings. The investment must be maintained in the area concerned for at least five years, or three years for SMEs, after its completion;
    - individual investment aid: Member States may use a variety of indicators to demonstrate the regional contribution of the aid measure, including the number of direct and indirect jobs created, clustering effects, knowledge spillovers, *etc.*
- need for State intervention: this condition is considered as satisfied for aid granted in 'a' and 'c' areas because in these regions, the Commission considers that the market does not deliver the expected cohesion objectives set out in the Treaty without state intervention;
- appropriateness of the aid measure: the regional aid measure must be an appropriate policy instrument to address the objective of common interest;
- incentive effect:
    - formal incentive effect: the aid application must be submitted before the start of the works;
    - substantial incentive effect: it can be proven in two possible scenarios: (i) the aid gives an incentive to adopt a positive investment decision because an investment that would otherwise not be sufficiently profitable for the beneficiary can take place in the area concerned (*scenario 1*, investment decision); or (ii) the aid gives an incentive to opt to locate a planned investment in the relevant area rather than elsewhere because it compensates for the net disadvantages and costs linked to a location in the area concerned (*scenario 2*, location decision);
- proportionality of the aid: the amount of the regional aid must be limited to the minimum needed to induce additional investment or activity in the area concerned. The 'net-extra cost approach' and the definition of eligible costs and maximum aid intensities are used for this purpose;
- avoidance of undue negative effects: aid cannot be declared compatible with the internal market where the negative effects of the aid manifestly outweigh any positive effects. For scenario 1 cases (investment decisions), this is for example the case where the creation of capacity by the project takes place in a market which is structurally in absolute decline. In scenario 2 cases (location decisions), this is the case where without aid the investment would have been located in a region with a regional aid

intensity which is higher or the same as the target region or where the beneficiary closes down the same or a similar activity in another area in the EEA and relocates that activity to the target area;

- transparency of the aid measure.

Similar requirements have been introduced in the GBER.

The RAG 2014 strengthens consistency between State aid and EU regional aid policy. It explicitly refers to those policies and presumes some of the compatibility criteria to be fulfilled for projects implemented within cohesion policy programmes.[67]

7.1.4 Conclusion

It results from the descriptive analysis that the objectives, criteria for application and for approval of ESI Funds and the RAF 2014 are clearly pre-defined and objective. There are however some differences between the two sets of rules, in particular in terms of scope of application and criteria for approval. However, it should also be highlighted that these are differences rather than contradictions between the two sets of rules and that they do not therefore appear as irreconcilable. In addition, the analysis of the general objectives of the provisions show that their goals tend to overlap and that consistency was at the heart of the 2014 reform.

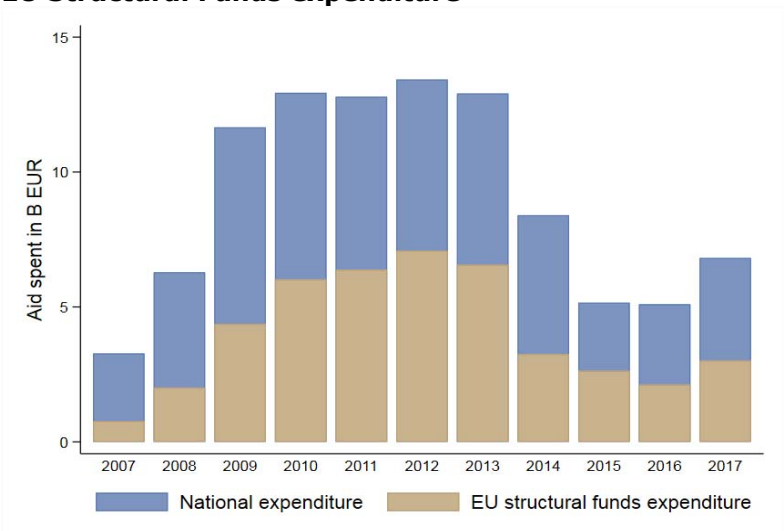
7.2 EVIDENCE FROM DESCRIPTIVE DATA ANALYSIS

The State aid Scoreboard database reports the total amount of co-financed aid, including both national and EU structural funds expenditure. This allows to assess to which extent the regional aid framework has been complementary with EU structural funds legislation in force.

Figure 40 presents the evolution of regional aid spent for the years 2007-2017, highlighting in gold the part which corresponds to EU expenditure. Clearly, an important part of regional aid is persistently funded through EU structural funds.

[67] See, in particular, paragraph 32 of the RAG as regards the contribution to a common objective and paragraph 58 of the RAG as regards the appropriateness of the aid measure.

Figure 40: Regional State aid spent, distinguishing between national and EU Structural Funds expenditure



Source: Own analysis based on Scoreboard Database, EC search database and TAM Database. .

Table 15 provides information on the number and importance of co-financed cases, distinguishing between cases granted respectively under the RAF 2007 and the RAF 2014. Specifically, under the RAF 2014, nearly 40% of all cases were co-financed, accounting for EUR 6 billion (more than 50% of total aid spent). Through co-financed cases, EU structural funds expenditure amounted to approximately 47% of total aid.

Table 15: Number of cases and total aid spent – all cases and co-financed cases, distinguishing between RAF periods

Regional aid frame-work	Number of cases	Total aid spent (in B EUR)	Number of co-financed cases	Aid spent for co-financed cases (in B EUR)		
				Total	EU	National
RAF 2007	865	87.9	431	51.4	39.2	12.2
			49.8%	58.5 %	44.5%	13.9%
RAF 2014	362	10.8	142	5.8	5.1	0.7
			39.2%	53.4 %	47.0%	6.3%

Source: Own analysis based on Scoreboard Database, EC search database and TAM Database.

Table 16 provides summary statics for co-financed cases. In particular, for an average co-financed case granted under the RAF 2014, 68.8% of total aid constitutes EU structural expenditure.

Table 16: Summary statistics on percentage of EU structural funds expenditure for co-financed cases

Regional aid framework	Mean	Std. Dev.	Min.	Max.
RAF 2007	68.8%	23.3%	0.3%	100.0%
RAF 2014	82.4%	21.2%	4.8%	100.0%

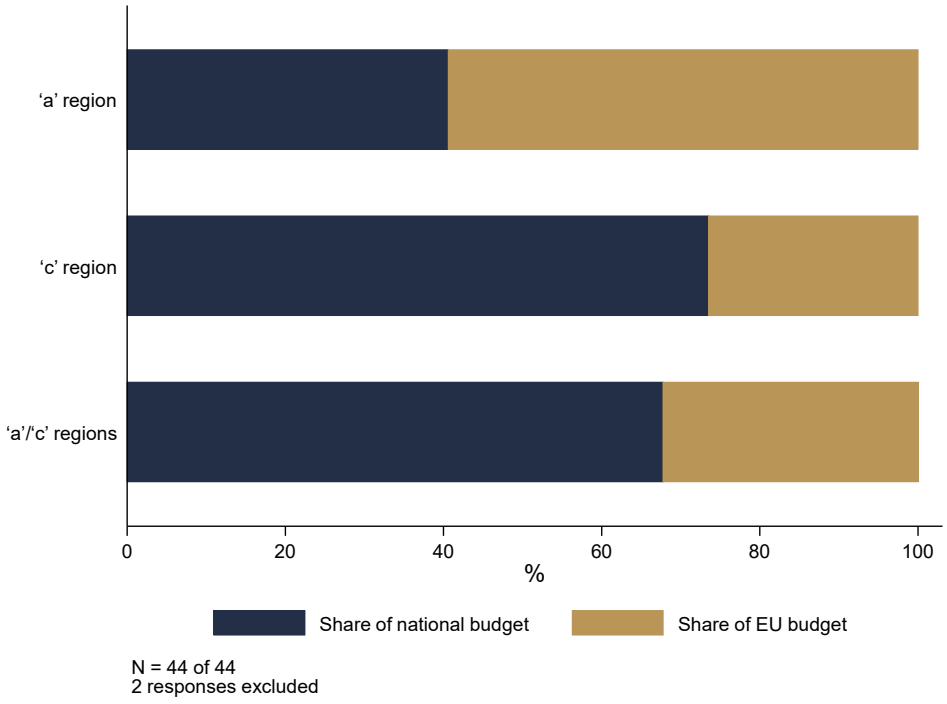
Source: Own analysis based on Scoreboard Database, EC search database and TAM Database.

7.3 EVIDENCE FROM THE SURVEY

In this section, we summarise the answers provided by the aid-granting authorities to the survey.

We first asked the authorities about the average share of regional State aid paid from national budget and the average share paid from the EU budget. As shown on Figure 41 below, authorities representing 'a' regions use more EU budget than authorities representing 'c' regions.

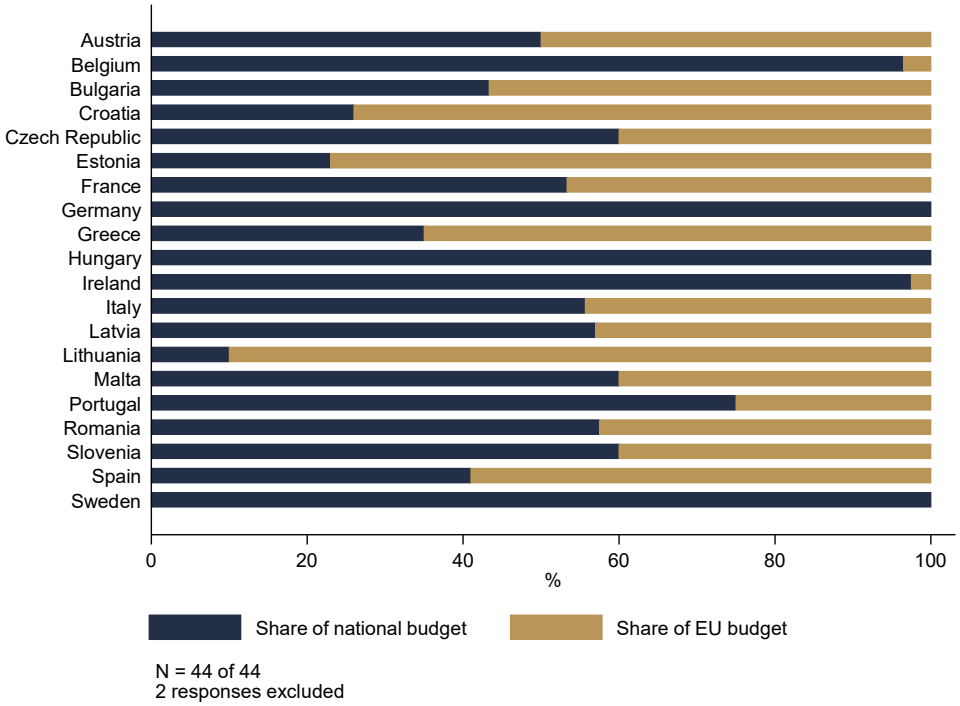
Figure 41: For investment projects in your region, what is the average share of regional State aid paid from national budget and what is the average share paid from the EU budget? (Question 28, by region type)



Source: Survey of aid-granting authorities. 2 responses were excluded as the shares did not add up to 100%. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

If we look by Member State, it appears that, on the basis of the sample of interviewees, the largest EU budget users are Croatia, Estonia, Greece and Lithuania, while Germany, Hungary and Sweden do not use EU budget to finance regional State aid (see Figure 42 below).

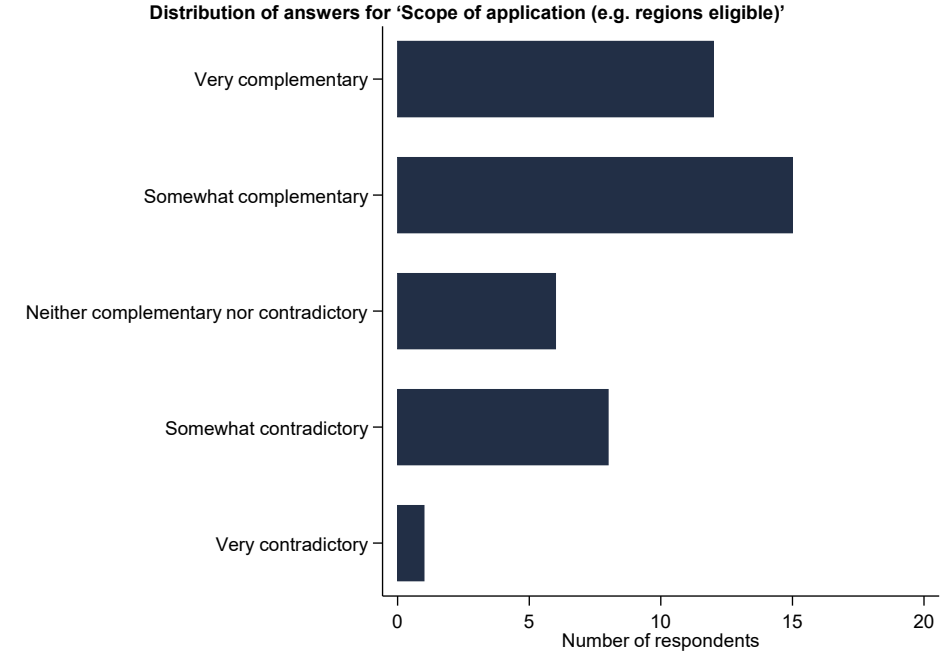
Figure 42: For investment projects in your region, what is the average share or regional State aid paid from national budget and what is the average share paid from the EU budget? (Question 28, by Member State)



Source: Survey of aid-granting authorities. 2 responses were excluded as the shares did not add up to 100%. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

We then asked the authorities more specifically if they consider that the provisions of the EU structural funds legislation and the RAG 2014 were complementary. As shown on Figure 42 to Figure 47, the largest number of aid granting authorities considered them somewhat complementary in all aspects.

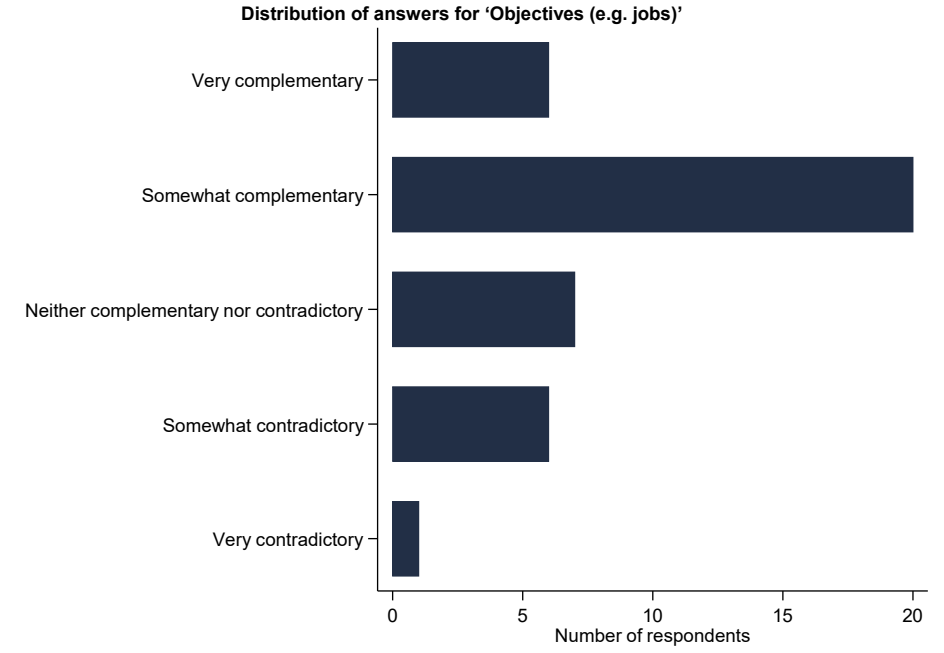
Figure 43: Do you find the provisions of the EU structural funds legislation and RAG for 2014–2020 contradictory or complementary in terms of the following? (Question 29, scope of application)



N = 43 of 63

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

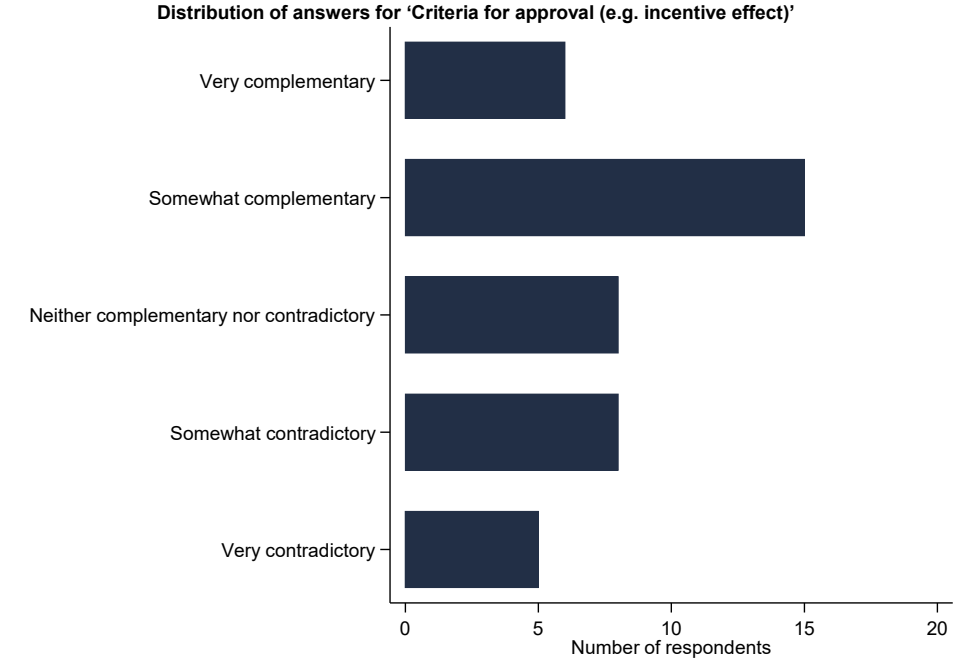
Figure 44: Do you find the provisions of the EU structural funds legislation and RAG for 2014–2020 contradictory or complementary in terms of the following? (Question 29, objectives)



N = 43 of 63

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

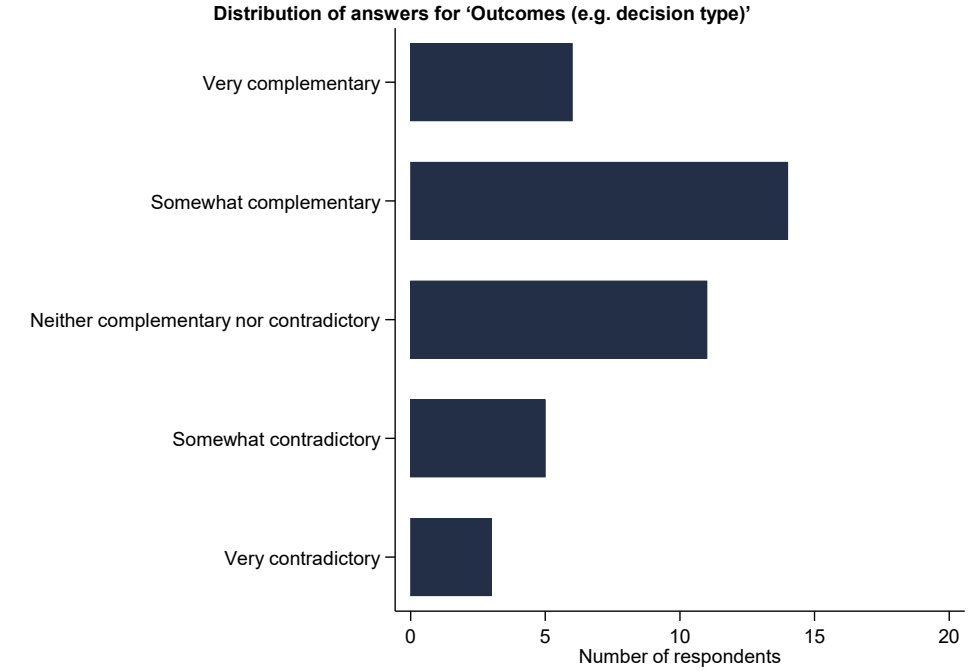
Figure 45: Do you find the provisions of the EU structural funds legislation and RAG for 2014–2020 contradictory or complementary in terms of the following? (Question 29, criteria for approval)



N = 43 of 63

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

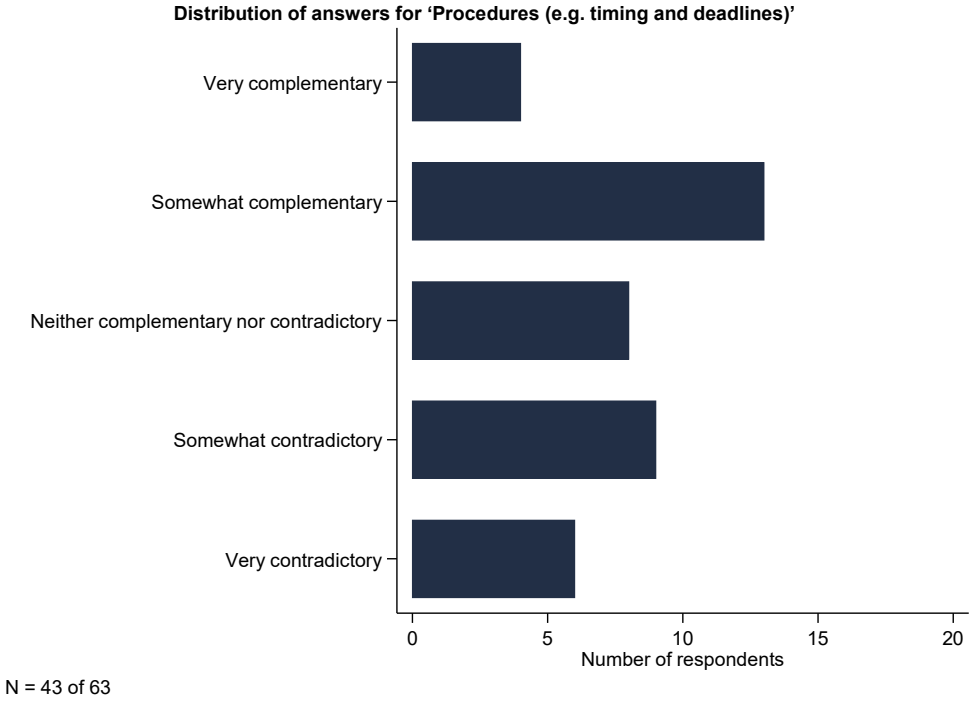
Figure 46: Do you find the provisions of the EU structural funds legislation and RAG for 2014–2020 contradictory or complementary in terms of the following? (Question 29, outcomes)



N = 43 of 63

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

Figure 47: Do you find the provisions of the EU structural funds legislation and RAG for 2014–2020 contradictory or complementary in terms of the following? (Question 29, procedures)



Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

A significant share of authorities pointed out that the provisions on scope of application, criteria for approval and procedures were somewhat or very contradictory.

In the next question (question 30), the authorities were asked to give recent examples and explain how the provisions of the EU structural funds legislation and the RAG 2014 were complementary (or contradictory). 23 authorities did not answer the question. Out of 40 replies:

- 3 authorities explained that they have not used the RAG 2014 so they could not answer the question;
- 7 authorities explained that they have not used or are not responsible for structural funds, so they could not answer the question.

Out of the 30 authorities that provided an answer, a large majority of them rather explained that there were issues with the interaction between the two sets of rules, even if not all of them qualified these issues as "contradictions". Among the issues described by the authorities, we can list the following ones[68]:

- Different application procedures, goals, timing and management authorities: for instance, the Flemish authority pointed out that "structural funds cases focus more on no aid situations, and if there is State aid involved, this is most of the times granted on the base of the RDI articles of the GBER, or based on environmental protection investments. There was within our regional aid scheme not one co-financed case with

[68] Please note that not all comments made by authorities are relevant for regional aid.

structural funds. These two regimes have very different application procedures, other goals and other timing. They are also being decided by different Management authorities."

- Structural funds are not available if the investments is physically completed or fully implemented at the date of the investment decision (art. 65(6) CPR), while for an aid measure to have an incentive effect it suffices that the beneficiary has applied for the aid before the work starts (section 3.5 RAG 2014). A clarification in this regard would increase legal certainty. This is clearly mentioned by the Italian authorities: "*we are asking for definitive clarification on the possibility of consistency of interpretation between the principle of the incentive effect mentioned in point 3.5 RAG (and, more generally, on discipline in terms of aid, save for specific exceptions) and art. 65 paragraph 6 of (EU) Regulation 1303/2013, in order to give us legal certainty of when and under what conditions this last article would be applicable to projects already underway.*" The Austrian authority reports as well that "*legislation of both systems has been contradictory especially for large investment projects and infrastructure projects. Contradiction can be seen for instance regarding the incentive effect*."

- Definitions and provisions should be consistent between the two sets of rules:

    - A Croatian authority proposes "*to streamline definitions as well as other parts of relevant regulations (e.g. durability of operation, eligible expenditures);*"

    - An Estonian authority noted that "*maximum aid intensity is different; incentive effect is obligatory in case of State aid, but not in case of SF rules.*"

    - For the Dutch authority, "*it is important that EU structural funds legislation and regional aid guidelines use the same definitions, where possible. These could be more aligned. However it should be kept in mind that EU structural funds and the regional State aid rules have different objectives.*"

- A Czech authority reports that "*there is a lot of shattered restrictions for large enterprises in EU legislation. Something is written in GBER, something in CPR, some restrictions were implemented directly in the text of OP etc. In our opinion the position towards large enterprises should be clear and all provisions towards large enterprises on one place.*"

- In Lorraine, structural funds can be used for the takeover of companies, while a State aid scheme under the GBER only allows support if the operation creates new jobs. In case of a takeover, the jobs that are saved *[sic]* should be an eligibility criterion when the salary costs are considered as eligible costs.

- Some State aid rules limit the possibilities to use structural funds:

    - self-financing of local authorities assimilated to public financing, which either prohibits some financing or limits the maximum aid;

    - limited eligible costs under State aid rules limits the possibility of having recourse to simplified costs options as under structural funds rules;

- the differences in the terms used for eligible costs can result in not financing a project simply by fear of the project being controlled and found not to comply with the rules;

- the admissible areas under the two sets of rules are different, in particular transition regions, as regional aid maps result in an extreme fragmentation of territories and a geographical discontinuity. Another example is that State aid can be granted to large companies in 'a' regions while structural funds rule do not allow them to be co-financed.

- structural funds are difficult to manage administratively, rather for large companies, and the projects of large companies are rarely eligible for State aid.

The few authorities that considered the two sets of rules as complementary were quite laconic with some exceptions:

- Belgium: "*for regional aid, no contradiction issue with the structural funds rules; they are however contradictions between structural funds rules and other State aid instruments.*"

- France: "*in general the two are complementary.*"

- Latvia: "*support for the same eligible costs can be combined with support from other regional State aid or EU structural fonds [sic]*."

- Malta: "*ESIF and RAG are complementary in addressing regional disparities, supporting Member States to increase their competitiveness and an incentive for change in the behaviour of beneficiaries*."

- Slovakia: "*complementary – support for Bratislava region.*"

- Spain: "*they complement each other because they cover investments from different sectors*."

- Spain: "*in order to encourage the creation of a new production site, RAG can be applied to subsidise investment in fixed assets, through the European Social Fund the hiring of certain workers profiles and through the Regional Development Fund the carrying out of R+D+I projects. This is a clear example of complementarity between regulations*."

Some authorities simply used this question to list issues they have with the set of rules they actually use:

- Need for wider eligible costs under the GBER as stated by one Bulgarian authority: "*we also encounter difficulties in applying certain definitions recorded in the GBER. Also, certain categories of eligible costs may be more clearly defined. Furthermore, we believe that it is appropriate to have wider eligible costs. It is necessary to apply the rules set for individual investors in respect of the whole group in which it participates*."

- An authority from Cyprus also reports practical issues with structural funds when funds are spent in several Member States and projects are approved by Monitoring/Steering Committee composed of all Member States involved in the Program. Some Programs consider that the origin of funds is the country where the Granting Authority is located (*e.g.* Interreg med is in France). This causes issues as to how to monitor whether beneficiaries in other countries exceed the *de minimis* threshold.

- Finally, a Polish authority stated that: "*limited funding meant that RAG funding was not as attractive in relation to the level of GBER funding*."

Following this open question on the complementary or contradiction between EU structural funds and the RAG 2014 rules, question 31 asked the authorities whether the RAG 2014 rules "cause restrictions to the implementation of the EU structural funds."

- 17 authorities did not answer the question;
- 3 authorities said they did not know;
- 9 authorities explained that they have not used or are not responsible for structural funds so they could not answer the question.

Out of the 34 authorities that provided a meaningful answer, a large majority of them (21) confirmed that they experienced restrictions to the implementation of the EU structural funds by the RAG 2014 rules. A French authority even reported that the "*RAG rules are so restrictive that they would rather use another State aid instruments if structural funds are involved.*" The comments can be classified as follows. One relevant point is also the trend of using GBER only, which may affect the relevance of the comments described below.

- Lower intensity of aid is one of the recurrent restrictions caused by the RAG 2014 rules mentioned by authorities. For example, a Romanian authority points out that: "*due to the State aid regulation there is an artificial split of the activities (especially when you have different intensity of aid on different parts of activity).*"
- Eligible costs are also identified as an issue by six authorities. A Maltese authority mentioned: "*the impetus towards simplification in the implementation of ESIF may result in restrictions in their implementation from a State aid perspective in those instances where the ESIF simplification is not reflected in State aid rules such as was the case in the application of simplified cost options for eligible expenditure.*"
- The incentive effect condition is also mentioned as one restriction by several respondents' authority. For instance, a Maltese authority states that: "*the ESIF may support actions initiated prior to the submission of an application, subject to certain conditions, which instance would render an any State aid as not having an incentive effect.*"
- Sectors exclusion is mentioned by the Czech and Spanish authorities as another restriction.
- Four authorities also report difficulties in using financial instruments. A Spanish authority considers that "*the EU fund rules increasingly rely on financial instruments as opposed to grants. These are often de minimis due to the limitations and restrictions of the RAG, so financial instruments should be considered under the RAG and GBER.*" A Portuguese authority notes that: "*in terms of financial instruments, yes, since they strongly limit the range of companies which can be supported and the conditions under which that support can be provided.*"
- The mismatch between the eligible territories of the two sets of rules is also pointed out. For instance, an Italian authority states that, regarding investments for production facilities located in less developed areas and in transition areas: "*in some cases, there are implementation difficulties given the mismatch of the areas eligible for the ERFD programme, with particular reference to the regions in transition, and the RAG eligible maps*

(which present a geographical discontinuity of the areas eligible for State aid)."

- Other authorities made more specific comments.

    - An Italian authority provides a concrete example of contradiction between the two sets of rules as regards the maintenance of the assets subject to investment. In this respect, the GBER provides that the aided investment must be maintained in the assisted region for at least five years (three years in the case of SMEs); by contrast, Article 71 Regulation 1303/2013 provides that some rules "*do not apply to contributions provided to or by financial instruments, or to operations for which the cessation of a productive activity occurs due to a non-fraudulent bankruptcy*."

    - For instance, a Bulgarian authority states, as regards Article 16 GBER on urban development: "*[…] the restriction compared to the requirements under EU structural funds may be pointed in the following non-exhaustive cases: - eligible sectors for urban development projects: under EU structural funds urban mobility and energy efficiency are very important areas for such projects but at the same time aid to the transport sector as well as the related infrastructure, and aid for energy generation, distribution and infrastructure are not eligible for regional aid; - under ESIF rules in case of urban development the reorganisation of a debt portfolio regarding infrastructure may be eligible subject to conditions specified in the regulation while the definitions for loans and guarantees under the GBER provide only for new loans; - art. 16 may be applied only for assisted areas; - Due to its par. 2, art. 16 may be applied only for projects covered from the current programming period rules, urban development funding through recycled funding under the 2007-2013 rules is not covered; - GBER applies until the end of 2020 while eligibility period under ESIF rules is up to the end of 2023; - art. 16, par.8 prescribes more detailed parameters than required by ESIF rules.*"

    - A Czech authority refers to specific issues regarding the rules on depreciation and book value of assets (paragraph 14.7 RAG 2014), the need to appreciate the "*plans to close down in other Member States,*" the difficulty in assessing the concept of group for undertakings in difficulty across the other Member States and the lack of practical character of certain concepts.

On the other hand, 12 authorities replied that they do not consider that the RAG cause restrictions to the implementation of the EU structural funds. Most of them simply answered "no" without any further detail. A Slovakian authority provided more details: "*rather the opposite, the EU funding rules cause restrictions for providing regional State aid. The reasons relate to the quite complex conditions under the EU funds mechanisms and the beneficiary has to fulfil many obligations, that would not be requested under other than EU funded schemes*". A French authority also considered that it causes no restriction because the two are dealt with in parallel.

Finally, the Dutch authority pointed out that: "*It is possible that regional State aid rules cause restrictions for the implementation of EU structural funds, but those restrictions can be justified for the cause of level playing field in the European Union.*"

Question 32 asked the authorities whether "the parallel application of the two sets of rules often creates extra burden."

- 17 authorities did not answer the question;
- 3 authorities replied that they do not know;
- 8 authorities reply that they are not in charge or do not apply structural funds so they cannot answer the question.

On the one hand, out of the 33 authorities that provided a meaningful answer, a large majority of them (22) confirmed that the parallel application of both sets of rules creates additional burdens. A Czech authority for example reports that: "*GBER should be specific for structural funds and should have priority over CPR but it is not so. Often it seems DG Regio is not aware of the DG Comp legislation restrictions when setting plans for regional development /Cohesion Policy*." The reasons most often cited by the authorities for extra burdens are as follows:

- complexity of combining the rules (need for specific expertise, eligibility of costs);
- double financing – for example, a Croatian authority notes that: *"two programs running in parallel providing for different type of aid at the same time, where an entrepreneur applies for both schemes and claims costs for the same projects activities;"*
- duplication of many aspects of the administrative burdens: instructions for the same file; reporting obligations, audit timelines, timelines for retention of documentation, multiple audits for the same action, eligible costs bases, conventions and payments; multiplicity of levels of control;
- contradiction between the rules such as noted by a Spanish authority: *"RAG limit use of simplified cost options (fixed rates for indirect costs), which are however promoted by ERDF. The restrictive nature of the RAG makes it necessary in certain cases to apply the de minimis rules, which also have many limitations;"*
- different scope, different approval procedures, different terms and conditions, different timetables and terminology;
- number of restrictions and evidences needed;
- need to resort to public procurement rules.

On the other hand, 11 authorities replied that they do not consider that the parallel application of both sets of rules creates additional burdens. Most of them simply answered "no" without any further detail. A Croatian authority more specifically said that they "*do not find that the parallel application of these two sets of rules often creates extra burden, as EU structural funds legislation focus more to the regulatory aspects of the funds, while the RAG focuses more on the implementation.*"

8. EU ADDED VALUE OF REGIONAL STATE AID

The RAF can potentially bring added value to the Member States by blocking wasteful subsidy races, which are triggered by regional authorities when they compete with each other to attract investment to their region. In their decisions, Member States do not take into account the spillovers they impose on other regions. In addition, when firms have several locations for their investment to choose from and authorities overbid each other to attract the investment, the subsidy race can force the authorities to give away all benefits of the investment to a region in order to win the case. A recent and widely commented example of such a public auction was Amazon's second headquarter HQ2. In the absence of State aid control in the US, many cities competed in incentives for Amazon, which in the end received almost USD 2.5 billion in tax breaks, cash and other incentives (Mercury News 2018). This outcome is to be avoided from the distributional perspective, as the beneficiary captures all investment's benefits to the region, while the taxpayers in the region incur the shadow cost of taxation (Fumagallo 2003).

It is a unique feature in the field of competition policy systems globally, that the EU controls State aid granted by Member States to minimise negative cross-border externalities between them. The RAF 2014 is one of the instruments used for this purpose. It restricts the circumstances under which regions could compete in offering incentives to investors: the incentives offered must comply with the region's maximum aid intensities and ceilings. Moreover, the decision to locate the investment in an assisted region with handicaps is considered a particular type of incentive effect (2009 LIP Guidelines) for which evidence of cost-benefit analysis for both locations is required. This location scenario was first defined in the 2009 LIP Guidelines, paragraph 22, and made its way to the RAG 2014, paragraph 61b as "scenario 2" or "location decision".

This chapter attempts to answer the question whether the introduction of the RAF 2014, with the reduced maximum aid intensities and modulation of maximum aid ceilings, reduced the risk of subsidy races in the EU compared to the previous framework (Question 8).

We first review the changes in the RAF 2014 which constrained aid granting authorities in competing with other Member State for an investment (Section 8.1). Next, we look at the regional State cases review by the Commission with the location scenario and compare their frequency before and after the introduction of the RAF 2014 (Section 8.2). Finally, we report the views and experiences of aid granting authorities on subsidy races (Section 8.3).

The conclusions are summarised in Section 9.5.

8.1 LIMITS TO SUBSIDY RACES IN THE RAF 2014

The RAF 2014 introduced several instruments to restrict the use of subsidy races between Member States:

- The regional State aid eligibility scope was reduced in 2014 (see Table 4). 177 regions changed status from 'a' to 'c' or from 'c' to not assisted and only 47 regions increased their aid eligibility by moving from an 'c' to 'a' area status.

- The maximum aid intensities were significantly reduced in 2014. The (average) maximum aid intensity decreased from 15.0% in 2011-2013 to 11.5% in 2014-2017 because of the introduction of the RAG 2014 (see Figure 20).

- Finally, relocation of existing investment to another Member State is considered a negative effect which is unlikely to be compensated by any positive effects (paragraph 122 RAG 2014). This implies a practical prohibition of relocation of the existing capacity introduced by the RAG 2014.

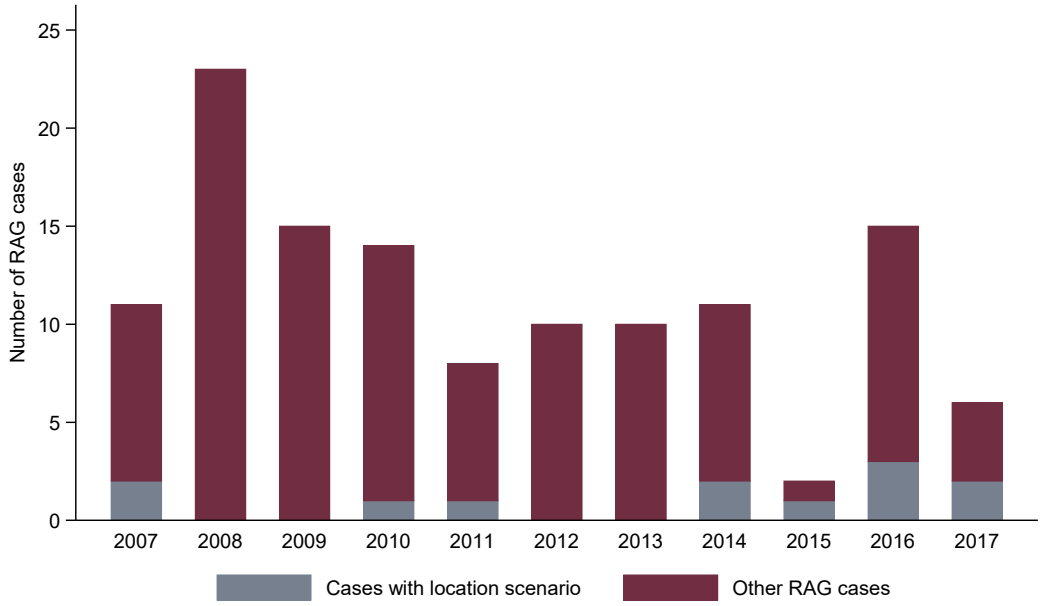
These three conditions applied in combination have theoretically restricted the possible options for aid granting authorities to bid against a region in another MS.

8.2 CASES WITH LOCATION SCENARIO

An example of a subsidy race is a regional State aid case notified to the Commission with the location scenario where at least two regions were considered as location for the project. However, location scenario cases do not capture the full universe of bidding competition between regions. For example, projects covered by GBER are not included in this definition. Subsidy races where EU regions lost against a non-EU region are not covered either. The number of cases with location scenario are thus a lower bound on the true number of subsidy races.

We used the Commission's case registry and case studies in this report to identify all cases concerning regional State aid with a location scenario since 2007.[69] Altogether, twelve such decisions were identified. Each decision was assigned to the year of notification. The following figure shows the distribution of cases over time.

Figure 48: **Regional State aid cases with location scenario by year**



Note: The dates indicate the notification date.
Source: European Commission - DG Competition

Source: Own analysis based on Commission's case search.

The bar for each year shows the total number of State aid cases notified under the RAG 2014. The grey parts of the bar are those cases, which were notified with

[69] Four criteria applied jointly were used in the Commission's case search: 1) policy area -State aid, 2) State aid procedure - N, 3) EU Secondary legal basis: "RAG, 2007-2013", 4) Case type: Ad hoc case + Individual application. The decisions for all 102 cases were searched for the mentioning or the full description of the location scenario/scenario 2.

the location scenario, *i.e.* we identify them as a subsidy race. In four of the years (2008-2009 and 2012-2013) there were no subsidy races notified. In 2016, the highest number of three subsidy races was found.

Which RAF period faced more cases with location scenario? In the years 2014-2017, eight such examples of a subsidy race were observed, compared to only four raced under the old RAG 2007. Thus, in terms of absolute numbers, the number of cases with location scenario has doubled. Two interpretations of this observation are plausible. On the one hand, regions in the EU may have indeed entered subsidy races more frequently since 2014. Large investments in top expanding markets may have attracted more interest from different EU regions and used this interest to encourage a bidding process.

Alternatively, the change in the frequency of cases with location scenario is driven by the change of rules. Under the RAG 2007, the case review by the Commission focused on market definition and thresholds. The comparison between the locations was not the priority in the review process. The location scenario was not spelled out in the RAG 2007 explicitly and it showed up in the LIP guidelines 2009 for the first time. In the RAG 2014, the location scenario and some instructions about its use is included as one of the incentive effect types.

Thus, it is not possible to conclude about the overall change in the frequency of regions in the EU competing against each other since 2014. Focusing on cases with location scenario only, they were reviewed under the RAG 2014 more frequently compared to the RAG 2007.

The following table presents the characteristics of all twelve identified subsidy races: the eligibility status of the region where the project was located, the economic sector of the beneficiary, eligible cost in EUR, aid instrument used, competing region which lost the bidding, and whether the Commission's decision includes a formal analysis of the location scenario (scenario 2).

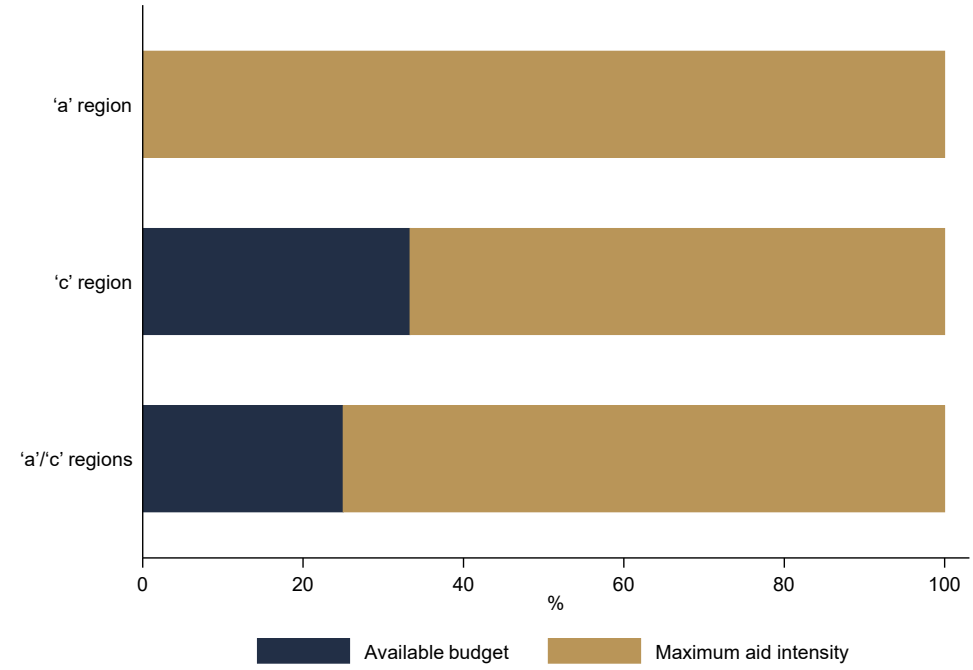
Table 17: Overview of identified cases with location scenario

[…]
Source: Own analysis.
Note: […]

8.3 EVIDENCE FROM THE SURVEY

Aid-granting authorities reported that they perceive the RAF 2014 as constraining them in bidding for investors. Since 2014, ten surveyed aid granting authorities found themselves competing against another region to attract an investor. The authorities from France competed against locations in Poland, the US or another French region. The authorities from Ireland competed against a region in the UK, from Slovenia against a region in Hungary and from Spain against regions in Portugal and in Serbia. The aid-granting authorities were constrained in offering more State aid to attract the investment by maximum aid intensities in all 'a' regions and in the majority of 'a' and 'c' regions. The available budget limited State aid amounts granted by 40% of authorities representing 'c' regions and over 20% in 'a' regions.

Figure 49: What was the main constraint on the amount of State aid you offered? (Question 35)



N = 11 of 11

Source: Survey of aid-granting authorities. Responses to the survey are representative of the respondents only and cannot be generalised to all aid-granting authorities.

To make their bids more attractive, the authorities used other State aid programs, taking equity stakes and searching for private financing.

9. CONCLUSIONS

9.1 EFFECTIVENESS OF REGIONAL STATE AID

To assess the effectiveness of the RAF 2014, we were asked to answer the following questions:

- To what extent has the regional aid framework allowed the aid to have a real incentive effect?
    - What has been the relative importance of regional State aid granted within the current legislative framework for investment location decisions by companies compared to other location factors?
    - Have enterprises taken account of the aid in their financial analysis or did they consider it as a qualitative plus?
    - To what extent do answers to questions a and b differ when analysed by sector, enterprise size (SMEs and LE), investment area ('a' areas vs. 'c' areas), maximum aid intensities applicable in the investment area, or type of investments (*e.g.* greenfield, expansion, diversification).
- To what extent has the modulation of maximum aid ceilings (between different types of areas and between large, medium-sized and small enterprises) been appropriate?
    - To what extent did the decrease of the maximum aid ceilings introduced in 2014 have an effect on the level of investment?
    - To what extent is there any evidence that some of the 'a' areas do not have sufficient budgetary capacity to offer the maximum amount of aid allowed under the current maps?
    - To what extent is there any evidence that regions did not attract certain large investment projects because the maximum aid allowed under the regional aid framework was too low due to the scaling down mechanism?
    - In cases where enterprises applied for aid in a certain region but finally decided not to invest in that region, where did the investment go?
- What has been the impact of the other restrictions on aid to LEs in 'c' areas (eligibility of projects) introduced in 2014 on regional aid expenditure, levels of investment and regional development?

To answer the above questions we draw from the different methods applied in this report, *i.e.* expert interviews, the survey of aid granting authorities, descriptive statistics, econometric evidence, case studies and the literature review.

Overall, the evidence collected in this study confirms that the availability of regional investment aid in EU's disadvantaged regions does attract investments to those regions. The relative importance of regional aid as an incentive to attract investment varies depending on the stage in the decision process, the type of investment, enterprise, sector and the eligibility status of the region. This conclusion comes robustly from the econometric analysis, the survey of aid granting authorities, literature review and the expert interviews.

Under the RAF 2014, the most disadvantaged EU regions also spent the highest amount of regional State aid (when measured relative to its GDP), *i.e.* the higher the average maximum aid intensity of a Member State, the higher the share of regional State aid spent relative to a country's GDP over the period 2014-2017. This indicates that regional aid is well targeted. In addition, descriptive country-level data analysis revealed that the reduction in maximum aid intensities – as introduced by the RAG 2014 – is positively correlated with the change in private investment: the larger the reduction in a country's average maximum aid intensity, the larger the reduction in investment into the country. This provides preliminary suggestive evidence that the changes in aid intensity may affect actual investment flows.

The econometric analysis provides strong evidence for the incentive effect for LEs in 'c' areas. The incentive effect is identified by estimating the change in firms' investment, which is caused by one of the two key changes in regional State aid rules introduced by the RAF 2014.

First, State aid eligibility of investments by LEs in 'c' areas was restricted. We looked at private investment in 'c' areas solely affected by this restriction, *i.e.* where the maximum aid intensities did not change in 2014. We compared the investment growth rates in these areas to the investment growth rates in counterfactual non-assisted areas selected to be similar in the levels and growth of observable characteristics such as GDP and employment. Albeit still being positive, investment rate of LEs were significantly lower in the 'c' areas than in the counterfactual areas. This result is consistent with the views of aid granting authorities from 'c' areas who, based on several examples, hold restrictions related to aid being granted to LEs responsible for their failure to attract the investment to 'c' regions. In the examples given, the investment projects were, after rejection, then carried out in other EU Member States (*e.g.* Poland, Hungary, Spain) or in non-European countries (Morocco, Turkey).

Second, maximum aid intensities in some 'a' and 'c' areas were decreased (and more so for the LEs than SMEs). For some areas, these changes were accompanied by a change in eligibility status from 'a' to 'c' or from 'c' to non-assisted. According to our estimates, the investment growth rate of LEs was smaller – yet still positive – in 'c' areas where the maximum aid intensity was reduced if compared to 'c' areas where the maximum aid intensities remained the same. Although being economically relevant, this effect is not statistically significant. We find an economically even larger and statistically significant drop in investment rates by LEs in areas that changed from a 'c' status to a non-assisted status if compared to 'c' areas where the maximum aid intensities remained the same. In this case, it is not possible to cleanly identify whether this effect is determined by the change in eligibility status *per se* or by the implicit drop in maximum aid intensities to zero.

In contrast to these results for the 'c' areas and LEs, the investment levels in 'a' areas were not significantly impacted neither by the drop in maximum aid intensity levels nor by the change in eligibility from 'a' to 'c' areas. Neither were SMEs impacted by any of the changes introduced by the RAF 2014 – nor the reduction of maximum aid intensity nor the change in eligibility – both in 'a' and in 'c' areas. Many reasons may explain these findings in theory, but our econometric analysis cannot identify them empirically.

The importance of regional aid for a firm's investment decision making is confirmed by evidence from other research methods. The reviewed literature suggests that regional State aid has had a positive impact on both employment and investment, at least at the level of SMEs and on manufacturing sector. The interviewed experts agreed that investors do consider regional State aid when choosing the location for an investment project. However, it is not the investor's main criterion. According to the interviewed experts, investors' main criteria for

the location choice of an investment have been labour availability and labour cost. The availability of regional aid is one of several (five to seven) location factors and is considered as a qualitative plus in the initial stages of the location decision process of companies. When it comes to the final decision making, once the short list of potential locations has been established, regional State aid comes as a cost factor in the investment profitability calculation. Investment incentives are one element determining the overall cost level, comparably to tax levels. Therefore, incentives are part of net present value ("NPV") calculations and/or of internal rate of return ("IRR"), analyses usually being carried out for each location being listed on the shortlist, *i.e.* the later stage of the decision process.

The interviewed experts also concur that both the absolute and the relative importance of State aid depends on the characteristics of the investing company, such as company size and age. Investment incentives are more important for companies in the course of establishing themselves in the EEA and for companies from outside the EU considering investment in the disadvantaged areas of the EEA. State aid in form of a direct cash subsidy is particularly important for capital-intensive industries like automotive or chemical and for start-ups and SMEs, which typically are financially constrained by the limited access to credit. On the other hand, tax breaks are more relevant for labour-intensive industries and for large enterprises, which typically have more financial resources for investments and consider a long-term perspective. Tax incentives are also more relevant for the location of headquarters. In addition, since LEs typically have better access to credit, they are less interested than SMEs in public funding in the form of low interest loans.

Regarding maximum aid ceilings more generally, interviewed experts indicated that maximum aid intensity confuses investors: when investors look at the map, they believe they will get the maximum aid level and have difficulties to understand that this is only a theoretical maximum. A simplification of rules in this respect might be helpful for investors.

On the question whether budget constraints restrict aid granting authorities to grant the maximum amount of regional State aid allowed, we find from the survey that a limited share of 20% aid granting authorities from 'a' regions noted that they experienced such constraints. For authorities representing 'c' areas, the share of authorities reporting such constraints was higher (nearly 35%). This could limit the potential incentive effects of regional aid.

Regarding the question whether regions fail to attract large investment projects due to low maximum aid ceilings, the vast majority of responding authorities (38 out of 48) answered that they have not encountered a situation where an applicant with a large investment project moved elsewhere after application despite positive signals from the aid granting authority (whether firms did not apply due to too low maximum aid ceilings cannot be judged based on the survey though). More generally, the interviewed experts expressed the view that it was a challenge to attract investment to 'a' regions and that a restrictive State aid policy was not helpful in this context.

Nineteen authorities answered the question regarding what happened after rejection of the proposed investment projects. According to them, 561 projects by large firms were rejected. In 398 of those projects, the authorities did not have the information on what happened to the project after rejection. For the remaining 163 projects, *i.e.* those for which the authority had some information on what happened thereafter, the majority of projects were pursued in the same region, despite rejection. Ten projects, however, went ahead in another 'a' region in the EU, and nine projects went ahead in another EU region but the authority did not know whether it was an 'a' or a 'c' region. For fifteen projects, the aid granting authorities hold information that the investment after rejection was implemented outside the EU.

The case studies conducted for the purpose of this report provide insights on the incentive effect and the lack of thereof. Eleven investment projects have first been notified to the Commission under the RAG 2014, but were withdrawn from notification at a later stage. Of those, five were, or most likely were, pursued without State aid thereafter, exemplifying lack of incentive effect. All of them concerned notifiable investments by large enterprises in 'c' areas. This evidence is contradicted, though, by the – in our view more robust - evidence from the survey of aid granting authorities and from the econometric analysis. Results from those alternative analyses indicate that the State aid restrictions in 'c' areas on large enterprises deter investment. Specifically, our econometric results suggests that, on average, investment rates of LEs in `c' areas increased. Yet, albeit still positive, investment rate of LEs were significantly lower in `c' areas affected by additional State aid restrictions as compared to those which faced no such changes.

9.2 EFFICIENCY OF REGIONAL STATE AID

To assess the extent to which the RAF 2014 ensures that the Commission treats the most distortive cases, we were asked to answer the following questions:

- To what extent was the risk of negatively affecting competition and trade between Member States associated with the (pre-) notified regional aid balanced with the effort required from the stakeholders involved in notifying and assessing the case under the RAG?

- What happened to the projects related to (pre-) notified regional investment aid cases that were subsequently withdrawn? To what extent were those investment projects carried out? Did those projects receive other types of aid?

Answers to those questions are derived from the case study analysis and from the survey of aid granting authorities. We come to the following conclusions.

Based on the case study analysis, we identified two categories of cases for which, in our view, the balance between the *ex ante* risk of the aid measure to negatively affect competition and trade between Member States and the expected effort required from the stakeholders involved in notifying and assessing a case under the RAG was maintained. Those two categories are:

- All six notifiable cases concerning investments in 'a' regions, and

- Three out of eleven notifiable cases concerning investments by large enterprises in 'c' regions.

Both types of cases were notified and went through a review by the Commission. At the same time, their *ex ante* risk of those aid measures to competition and trade between Member States was high or at least moderate, justifying the effort.

Our assessment is confirmed by the fact that in two out of three of the cases in the second category, *i.e.* cases concerning investments by large enterprises in 'c' regions, the notification was withdrawn and the beneficiaries nonetheless pursued, at least in part, the investment projects without regional aid (in the remaining case the aid was approved by the Commission). Thus, *ex post*, these two withdrawn cases would likely not have been found compatible with the RAG as the aid likely did not create a substantive incentive effect. This assessment is based on limited public information, though.

A lack of balance was given, in our view, for the eight remaining notifiable cases concerning investments by large enterprises in 'c' regions. For those cases, we find that the negative effects on competition and trade between Member States

would likely be low or very low in particular due to the relatively low aid budgets, which lay below the notification thresholds of 'a' region cases. The aid amounts notified ranged from EUR 0.1 to 4.6 million. Still, those cases had to be notified and were then withdrawn. We therefore consider that the required effort appears not justified by the potential distortions of competition and effect on trade between Member States.

The case studies also hint to some potential room for improvement with respect to clarity under the current rules. First, the fact that ten out of eleven 'c' region cases notified pursuant to paragraph 15 RAG 2014 were later on withdrawn, suggests that the projects might not have been notified in the first place if the criteria of paragraph 15 RAG 2014 had been more clear or straightforward.

The same reasoning seems true to us in the two cases, which were erroneously notified under the RAG 2014. The significant amount of effort that both the Commission and the parties exerted before realizing that the aid could be granted under GBER, suggests that the GBER requirements may not be clear to the Member States and beneficiaries in all instances.

Based on the survey of aid granting authorities, 10% of the surveyed authorities reported that they try to avoid RAG notifications when feasible. The interviewed experts confirmed that for larger projects for which the State aid amounts come in any case close to the notification thresholds, the project is potentially restructured in a way to avoid notification. In general, the interviewed experts considered the notification and assessment procedures for regional State aid cases too long, and lacking, from the perspective of investors, transparency. For example, investors may sometimes even have difficulties to identify the person in charge of granting the aid at local or national level. A single point of contact is often not established.

9.3 RELEVANCE OF REGIONAL STATE AID

To assess the relevance of regional State aid, we were asked to answer the following questions:

- To what extent has the availability of regional investment aid been a relevant factor for enterprises to locate their investment in the EU's disadvantaged areas compared to other regions globally and compared to other factors?

- Is there a difference in this respect across the sectors or depending on the size of the enterprise?

To answer these questions we rely on our assessment based on descriptive analyses deploying UNCTAD data on FDI flows, evidence obtained from the expert interviews with location consultancy experts and the survey of aid granting authorities. We come to the following conclusions.

We have assessed the relevance of the RAF 2014 by examining whether, and if so to what extent, regional aid has contributed to attracting FDI to the disadvantaged regions of the EU.

Overall, the descriptive analysis of FDI data do not provide indications of a clear relation between the maximum aid intensity and share in worldwide FDI inflows.

At the EU28 level, both maximum aid intensities and the share in FDI flows have decreased over the period 2007 to 2017. However, the largest decrease in maximum aid intensities – due to the introduction of the RAG 2014 – coincided with a slight increase in the share in FDI flows. This increase was particularly pronounced in 2015 and 2016 (respectively one and two years after the

introduction of the RAG 2014), such that even if investments were only to respond after one or two years, there is no clear decrease in (the share of) FDI inflows. As such, this does not provide a clear indication of a relation between maximum aid intensities and FDI flows.

Comparing the levels of FDI flows and maximum aid intensities of the individual Member States reveals that there is a negative correlation between the (average) maximum aid intensity and the share in FDI inflows. This in our view illustrates that the RAF 2014 targets precisely those Member States with slow developing regions. We further looked at time development of FDI inflows and maximum aid intensities and we found a weak positive relationship between average maximum aid intensities and FDI flows. However, this correlation appears to be driven by developed countries that prior to the RAG 2014 had a low average maximum aid intensity and thus it is likely unrelated to regional aid availability.

These results are confirmed by a regression analysis (whose results are included in Appendix 5) that controls for differences across countries. While the power of the regression analyses is limited to the nature of the underlying data, the results from the analysis indicate that the observed positive relation is not statistically significant. From a statistical point of view, we cannot therefore exclude that the maximum aid intensity has no impact on the share of FDI flows. In line with the descriptive analyses, the regression analyses the effect on the share in worldwide FDI flows, and therefore differs from the econometric analysis carried out to examine the effectiveness (which focuses on the *level* of investment overall).

The expert interviews indicated that regional State aid has played a role in attracting investment to the disadvantaged regions of the EU though. However, investment incentives are typically not the key factor in the location decision-making process - they can tip the decision at times when two locations are similar in terms of all other characteristics.

The importance of regional State aid does also vary depending on the origin of the investors, according to the experts interviewed. American and Canadian companies are used to negotiating proactively investment incentives and putting regions against each other, as it is a common practice in the US. Asian and Australian investors tend to focus more on the trustworthiness if the relationship with the region (as a business partner) than on the financial package only.

The survey of aid granting authorities indicated that the authorities are only infrequently informed on investment projects that did not go through in their region and located outside EEA instead. With respect to applications for large investment projects, three authorities (out of 49) reported that investments went ahead in another region outside the EEA (mentioning Morocco and Turkey as specific countries). Regarding investments for which aid was not allowed under the current framework, only two authorities indicated that the investment went through in a region outside the EEA.

When bidding against another region with State aid to attract an investor for a large case, twelve authorities indicated that another location was chosen to carry out the investment. In three of these cases, the other region was outside of the EEA, whereas in nine cases the region was from the EEA.

9.4 COHERENCE OF THE RAF 2014

To assess to what extent has the RAF 2014 been coherent with the EU structural funds legislation we were asked to answer the following question:

- To what extent has the regional aid framework been complementary to and consistent with the EU structural funds legislation in force during that period?

Here we built our assessment on the analysis of relevant regulation, descriptive data analysis and on the survey of aid granting authorities. We come to the following conclusions.

One of the objectives of the State Aid Modernisation was to ensure consistency and synergy of State aid policy with other EU policies, in particular with the EU Cohesion Policy for what concerns the RAF 2014, as they both are tools to serve the EU regional policy enshrined in Article 3 TUE. This consistency objective is clearly mentioned in the ESI Funds provisions and the RAF resulting from the 2014 reform and is reflected in the two sets of rules through multiple references to the other set of provisions.

This consistency and complementarity between the two sets of rules also follow from the various sources of evidence used for the purposes of this Study:

- the descriptive analysis shows that the objectives, criteria for application and approval are clearly pre-defined and objectives;
- the analysis of the Scoreboard data shows that, under the RAF 2014, nearly 40% of all cases were co-financed, accounting for EUR 6 billion (more than 50% of total aid spent), showing that the ESI Funds provisions and the RAF 2014 are very often applied in parallel;
- out of the 63 aid-granting authorities interviewed for the Study, a majority of them considers the two sets of rules somewhat complementary in all aspects (*i.e.* scope of application, objectives, criteria for approval, outcomes, procedure).

It is true that both the descriptive analysis and the survey of aid-granting authorities show some differences between the RAF 2014 and the ESI Funds provisions, in particular in terms of scope of application (geographic and sectoral), definitions of terms and criteria for approval. However, these differences appear to be differences that would cause some extra burden for the beneficiaries and aid-granting authorities rather than contradictions that would make the two sets of rules irreconcilable.

9.5 EU ADDED VALUE

To assess the added value of the regional State aid for the EU, we were asked to address the following question: "To what extent has the current regional aid framework – with the reduced maximum aid intensities and modulation of maximum aid ceilings – reduced the risk of subsidy races in the EU?"

The evidence used to answer this question comes from an analysis of relevant State aid cases and from the survey of aid granting authorities. We come to the following conclusions.

In theory, the regional aid rules can bring added value to the Member States by preventing wasteful subsidy races, which are triggered by regional authorities when they compete with each other to attract investment to their region. The RAF 2014 reduced regional State aid eligibility and maximum aid intensities compared to the previous regional aid rules and it prohibited State aid for relocating existing investment between Member States. These measures potentially restricted aid granting authorities in their ability to bid for investments against other EEA regions.

In practice, we looked at regional State aid case reviewed with a location scenario under both RAG. These cases do not cover all subsidy races: cases under GBER and investments moving away of EEA are not included. Thus, it is not possible to conclude about the overall change in the frequency of regions in the EU competing

against each other since 2014. Focusing on cases with location scenario only, they were reviewed under the RAG 2014 more frequently compared to the RAG 2007.

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APPENDIX 2 SURVEY QUESTIONS

The Commission has launched a retrospective evaluation study of the EU regional aid framework applicable in 2014–2020 (see http://europa.eu/rapid/press-release_IP-19-182_en.htm). The purpose of this survey is to collect views of aid-granting authorities on the regional State aid framework, *i.e.* the RAG 2014 and the General Block Exemption Regulation (GBER).

The results will form an important part of the study and have an impact on its conclusions. All questions refer to regional investment State aid granted in 2014–2018 unless explicitly specified otherwise. The study concerns regional investment State aid only – regional operating State aid is not covered.

This questionnaire is not anonymous as the researchers will see the name of your authority with your responses. It should be filled in by the person with the most extensive experience in regional State aid case administration working in your authority. Any data you provide will be shared with the Commission, but will be treated as confidential vis-à-vis outside world.

Your answers are automatically saved after entering, but you can go back at a later stage to adjust them if needed. Please submit your answers until 26 March 2019.

A2.1 DETAILS ON THE AID-GRANTING AUTHORITY

We would first like to ask some general questions about the institution you work for.

	Question	Answer
1.	Please give a short description of your organisation's role in general and in overseeing regional investment State aid.	**{TEXT BOX, 3 LINES}**
2.	How many persons (in full-time equivalent) did your institution employ in 2018?	**{SINGLE ANSWER}** • 1–9 • 10–49 • 50–or more • I don't know

A2.2 QUESTIONS REGARDING REGIONAL STATE AID FRAMEWORK

3.	Please select three economic sectors that are the most important for your region.	**{DROP-DOWN MENU}** • **List of all NACE 2 codes**
4.	For investors from these sectors, what factors in your region make it difficult to attract investors? Please select five most important factors for each sector.	**{MATRIX TABLE, MULTIPLE ANSWERS PER ROW}** **{COLUMNS}** **Three NACE 2 codes selected above.** **{ROWS}** • Tax regime

	• Lack of skilled workforce • High operating cost, *e.g.* labour, energy • Poor availability of infrastructure • Regional industry/sectoral clusters • Poor availability of regional State aid • Poor quality of government • General economic conditions • Administrative effort required • Expansion possibilities • Distance to customers • Distance to suppliers • Distance of research centres or universities • Other, please specify: **{TEXT BOX, 1 LINE; ALWAYS LAST}**
5. Are any of these factors particularly relevant to attract investment of some types of enterprises or investments to your region?	**{MATRIX TABLE, MULTIPLE ANSWERS PER ROW}** **{COLUMNS}** • Particularly relevant for small and medium-sized enterprises • Particularly relevant for large enterprises • Particularly relevant for greenfield investments • Particularly relevant for expansion investments • Particularly relevant for diversification investments **{ROWS, RANDOMISED ORDER}**

	• **{See 4}**
6. Have you had a State aid scheme in place since 2014?	**{DROP-DOWN MENU}** • Yes • No
7. **{Only if yes in 6, otherwise go to next question}** How important were the following criteria when you assess individual applications for regional State aid under the scheme?	**{MATRIX TABLE, SINGLE ANSWER PER ROW}** **{COLUMNS}** • Very important • Somewhat important • Neither important nor unimportant • Somewhat unimportant • Very unimportant • I don't know **{ROWS, RANDOMISED ORDER}** • Sector • Type of investment (greenfield, expansion, diversification) • Size of the company • Whether the investment would also take place without aid • Number of jobs created • Other, please specify: **{TEXT BOX, 1 LINE; ALWAYS LAST}**
8. **{Only if yes in 6, otherwise go to next question}** Do you have any additional requirements from applicants in terms of project structure (*e.g.* minimum number of jobs) or evidence (*e.g.* project profitability analysis showing incentive effect) besides those required by the Commission? Please describe.	**{**TEXT BOX**}**

We would now like to ask you some questions about the impact of changes in RAG introduced in 2014 on investment in your region.

9. Compared to the time period before 2014, did you observe a change in the level of private-sector investments in your region since the new RAG was introduced in 2014?	**{DROP DOWN MENU, RANDOMISED ORDER}** • Much reduced • Somewhat reduced • Neither reduced nor increased • Somewhat increased • Much increased • I don't know
10. Please describe the RAG changes in 2014 that were the most relevant for your region.	**{TEXT BOX}**
11. How many regional investment State aid cases did you have in the period 2014-2018? (RAG and GBER separately)	**{MATRIX TABLE, SINGLE ANSWER PER ROW}** **{COLUMNS}** • Applications in total **{TEXT BOX}** • Approved **{TEXT BOX}** • Denied **{TEXT BOX}** • Withdrawn **{TEXT BOX}** • Other **{TEXT BOX}** **{ROWS}** • RAG • GBER
12. **{IF ANSWER IN 11 deny IS NOT 0}** How many times did you deny regional State aid because of the listed reasons? Please fill in numbers.	**{DROP DOWN MENU, RANDOMISED ORDER, MULTIPLE RESPONSE}** • Investment did not meet the requirements of a scheme **{TEXT BOX}** • Request exceeded the applicable maximum regional aid ceiling **{TEXT BOX}** • Insufficient budget available **{TEXT BOX}** • To avoid notification to EC **{TEXT BOX}**

	• Qualitative factors regarding the investment not promising enough (*e.g.* likelihood of spill-overs) **{TEXT BOX}** • Expect the investment to also take place without aid **{TEXT BOX}** • Similar activity closed down in the EEA in the past two years **{TEXT BOX}** • **Beneficiary did not want to give a relocation commitment {TEXT BOX}** • Other, please specify: **{TEXT BOX, 1 LINE; ALWAYS LAST}**
13. **{IF ANSWER IN 11 deny IS NOT 0}** In the cases where you denied regional State aid, how many projects went ahead despite not receiving regional State aid?	**{DROP DOWN MENU, RANDOMISED ORDER}** • In my region in the same scope **{TEXT BOX}** • In my region a later point in time **{TEXT BOX}** • In my region with some adjustments (e.g., downsized) **{TEXT BOX}** • In another 'a' region**{TEXT BOX}** • In another 'c' region **{TEXT BOX}** • In another region in EEA, but I don't know if a or c **{TEXT BOX}** • In another region outside the EEA **{TEXT BOX}** • I'm not aware of what happened to the investment project **{TEXT BOX}** • Other, please specify: **{TEXT BOX, 1 LINE; ALWAYS LAST}**

14. In how many cases did the investor request a certain State aid amount, which was then adjusted down before approval?	**{TEXT BOX}**
15. **{IF ANSWER IN 14 not zero, otherwise go to next}** In those cases, where the requested regional State aid amount was adjusted down, did you offer or recommend to these investors an alternative support or a compensation?	**{DROP DOWN MENU, RANDOMISED ORDER}** • **No alternative support offered** • **Operating regional State aid** • **Other State aid programmes** • **Marketing** • **Provision of local infrastructure** • Other, please specify: **{TEXT BOX, 1 LINE; ALWAYS LAST}**
16. How many times did you receive an application for regional State aid cases from a large investment project, but the company finally decided not to invest in your region? Please give an example.	**{TEXT BOX}**
17. **{IF ANSWER IN 16 NOT 0}** In these cases, how often did the investment go ahead but in another region? **[Comment to the Commission: This can be evaluated in the diff-in-diff logic: we will compare the change for regions with reduced max aid ceilings/changes in eligibility status to the change for regions with constant max aid ceilings/the same eligibility status]**	**{DROP DOWN MENU, RANDOMISED ORDER}** • In another 'a' region**{TEXT BOX}** • In another 'c' region **{TEXT BOX}** • In another region in EEA, but I don't know if 'a' or 'c' **{TEXT BOX}** • In another region outside the EEA **{TEXT BOX}** • I'm not aware of what happened to the investment project **{TEXT BOX}** • Other, please specify: **{TEXT BOX, 1 LINE; ALWAYS LAST}**
18. **{IF ANSWER IN 16 NOT 0}** In these cases, were you not allowed to grant sufficient regional State aid because of the scaling down mechanism for large investment projects (para 20(c) of the RAG)?	**{TEXT BOX}**

19. Is your budget available for regional State aid sufficient to grant the maximum amount of aid allowed for your region?	**DROP DOWN MENU, RANDOMISED ORDER}** • Yes • No • I don't know
20. **{If no in 19}** What measures do you use to attract investors nevertheless?	**{TEXT BOX}**
21. What was your yearly budget available for and spent on regional State aid? **[Comment to the Commission: this is a heavy question, but we propose to ask it. The answers will deliver useful information on schemes, time trends and geographic variation]**	**{MATRIX TABLE, MULTIPLE ANSWERS PER ROW}** **{COLUMNS}** • Available • Spent **{ROWS}** • 2014: **{NUMBER} {CURRENCY} / I don't know** • 2015: **{NUMBER} {CURRENCY} / I don't know** • 2016: **{NUMBER} {CURRENCY} / I don't know** • 2017: **{NUMBER} {CURRENCY} / I don't know** • 2018: **{NUMBER} {CURRENCY} / I don't know**

We would now like to ask you about regional State aid cases <u>for large enterprises</u>.

22. Since 2014, how many times did you wish to support an investment, but were not allowed to grant regional State aid under the current RAG or GBER?	**{TEXT BOX}**
23. **{Only if answer to 22 not 0}** Please give an example of such a situation and describe the relevant limitations of RAG and GBER.	**{TEXT BOX}**
24. **{Only if answer to 22 not 0}** In these cases, how often did the investment go through despite not receiving State aid?	**{DROP DOWN MENU, RANDOMISED ORDER}** • In my region **{TEXT BOX}**

	• In my region a later point in time **{TEXT BOX}** • In my region with some adjustments (e.g., downsized) **{TEXT BOX}** • In another 'a' region**{TEXT BOX}** • In another 'c' region **{TEXT BOX}** • In another region outside the EU **{TEXT BOX}** • I'm not aware of what happened to the investment project **{TEXT BOX}** • Other, please specify: **{TEXT BOX, 1 LINE; ALWAYS LAST}**

We would now like to ask you some questions about the administrative process of providing regional investment State aid.

25. How many employees deal with regional State-aid matters in your organisation?	**{SINGLE ANSWER}** • 1–9 • 10–49 • 50–or more • I don't know
26. What is their average workload (in hours) for a regional State aid case treated under the GBER and under the RAG?	**{DROP DOWN MENU, RANDOMISED ORDER}** • RAG **{TEXT BOX}** • GBER **{TEXT BOX}** • I don't know
27. Since 2014, in how many cases the beneficiary reduced the requested regional State aid amount for an investment project to just below the notification thresholds, so that the administrative burden related to notifying the aid to the EC could be avoided?	**{TEXT BOX}**

We would now like to ask you some questions about your choice of instruments when supporting regional investment projects.

28. For investment projects in your region, what is the average share or regional State aid paid from national budget and what is the average share paid from the EU budget?	**{DROP DOWN MENU, RANDOMISED ORDER}** • National budget **{TEXT BOX}** • EU budget **{TEXT BOX}** • I don't know**{TEXT BOX}**
29. Do you find the provisions of the EU structural funds legislation and RAG for 2014-2020 complementary or contradictory in terms of the following?	**{MATRIX TABLE, SINGLE ANSWER PER ROW}** **{COLUMNS}** • Very complementary • Somewhat complementary • Neither complementary nor contradictory • Somewhat contradictory • Very contradictory • I don't know **{ROWS, RANDOMISED ORDER}** • Scope of application (*e.g.* regions eligible) • Objectives (*e.g.* jobs) • Criteria for approval (*e.g.* incentive effect) • Outcomes (*e.g.* decision type) • Procedures (*e.g.* timing and deadlines)
30. Please give a recent example and explain how the provisions of the EU structural funds legislation and RAG for 2014-2020 were complementary (or contradictory).	**{**TEXT BOX}
31. Do you find that regional State aid rules cause restrictions to the implementation of the EU structural funds? Please explain.	**{TEXT BOX}**
32. Do you find that the parallel application of these two sets of rules often creates extra burden? Please give an example.	**{TEXT BOX}**

We would now like to ask you some questions about competition between regions.

33. Since 2014, how many times have you found yourself in a situation of bidding against another region with State aid to attract an investor?	**{TEXT BOX}**
34. **{CONDITIONAL ON 33, ONLY IF NOT '0}** In which country was the competing region located? (if you had more than one such case, think of the case with the biggest State aid amount)	**{DROP-DOWN MENU}** • **{ALL COUNTRIES WORLDWIDE IN ALPHABETICAL ORDER}** • Other, please specify: **{TEXT BOX, 1 LINE}** • I don't know
35. **{CONDITIONAL ON 33, ONLY IF NOT '0}** What was the main constraint on the amount of State aid you offered?	**{SINGLE ANSWER, RANDOMISED ORDER}** • Available budget • Benefit for the region • Maximum aid intensity • Other, please specify: **{TEXT BOX, 1 LINE}** • I don't know
36. **{CONDITIONAL ON 33, ONLY IF NOT '0}** What additional support did you offer or recommend to these investors?	**{MATRIX TABLE, SINGLE ANSWER PER ROW}** **{COLUMNS}** • Very common • Somewhat common • Neither common nor rare • Somewhat rare • Very rare • I don't know **{ROWS, RANDOMISED ORDER}** • **No alternative support offered** • **EU structural funds** • **Operating regional State aid** • **Other State aid programmes**

	• **Marketing** • **Provision of local infrastructure** • Other, please specify: **{TEXT BOX, 1 LINE; ALWAYS LAST}**
37. Do you have any other comments regarding the existing regional State aid framework?	**{TEXT BOX, 6 LINES}**
38. **{OPTIONAL}** Would you like to leave any other comments?	**{TEXT BOX, 6 LINES}**

{Only for aid granting authorities which were involved in one of the cases on the list of case studies} We would now like to ask you some questions about the administrative process of providing regional investment State aid in the specific case [case number and name to be added].

39. How many hours did your organisation spend on dealing with this specific case?	**{TEXT BOX} (drop down menu if more than one case)**
40. As we would like to learn also about the beneficiary's administrative burden related to notifying the aid to the EC in this specific case, please provide us with contact details of a person (*e.g.* legal counsel) involved in the case on the side of the beneficiary.	**{TEXT BOX} (drop down menu if more than one case)**
41. **{Only if the case was a withdrawal}** Had the case not been withdrawn, what additional efforts would have been required to deliver a decision? Please estimate the number of working hours needed until decision.	**{TEXT BOX}**
42. **{Only if the case was a withdrawal}** Has the investment still been made in your region?	**{DROP DOWN MENU, RANDOMISED ORDER} (matrix per case if more than one case)** • Yes • No • I don't know
43. **{Only if the case was a withdrawal and yes in Q42}** Do you have more information about this investment? *E.g.* whether the beneficiary received other public funds, project was delayed, the scope of the investment modified?	**{TEXT BOX} (drop down menu if more than one case)**

Thank you very much for your participation in this survey.

APPENDIX 3 TRANSCRIPTS OF EXPERT INTERVIEWS

A3.1 EXPERT INTERVIEW – CONWAY

A3.1.1 Introduction

On 11 March 2019, at 11 am, the expert interview on the enterprise decision making process when choosing a location for an investment project and the role of regional State aid in this process took place.

Denis Merkwirth and Douglas van den Berghe from CONWAY were the interviewed experts. Hans Friederiszick, Ela Glowicka and Paula Mäkelä from E.CA Economics asked questions and took notes.

The interview was based on the interview guide approved by the Commission in the inception report dated 13 February 2019. All questions refer to State aid granted in 2014–2018 (unless explicitly specified otherwise). The replies will be shared with the Commission.

A3.1.2 Expert profiles

Denis Merkwirth (DM) Vice-President of CONWAY, has been active in the field of foreign direct investment (FDI) for 12 years. Denis joined Conway in 2011 after four years at KPMG, where he formed part of a global network of FDI specialists (Global Location & Expansion Services) assisting companies from various industries with their international expansion projects by providing location analysis, site visit and incentives negotiation support. He also supported companies with the implementation of shared services and process optimisation programs in the areas of procurement, finance and accounting. In 2017, he took over the leadership of Conway Advisory. Denis develops strategies and action plans and manages lead generation programs for investment promotion agencies worldwide to effectively attract and retain foreign investors.

Douglas van den Berghe, PhD (DB) Vice-President of CONWAY, holds a Ph.D. in Business Administration from Erasmus University Rotterdam – Rotterdam School of Management (RSM) and was previously a Director at Ernst & Young and Economic Affairs Officer at UNCTAD. As a management and strategy consultant, he has assisted many corporate clients in successfully implementing their global investment strategies, their location selection, as well as optimising their global supply chains across the world. Some of his corporate clients include Shell, Philips, Electrolux, HB Fuller, Appvion, John Deere, Johnson Controls, Knowles, Appnovation Technologies, and ING. He is considered one of the leading global experts on FDI, location strategy and offshore strategies, investment incentives, SEZs, and how to develop FDI policies for economic development and increase competitiveness. He has been an advisor to numerous governments, free zones, and investment promotion agencies (IPAs) in countries in the Middle East, Africa and Latin America and various organisations including UNCTAD, UNDP, World Bank, USAID, OECD, US State Department and the EU. Douglas has also guest lectured at Harvard Business School, Rotterdam School of Management, Nijenrode University and published in several academic journals such as the International Business Review, Transnational Corporations, and Business Strategy Review. He has worked in many countries including EU27, Central America, Albania, Australia, China, Ghana, India, Jordan, Iraq, Mexico, Saudi Arabia, Senegal, Ukraine, United Arab Emirates, the US, and Turkey. In addition, he has the following sector expertise: electronics, consumer products, financial services, automotive, oil and gas, chemicals, and IT.

A3.1.3 Questions on enterprise decision making

1) What is the typical decision process when choosing a location for an investment?

DM: The first and important remark is that projects are individual, can differ in all details and it is difficult, if not impossible, to generalise. However, one can generalise the process which we use to advice investors. When we meet an investor looking for a site, we first

need to understand intentions and objectives, based on which we develop decision criteria. Then select locations according to those criteria.

Geographic scope of the locations is based on facts. It starts on the national level with the selection of a country/countries, then it zooms in on region, city and a particular site. We gather data on the location and validate them by interviews with local business people or service providers. Based on this, we score each location. Scoring is the basis for comparing locations. Next step is visiting all locations. This is typically the first time the investor meets the local authorities and starts negotiating the incentives. Finally, a decision is made which can take several months.

Large companies may have their own staff doing the analysis, their investment location process is more data driven and analytical. Small and medium companies make location decisions rarely, or even once in lifetime. Typically the CEOs make the choice themselves, which can be chaotic, intuitive or opportunistic.

In case of looking for a location in Eastern Europe, 10-15 locations are typically on the choice list. We start at the country choice and zoom into the regional dimension.

This process can vary a lot – depending on the global or local focus, the type of project, the size of the company, the industry.

DB: The decision process critically depends on whether the investment is for expansion, optimisation of supply chains, or if it is a strategic decision. The process of large companies to select a location is very similar to that of SME's, but they use different variables and criteria of choice. In some industries there are location trends. *E.g.* 10 years ago numerous shared service projects located in Cracow – there was a bandwagon effect, where companies look at others in the industry and follow. This creates hubs, where some firms decide to locate even if it is not even optimal. Similar effects could be observed in IT operations in the Baltic states, operations moving from the UK to Amsterdam very recently, shared services moving to Prague and Brno, manufacturing moving to Spain and Portugal. These trends are prevalent and driven by the bandwagon effect, which does not necessarily coincide with rational decision-making.

Mid-size companies are less eager to join the bandwagon and more open to other location suggestions. They take more risk and thus they require a more sound choice. In a hub large companies change the business environment: drive wages up, steal people from others. The mid-sized companies do not necessarily have the resources to deal with the increasing cost level and therefore are more willing to look for secondary cheaper locations.

2) What are the most important regional factors considered in the investment location decision? For example:

   a) Tax regime

   b) Investment cost (availability of skilled workforce, infrastructure, *etc.*)

   c) Operating cost (workforce, energy, *etc.*)

   d) Regional industry/sectoral clusters

   e) Proximity to customers and suppliers

   f) Possibility of expansion

   g) Investment incentive

   h) Quality of institutions

   i) Macroeconomic trends

j) Administrative effort required

k) Expatriate life quality

l) Weather and climate

m) Predictable and safe EU legislative framework

n) Other?

DM: The key factor is the availability of skilled workforce, especially for manufacturing. Access to a pool of workforce that is large enough and has required quality - graduates (regions with a university), or blue-collar workers (regions with technical college). Also absenteeism and worker turnover are relevant factors.

The second rank is available infrastructure. It may be technically required, for example a clean room in the medical business, chemical park in chemicals, access to a port, availability of natural resources (for manufacturing), services: high speed internet, high-quality office space. If this is not provided by the region, investors must build it themselves, which is costly.

For small and medium companies, investment cost is very relevant, which means upfront incentives.

DB: Mid-sized companies are less able to accept large risk; they are more cost-sensitive and need to minimise the risk. Not able to train employees themselves, they need this to be offered. This is why they may be more receptive to incentives than large firms. There are differences in what is considered a mid-sized company across countries: very small in the Netherlands, significantly bigger in Germany. Mid-sized companies make more opportunistic decisions, they would look in a magazine, see an ad by a region's promotion agency and feel addressed, go there and see if it fits.

The key driving factor is the availability of workforce.

From outside of the EU, Eurozone is seen very similar, country-level analysis not relevant, it moves quickly to regional or city location. Similar in the US.

A recent trend is that **transparency**, **stability** of policies and incentives and **predictability** become increasingly important. Since the financial crisis, investors are concerned how long the offer will be valid, when is the next election and how likely it is that the incentive offer may change after the election. This is happening for projects within Europe.

DM: More recently, investors are concerned about corruption scandals in Eastern Europe, stability of the legal system in Poland, *etc.* In the US insecurity of political situation. Thus, investors take account of when the next local election is planned and if soon, this can lower the rank of a location.

Language diversity in Europe: a location must have 10-15 people familiar with western cultural values and speaking good English. This is a "kick-out criterion." Quality of expat life, whether and climate are relevant for investments where a lot of management would need to move to the new location.

3) Do companies make a separate qualitative and quantitative analysis?

a) What are the most important qualitative factors?

b) What are the most important quantitative factors?

i) What are the thresholds that need to be met?

c) How are both those qualitative and quantitative factors valued against each other in a final investment decision?

DM: Investors always use both qualitative and quantitative assessment methods. A matrix of cost and quality region characteristics is typically assessed, cost quantitatively, while quality may not always be quantifiable. The stage of the process also plays a role: initially qualitative factors are considered to make the first national level choices, but the more advanced the process, the more relevance to quantitative factors. In the end, there is a measure for everything and a score per location is calculated.

The measures need to be well balanced between absolute and relative values, *e.g.* total pool of workforce and the share of blue-collar workers in the pool.

High quality of the region usually means higher cost, *e.g.* the better education of workforce, the higher wages. This is an important interdependence. Investors use it in benchmarking: find regions with a similar level of workforce education but lower wages, drop regions below 50% of the scale, *etc.*

NPV, IRR, forecasting: this is normally done, but some (large) companies like to do it themselves. We do it, too. It is more relevant for investments in manufacturing, which are capital-intensive. Labour cost and its predicted growth is very relevant. Also the future size of the labour pool matters – when companies expect expansion, they chose a larger labour pool. Demand and demand development is not so relevant.

DB: Large companies use their own models for quantifying the value of investments. We use IRR cash flow models, one cash flow model per location, take into account many variables, estimate operational cost per location. The larger the project, the more likely this type of analysis. Another type of models is scenario analysis with wages forecast (based on assumptions), this is relevant for projects with two to three thousand employees. These projects are rather scarce, ever less frequent.

Thresholds for factors: every project has a knock-out variable. Not necessarily value, but existence, *e.g.* language capabilities. These are used to reduce a long list of potential locations to the short list. When the short list is ready, the key moment comes: site visits. The location must feel good, look good, good feedback from local staff, if it does not feel good, it will not be chosen.

4) Do companies select a specific region because regional investment State aid is available?

DM: Investment incentives are not a stand-alone issue. I can recall only one case where a Chinese investor said they would not go to a region where there were no incentives. Companies look at the overall cost level. Expected set up cost, operating cost, tax rates, indirect costs, and finally, coming at the end, incentives. For capital intensive projects (*e.g.* manufacturing) companies always count incentives in, they are aware of incentive offered.

Generally, from a total of five to seven factors, the importance of investment incentives is below average weigh (max 15%). In some projects the type of incentive plays a role: for a high Capex investment cash grants are more important and the incentives would be ranked higher than a tax break. Small and medium would also prefer cash grants, because they are more cash-constrained and they need to reduce the initial investment cost. Large companies plan more long-term and would be more interested in tax breaks, which are relevant the long run. Large companies negotiate tougher – they have experience in such negotiations, they know their brand.

DB: This is a very topical question in the US and in the EU. In the forefront, incentives are not a driver. They are a cherry on the cake. Incentives just support the cash flow. The type of incentives is very relevant: finance driven, *ex ante* (cash grant) or *ex post* (tax break). Globally, similar menus of incentives are offered in the last 5-10 years. Investors tell governments: we can get it anywhere! "Soft" incentives are gaining on importance, *e.g.*

support for education programs. Larger companies more influential, get red carpet treatment. Behavioural incentives more and more common. Authorities invent strategies how to make companies behave after they have located.

It could well be that regions lose a project because they cannot offer what others can. Depends on the details of the project.

Regional State aid has played a role in attracting investment to the disadvantaged regions of the EU.

Incentives play the key role between locations which are more similar on other characteristics, say between European locations. If scores are similar, the incentives can tip the decision to one location over the other.

Aid intensity is factored in at the early stage of the process and its importance depends on the investment level. Investors are keen to hear about it. (High) aid intensity in a region is promoted by authorities. The type of incentives offered is not necessarily what companies need. *E.g.* tax reductions spread over years, but if there are no profits in the first years, it is irrelevant or not helpful. Something else may be important instead: training or R&D. Authorities should tailor.

5) Do companies decide not to invest because no regional investment State aid is available?

See answer in question 4.

6) Is the availability of regional State aid a qualitative or quantitative factor?

   a) How important is the availability of regional State aid? How much weight does it have overall?

See answer in question 3.

7) Do companies care about what type of State aid is offered?

See answer in question 4.

8) Does the maximum State aid intensity play a role?

   a) To what extent can a State aid intensity of 5%, 10%, 15%, 20%, *etc.* change the decision making of a company?

DM: In the last years, automotive OEMs would go to eastern Europe rather than Eastern Germany, because of better incentives.

Nowadays, Eastern Germany is not an alternative to Eastern Europe. Rather, companies compare eastern Germany with the rest of Germany where there is no regional State aid.

9) Did you experience a change in the importance of regional State aid under the new guidelines 2014-2020 compared to the previous period 2007-2013?

10) In what type of projects do large enterprises typically invest in the 'c' areas? *E.g.* expansions or diversifications of their current sites, new investments (some statistics might perhaps also help)

DB: It is a challenge to attract investments to 'a' regions. A restrictive policy is not helpful.

11) How do all the considerations above differ for

a) Small/medium enterprises and large enterprises

b) Industry/sector? In particular hotel accommodation and food services, wired telecommunications activities, manufacture of parts and accessories for motor vehicles, manufacture of motor vehicles, trailers and semi-trailers, manufacture of other plastic products, manufacture of tools, manufacture of pharmaceutical preparations, manufacture of metal structures and parts of structures, machining.

c) Enterprises from outside EU and those located in the EU

See answers above.

A3.1.4 Investment and localisation trends

12) In the period 2014-2020, what were the global trends in locating investments?

13) How did they differ for

a) Small/medium/large enterprises

b) Industry/sector

c) Enterprises from outside EU and those located in the EU

DM: Trends have been a roller coaster in the last years, there are no clear trends. The outlook is not very clear. In 2015, developing countries got more FDI than developed countries, one year later it was reverse. In the EU, there were more expansions and less new investments.

US companies, but also Chinese, Indian, Malaysian, Thai, are much more used to incentives so they would be keener to look for them than European companies.

A new trend is decentralisation of footprints: companies set up regional or local headquarters, reorganise existing locations in the direction of hidden expansion, hire more management or technical staff decentrally. Additive manufacturing (3D printing) will decentralise production.

DB: The trend is that expansion investments are prevalent. Greenfield FDI investments have stabilised/declined, many investors invest in strategic partnerships, JVs, *etc.*, instead of enter new markets by plant construction. Expansion projects are still frequent.

Japanese investors culturally do not negotiate incentives, see taxes as a normal thing. Also European firms, *e.g.* Daimler would not make a bid auction. The recent case from the news about regions in the US bidding for Amazon's investment would not happen in Europe.

There is a tendency to appreciate soft incentives, support operations, this becomes more important globally.

Greenfield FDI could decline as a source of economic development from outside and other ways to enter markets will matter, *e.g.* M&A or JVs.

14) Had the change of Regional Aid Guidelines and GBER in 2014 any influence on these trends?

A3.1.5 The role of regional State aid over the 2014-2020 period

15) What are the weaknesses and the strengths of the current rules on regional State aid from investors' perspective?

DM: There are five major issues that hinder investors from applying State aid: 1) Transparency regarding the application process and eligibility for aid. 2) The burden and costs associated with the application process. 3) The level and depth of (confidential) internal information that they would have to provide to the aid granting authorities. 4) Reputational risk: If a company gets a grant, how is it perceived by competitors? Is it seen as a sign that the company is financially constrained because it needed the grant? 5) Risk of claw back and requirement of keeping jobs. Companies often use risk – reward analysis to assess these.

DB: Transparency in terms of eligibility could be a show stopper, see Apple in Ireland. Increasing transparency and predictability would be a recommendation for the new guidelines.

There is a commercial database on incentives - Incentives monitor – since 2010/2011, originally developed by ICA (now Conway). The database shows which incentives were provided to corporate investors, allow to compare locations in terms of actually granted incentives.

16) What are the most important parameters of the current rules on regional State aid that are relevant for investment location decisions? Do they affect the location decisions in reality?

a) restrictions on project eligibility

b) maximum State aid intensities

c) individual notification thresholds

d) requirement to submit State aid application before start of works (formal incentive effect)

e) restrictions on enterprises' behaviour

f) requirement of keeping employment for a number of years

g) prohibition of closing facilities elsewhere

h) other?

DB: This is not a topic for investors.

DM: There was one case where the investor agreed to a reduced incentive amount to avoid notification to the EC. This is very rare, only when the incentives amount is close to the threshold.

17) What alternative public support (national and/or EU funds) do enterprises consider?

DM: Training aid, R&D incentives (but this is more complex, quality/quantity matrix more difficult, rely on specific assets which exist only in one/two specific locations, no national program is possible).

Like in M&A, locations should offer a deal book, to inform what they can offer and include soft incentives.

A3.2 EXPERT INTERVIEW – DELOITTE

A3.2.1 Introduction

On 16 April 2019 at 4 pm, the expert interview on the enterprise decision making process when choosing a location for an investment project and the role of regional State aid in this process took place.

Sjors Berns and Thomas van Bergen from Deloitte were the interviewed experts. Hans Friederiszick from E.CA asked questions and Harm van Leeuwen and Paula Mäkelä took notes.

The interview was based on the guide approved by the Commission in the inception report of 13 February 2019. All questions refer to State aid granted in 2014–2018 (unless explicitly specified otherwise). The replies will be shared with the Commission.

A3.2.2 Expert profiles

Sjors Berns (SB) is a Senior Manager at Deloitte's Business Location Services unit in Amsterdam. He has worked for Deloitte for almost 13 years on location strategies mainly in the Netherlands but also internationally, predominantly in Northern Europe. The Business Location Services unit is part of Deloitte's real estate division. The unit advises both on searches for office space (white-collar) as well as investments in industrial real estate, such as chemical plants or the construction industry. There is no specific sector focus. Clients are typically large companies, rather than SMEs.

Thomas van Bergen (TvB) is a Manager at Deloitte's Business Location Services unit in Amsterdam, specialising in investment locations for the chemical industry in the Netherlands. He has worked for Deloitte for almost five years, previously working in public-private partnerships. Most clients are American and Canadian companies, as well as some Asian companies, who are looking to expand in areas close to seaports. He has a particular focus on green or bio-based chemistry. State aid and subsidies and incentive schemes have been very relevant in these cases. Thomas has also advised technology firms, though these are not very interested in subsidies, as attracting staff ('talent') is of a larger concern.

A3.2.3 Questions on enterprise decision making

18) What is the typical decision process when choosing a location for an investment?

SB: The steps are longlist analysis; shortlist analysis; big book procedure or 'beauty contest'; and then negotiation of final location and commissions. The set of location criteria that are relevant at every stage are set by the client.

Whether search is within a country or region or wider depends on the client. They are always leaning towards a specific region. That's typically included in our analysis and based on our experience we can also add locations we consider relevant for them.

There is no predominant motive, it really depends on business or sector. For chemical industry which is typically characterised by huge investments, the financial business case is the driving motive. For corporate office locations the availability of skilled labour and the expatriate environment is driving.

TvB: It is very much dependent on activity. If it is capital intensive, *e.g.*, chemical or automotive, then you see that incentive schemes or subsidies are of high importance. Whenever it is mostly labour intensive, this is less important. Then you don't really keep that in mind. In that case, it is more about taxation maybe; but more from an operation/exploitation perspective.

19) What are the most important regional factors considered in the investment location decision? For example:

a) Tax regime

TvB: Deloitte does a lot of tax advice as well. Investment/location advice is part of the total package, so we work with our tax colleagues on transfer pricing, *etc.* It is a very large criterion for us. But I don't think for many companies moving into the Netherlands the tax regime is of the highest importance. There are two fiscal characteristics/exceptions with respect to the Netherlands that have to do with the lack of taxation on interest and the exemption of ownership where there is no taxation. That is unique in the EU. So you do find a lot of treasury activities here. And a lot of intellectual property, marketing and sales. However, those activities do not typically involve much personnel or a large capital investment. To this end, tax regime might be important, but only for those companies actively tax structuring (for which the Netherlands as well as, for example, Luxembourg, Ireland and the UK are interesting).

In general, taxation is more important for capital-intensive investments than for labour-intensive investments. Location decision is a project and there are separate business cases that can be made for each type of investment. Location can be analysed from several perspectives, proximity, personnel, *etc.* Moreover, it is always a financial business case in terms of potential profit. Typically, when the investment is labour intensive involving, for example, headquarter activities, sales or marketing, then taxation is less of an issue because a business case as a whole is much less ring-fenced. Therefore, it is less transparent what the whole movement will entail in terms of taxation.

b) Investment cost (availability of skilled workforce, infrastructure, *etc.*)

c) Operating cost (workforce, energy, *etc.*)

d) Regional industry/sectoral clusters

e) Proximity to customers and suppliers

f) Possibility of expansion

g) Investment incentive

h) Quality of institutions

i) Macroeconomic trends

j) Administrative effort required

k) Expatriate life quality

l) Weather and climate

m) Predictable and safe EU legislative framework

n) Other?

SB: As for the entire list of criteria, which are most important is really dependent on activity. Very different for chemical factory than for regional headquarter. So it is difficult to say.

TvB: For regional headquarter it is talent, proximity to airport (Schiphol). For chemical or manufacturing investment, availability of workforce again but also infrastructure: accessibility from a supply chain perspective in particular. So overall general prioritisation of factors is really hard because the cases are too different.

20) Do companies make a separate qualitative and quantitative analysis?

a) What are the most important qualitative factors?

b) What are the most important quantitative factors?

i) What are the thresholds that need to be met?

c) How are both those qualitative and quantitative factors valued against each other in a final investment decision?

SB: Longlists and shortlists are based on multi-factor analysis. We apply weightings to various factors or criteria. We think we have a good understanding of importance, but we always define weightings in cooperation with clients. Scores are based on objective data. Qualitative and quantitative analysis are both important – business conditions and business costs. We often produce a conditions vs cost matrix, where locations are plotted on these two axes.

TvB: We have a big data file with sources mostly from government institutions so we can objectify the categories, quantitative and qualitative. For example, availability of skilled workforce and related cost could be objectivised using salaries, Dutch higher education participation or patents.

SB: Indeed, we can evaluate the available education, but we can also reach out to a number of selected recruitment agencies and provide them with a questionnaire on ease of recruitment, or the premium one would have to pay for specific skills.

TvB: In terms of forward-looking perspective and predictions, we do benchmark analysis and cross-referencing. We benchmark capacity for chemical plants and also do competitive benchmarking: where other companies are located, how are they doing and how we expect markets to grow. There's a predictive part to that. When it comes to workforce projections and labour force projection, we involve/integrate inflation but we do not do that much further.

SB: When advising on a decision between different locations, we make a business case for each location. For capital-intensive projects, we do so typically at a later stage of evaluation, where costs and conditions are detailed. So for finalist locations, we build detailed business cases including forward projections of costs and benefits.

TvB: For how many locations such a detailed business case is made depends on client requirements. A long list may contain ten locations, whereas a short list can consist from two or three up until five locations. In addition to detailed business plans, we also take clients for cite visits and introduce them to the local contact people, such as government officials and recruiters.

21) Do companies select a specific region because regional investment State aid is available?

22) Do companies decide not to invest because no regional investment State aid is available?

TvB: We work together with 'grants and incentives' colleagues at Deloitte, who specialise specifically in subsidies. As I understand it, subsidies are pre-approved State aid. We make an inventory of subsidies that are available and the amount of money involved, as well as the likelihood of receiving them or a completion percentage. We do that at a European level on mostly large-scale subsidy schemes. Then go into national and regional/municipal level of subsidies. But subsidies are only one part. We also go into specific types of State aid schemes, mostly regional State aid. The amounts of aid granted under Environmental and R&D aid are typically so small that they do not really affect the business case.

It depends a lot on the activity, but from experience with bio-based chemical companies, State aid regulations generally allow a maximum of EUR 50 million co-investment of the government in these types of companies. As far as I'm aware, the relevant schemes are mostly run under regional aid guidelines.

Other fiscal incentives are relevant in parallel, but these have to be compliant with State-aid rules as well. So there's no difference and every organisation gets the same fiscal treatment. It first comes down to subsidies and we check all that are available. Then, if there's still no business case we can look in more detail.

SB: Agree. Also in non-capital-intensive investments, subsidies play smaller role.

23) Is the availability of regional State aid a qualitative or quantitative factor?

    a) How important is the availability of regional State aid? How much weight does it have overall?

24) Do companies care about what type of State aid is offered?

25) Does the maximum State aid intensity play a role?

    a) To what extent can a State aid intensity of 5%, 10%, 15%, 20%, *etc.* change the decision making of a company?

SB: With regard to the thresholds, there is sometimes a communication problem. Of course, the client would always like to see the highest possible amount, but they generally also understand this is not always what they will receive.

TvB: I'm not very familiar with notification thresholds themselves, but I do have some experience. The current perspective is that it takes too long for the Commission to respond to these type of investments. That is, the processing time is too long in terms of investment decision process. Therefore, the maximum amount of money that you can provide as national or regional government is often perceived as a strict maximum. In my experience, they have not really gone above it because of the bureaucratic processes involved in notifying to the Commission. It is already quite difficult for companies to find a responsible authority or person in charge with some decision power in a local or national authority. It is more difficult in the Commission. For certain industries that the EU wants to get better at, this could certainly be improved, for example, by introducing a contact person or a head of commission whom to contact with these issues.

I have some experience with a specific confidential client. It was an investment initially aimed at the Netherlands, but alternative locations were Germany, Sweden or Belgium as well. The capital investment was a few EUR 100 million and the business case showed there was still a definite gap to bridge. We have been looking to national governments rather than Commission on how to deal with this. At a European level, we have been talking to European Investment Bank. We understand, however, that this operates mostly like a bank.

When bargaining with local or regional governments, the bargaining position is a lot better for large projects, of course. I think large companies and multinationals have a different attitude than mid-scale or small companies, even though we do not have many of the latter as our clients. But we have had some mid-scale companies and they are very different. Multinationals are much more aware of economic contribution and impact that they can make. This seems clear and evident, but in negotiations multinationals use it more than mid-scale companies, who leave a lot of room to the negotiating partners and could improve their negotiation position.

Negotiations are mostly about jobs or CO2 reduction, which are major priorities for governments. Of course governments are also sensitive to large investments coming in,

but they mostly focus on job creation and increasingly CO2 reduction, or green chemistry/energy instead.

SB: Of course, competition between regions for investment exists. We try to make the process as transparent as possible to governments as we are not there to play regions or states against each other.

TvB: We also often come in for this process in order to make it clear to governments what the added value is and why the government might be interested in the investment. In my experience, in the first round, it is often about which country. But once this is decided on, the real competition is between regions. The playing field there is less transparent and there is more variation in terms of how many incentives or support they are willing to provide; not only in terms of money, but this could also be legislation or political support.

If one of potential location is in Europe and another one elsewhere, this changes the bargaining situation. This is often the case. For example with chemical companies, it is often Thailand, which is very aggressive in attracting green chemistry. Also Singapore. Then it becomes a question of how much governments are willing to fight to get a project into the EU. We are not really trying to play out governments against each other. But governments do the same with companies in case of tenders, say, for large infrastructure projects. The Amazon case has helped us, as they took this competition between regions very far. Now, things that resemble the Amazon case but are a lot less aggressive can be perceived as more standard procedure, as a lot of major companies are doing it.

American and Canadian companies use competition between regions more as it is a common thing in the US, where there is a lot of competition between states. I think that investors coming in from Asia and Australia tend to be much more focused on the relationship than only on the business case. When an Asian client comes in we make sure that they meet up with political representatives and they meet everyone at highest possible levels, as building trust is more important.

Singapore has a ready-made standard global-trader incentive package. It was an integrated deal that commodity trading companies can sign. It gives them benefits such as some fiscal and education benefits, relocation services and access to education, to make relocation easier. It is therefore both fiscal but also including soft incentives that guarantee a 'soft landing'. I would say that that type of packages for industries that EU really wants to attract would be very smart, as we have seen it working. Even though this may be more difficult to implement in the EU than in Singapore.

26) Did you experience a change in the importance of regional State aid under the new guidelines 2014-2020 compared to the previous period 2007-2013?

TvB: I have not worked a lot with the guidelines before 2013, as I've only with Deloitte for 5 years. I do see that if you want to make a real change in industry transition, maximum amounts of State aid are not sufficient.

SB: I also do not have experience to comment on this.

[SB leaves meeting due to another appointment.]

27) In what type of projects do large enterprises typically invest in the 'c' areas? *E.g.* expansions or diversifications of their current sites, new investments (some statistics might perhaps also help)

See answer to question 25.

28) How do all the considerations above differ for

a) Small/medium enterprises and large enterprises

b) Industry/sector? In particular hotel accommodation and food services, wired telecommunications activities, manufacture of parts and accessories for motor vehicles, manufacture of motor vehicles, trailers and semi-trailers, manufacture of other plastic products, manufacture of tools, manufacture of pharmaceutical preparations, manufacture of metal structures and parts of structures, machining.

TvB has mostly advised large companies in chemical industry and therefore did not comment on this.

c) Enterprises from outside EU and those located in the EU

See answer to question 25.

A3.2.4 Investment and localisation trends

29) In the period 2014-2020, what were the global trends in locating investments?

TvB: Mostly from a green chemical perspective, the amounts of money involved are getting a lot bigger, it is becoming a mature industry. Also done a bit of location advice for large tech firms. For these, it is not so much a competition between national governments, but more between metropolitan cities. For example, Rotterdam, Amsterdam, London, Berlin, Milan.

My colleagues at Deloitte's grants/investments/subsidy service lines would probably have more detailed experience with State aid. I can provide contact information for another suitable interviewee.

30) How did they differ for

a) Small/medium/large enterprises

b) Industry/sector

c) Enterprises from outside EU and those located in the EU

See answer to question 28.

31) Had the change of Regional Aid Guidelines and GBER in 2014 any influence on these trends?

See answer to question 26.

A3.2.5 The role of regional State aid over the 2014-2020 period

32) What are the weaknesses and the strengths of the current rules on regional State aid from investors' perspective?

See answer to question 25.

33) What are the most important parameters of the current rules on regional State aid that are relevant for investment location decisions? Do they affect the location decisions in reality?

a) restrictions on project eligibility

b) maximum State aid intensities

c) individual notification thresholds

d) requirement to submit State aid application before start of works (formal incentive effect)

e) restrictions on enterprises' behaviour

f) requirement of keeping employment for a number of years

g) prohibition of closing facilities elsewhere

h) other?

See answer to question 25.

34) What alternative public support (national and/or EU funds) do enterprises consider?

See answer to question 25.

A3.3 EXPERT INTERVIEW – EY

A3.3.1 Introduction

The Commission has launched a retrospective evaluation study of the EU regional State aid framework applicable in 2014–2020, *i.e.* the RAG 2014 and the GBER (European Commission 2019b). The objective of the study is to investigate whether the regional aid framework is still fit for purpose. The study will be published in September 2019. It concerns regional investment State aid only (regional operating State aid is not covered).

One of the major inputs to the study is experts' feedback on the enterprise decision making process when choosing a location for an investment project and the role of regional State aid in this process. To this end, E.CA interviewed Falk Bachhuber, Tina Bimböse and Tobias Kühne from EY by telephone on 9 April 2019. The interview started at 4.15 pm and took about one and a half hours. Hans Friederiszick, Ela Głowicka and Harm van Leeuwen from E.CA asked questions and took notes.

The interview was based on the guide approved by the Commission in the inception report of 13 February 2019. All questions refer to State aid granted in 2014–2018 (unless explicitly specified otherwise). The replies will be shared with the Commission.

The rest of this memorandum summarises the responses given by the EY experts during the interview.

A3.3.2 Expert profiles

Falk Bachhuber, Tina Bimböse and Tobias Kühne work at EY's Global Incentives Advisory division, supporting companies in their location decisions with respect to government subsidies. Experts from EY Global Incentives Advisory Team guide inter alia the companies' process of locating in a region, including the selection of the location and requests for government funds. Due to EY's structure (it also has similar divisions in other countries), typically investors contact their local EY division and once a company has decided to locate in a certain region outside Germany, colleagues in that country would take over the implementation of the project.

Customers are mainly large companies as well as large mid-sized companies. Small companies or start-ups are rather uncommon as customers.

Mr Falk Bachhuber is an Associate Partner with more than 23 years professional experience in investment and infrastructure incentives as well as EU State aid law. He has been with the EY team for four and a half years. He joined EY from PricewaterhouseCoopers, where he worked for more than 13 years in the same field.

Before, he worked at a German state-level economic-affairs ministry as a civil servant and as a project leader at a state development agency responsible for subsidies.

Ms. Tina Bimböse is a Manager with eight years professional experience in investment and infrastructure incentives as well as EU State aid law. She has been with the EY team for 4½ years. Before, she worked for three and a half years at PricewaterhouseCoopers in the same field. In Addition, she is a certified grant consultant.

Mr Tobias Kühne is a Senior Consultant with five years professional experience in funding and investment consulting. Before joining EY in January 2015, he worked for PricewaterhouseCoopers in the same field.

A3.3.3 Enterprise decision-making

35) What is the typical decision process when choosing a location for an investment?

The typical decision process when choosing a location for an investment depends on the company's business model and other considerations. EY generally gets involved in a project at an early stage, when a company is looking for a new location, *e.g.* for a production plant. In general, this is already quite focused and the catalogue of questions or requirements is already given from the company. The requirements differ by sector, *e.g.* a logistics firm has different requirements from a car-maker, a producer of optical systems or a chemical company. Some companies need to serve specific markets, to factor their supply chain, to access to specifically trained workers and/or a suitable surface area, consider geopolitical risks, taxes as well as government subsidies.

The first question is generally which locations are suitable in the first place when looking at the supply chain and markets to be served. A large number of locations is analysed in advance and a longlist of potential locations is presented to the company. The longlist summarises to which extent different locations satisfy the first requirements such as surface area, framework conditions and expansion possibilities. Sometimes the longlist can contain locations all over Europe, in other instances there is already a focus on a region (*e.g.* Eastern Europe) due to specific requirements. Some companies have already narrowed down the options to a few locations within one or two countries. A typical longlist would contain about 15 to 20 alternative locations.

The selection for the longlist is not based on the region or the country, but rather on the requirements. EY summarises the overall conditions. In some cases the companies do not inform about all relevant parameters and their weight in the decision. Rather, the company takes the list and takes a decision itself, perhaps approaching EY at some later stage if they wish to continue searching.

Not every location on the longlist necessarily needs to fully comply with all requirements. For example, it is possible that a company requires a building with a certain number of storeys, but there is a location that fulfils all requirements except that it is only permitted to build single-storey buildings. EY includes it in the list anyway, so that the company can still consider it.

In a discussion process with the company, the longlist is narrowed down to the shortlist of about three to five locations. These are then analysed in more detail and there is a site visit. At this stage EY may regularly not be involved anymore, but the companies assess the locations themselves. In the course of the decision-making process, companies also regularly consider 'soft' factors relating to individual locations.

In most cases, EY is involved in negotiations with the local institutions on the conditions of State aid.

36) What are the most important regional factors considered in the investment location decision? For example:

a) Tax regime

b) Investment cost (availability of skilled workforce, infrastructure, *etc.*)

c) Operating cost (workforce, energy, *etc.*)

d) Regional industry/sectoral clusters

e) Proximity to customers and suppliers

f) Possibility of expansion

g) Investment incentive

h) Quality of institutions

i) Macroeconomic trends

j) Administrative effort required

k) Expatriate life quality

l) Weather and climate

m) Predictable and safe EU legislative framework

n) Other?

The list contains the relevant criteria, but it is difficult to choose a few criteria from the list that are most important, as this depends on the specific company, such as its size and industry. Companies always ask about tax rates and EY discloses the tax framework for individual locations, but for some companies this may be less important and *e.g.* labour costs may be much more crucial. It can also be that the decision hinges on subsidies for some companies. Only more general considerations such as geopolitical risk or climate conditions are less important in the first stage.

Empirically, large companies have a more structured and long-term planning process, and also have more means available to invest in the decision. They thus generally organise the process more professionally, asking for input from many of their specialised departments, and may take up to one or two years to come to a decision. Mid-sized companies do not have these possibilities. In some cases they even locate together with a larger company they depend on.

37) Do companies make a separate qualitative and quantitative analysis?

a) What are the most important qualitative factors?

Qualitative factors are most important initially, such as surface-area requirements or availability of labour force. These are 'hard' location requirements.

b) What are the most important quantitative factors?

i) What are the thresholds that need to be met?

c) How are both those qualitative and quantitative factors valued against each other in a final investment decision?

Only after these qualitative requirements have been considered, 'soft' quantitative criteria such as subsidies and taxes become relevant.

38) Do companies select a specific region because regional investment State aid is available?

State-aid availability is shown to companies from the beginning in the requirements catalogue, together with taxes. Initially this is mainly about the question whether State aid is a possibility or not but it is not a decisive factor in the first stage. For example, State aid is generally not enough to compensate for structurally higher logistics costs in underdeveloped regions. Only once the list has been narrowed down to fewer (*e.g.* three to five) potential locations, State aid becomes more important. This is very common as there are generally multiple locations that fulfil or almost fulfil the basic requirements. The State aid is likely to compensate for locational handicaps (*e.g.* logistical cost disadvantages).

39) Do companies decide not to invest because no regional investment State aid is available?

It does not happen very often, but it is possible that a location is dropped from consideration because State aid is not available.

40) Is the availability of regional State aid a qualitative or quantitative factor?

a) How important is the availability of regional State aid? How much weight does it have overall?

Large companies have a more long-term perspective and financial strength. The stronger the financial strength of a company, the less decisive is the aspect of public funding or granting of subsidies (this tends to apply to small and medium-sized enterprises than to internationally operating groups). Mid-sized companies are more likely to make State aid a decisive factor. Smaller companies are more likely to decide for a certain location than large companies based on State aid, as they are considering a completely different scale in terms of workforce and time span.

There are little differences between industries concerning interest in State aid, *e.g.* it would be just as interesting to a logistics firm as to a manufacturer. An exception is sectors which are excluded by the regional Aid guidelines. Once a company has identified potential locations sites where State aid is a possibility, it is relevant. However, State aid is not always a possibility in practice even when it is theoretically permitted (*e.g.* in terms of the regional-aid guidelines), as countries and regions set their own focus in terms of certain clusters or industries.

41) Do companies care about what type of State aid is offered?

The type of State aid preferred differs between large and smaller companies. Whereas large companies have no problem financing themselves, as they have normally better access to credit. But credit has become much cheaper in recent years. They are therefore less interested in public funding in terms of a low-interest loan, as the conditions are very similar to market conditions. This leads to a higher importance placed on direct grants. For small and mid-sized companies, this is different, as they are happy to take any form of aid.

42) Does the maximum State aid intensity play a role?

a) To what extent can a State aid intensity of 5%, 10%, 15%, 20%, *etc.* change the decision making of a company?

The maximum aid intensity is clearly reported on the longlist. Apart from the intensity, the concrete subsidy catalogue available in a region is also relevant. EY reports this to the company so that they can consider it. It has happened before that this led to give up certain

regions in favour of looking at others, with a higher maximum aid intensity, in more detail. When locations are comparable in terms of other factors, State aid becomes important.

In the longlist phase, only the framework conditions (*i.e.* maximum intensity) is relevant. In the shortlist phase, negotiations with the regions start and the focus is more on the execution, *i.e.* concrete subsidies. In the case of competition between regions in terms of location, public funding would become part of ministerial discussions and would be included in the state's offer to the potential investor in form of a Letter of Intent (LOI).

The level of subsidies is generally very close to the maximum aid intensity.

43) Did you experience a change in the importance of regional State aid under the new guidelines 2014-2020 compared to the previous period 2007-2013?

The guidelines 2007 – 2013 were much more open than the guidelines 2014–2020, particularly for large companies, which is an essential aspect and this has been consciously adapted by the Commission. For SMEs, there is less of a difference, as they can receive the same aid as before only at different intensities. The difference for large companies is also noticeable in Commission notification procedures, which take several years before a decision can be taken, have a high administrative burden and the outcome is unpredictable. Therefore, regional granting agencies generally advise against a notification procedure even when this is possible, and in favour of limiting the aid granted (to the notification thresholds). This is why companies are cautious with large higher risk investments, as the risk cannot be mitigated by State aid.

44) In what type of projects do large enterprises typically invest in the 'c' areas? *E.g.* expansions or diversifications of their current sites, new investments (some statistics might perhaps also help)

EY does not carry out statistical analysis of large enterprises' investments in 'c' areas. Rather, large enterprises carry out in investments as needed, particularly in the light if the current State aid restrictions on these enterprises (only establishment and diversification are eligible investment projects). This means that State aid cannot be used to create deadweight effects.

45) How do all the considerations above differ for

a) Small/medium enterprises and large enterprises

b) Industry/sector? In particular hotel accommodation and food services, wired telecommunications activities, manufacture of parts and accessories for motor vehicles, manufacture of motor vehicles, trailers and semi-trailers, manufacture of other plastic products, manufacture of tools, manufacture of pharmaceutical preparations, manufacture of metal structures and parts of structures, machining.

c) Enterprises from outside EU and those located in the EU

Once a company is eligible for public funding, it does not matter whether it is a small, medium or large-sized enterprise and whether it is located inside or outside the EU or which sector it belongs to.

A3.3.4 Investment and localisation trends

46) In the period 2014-2020, what were the global trends in locating investments?

EY has noticed a certain reluctance to invest for some time now and the tendency to invest is declining. Amongst other things, this is due to uncertainty and political challenges such as Brexit and the trade war between America and China. This also affects the car industry, Germany's largest sector. The government should take countermeasures in this respect.

Particularly for normal investments, EY sees only a modest development. When companies invest, they do try to focus on, *e.g.* carbon-neutral investments if this is economically viable. Perhaps the environmental guidelines can be used for this.

47) How did they differ for

a) Small/medium/large enterprises

b) Industry/sector

c) Enterprises from outside EU and those located in the EU

Larger companies appear more reluctant to invest than SMEs.

In terms of investment from outside Europe, EY sees a high willingness to acquire shares in European companies. But EY does not see a tendency for non-European investors to invest in expansion in Europe, *e.g.* new production sites. Non-European investments are more focused on acquiring technology and know-how rather than starting new production sites.

48) Had the change of Regional Aid Guidelines and GBER in 2014 any influence on these trends?

This is a difficult question, as it is hard to determine the exact influence.

A3.3.5 The role of regional State aid over the 2014-2020 period

49) What are the weaknesses and the strengths of the current rules on regional State aid from investors' perspective?

Uncertainty about the interpretation and application of the guidelines by the Commission is a clear weakness. It has become difficult to predict what the outcome of a notification procedure will be. Inflating the guidelines would theoretically be a way of reducing uncertainty, but is probably not necessarily desirable either.

50) What are the most important parameters of the current rules on regional State aid that are relevant for investment location decisions? Do they affect the location decisions in reality?

a) restrictions on project eligibility

b) maximum State aid intensities

c) individual notification thresholds

d) requirement to submit State aid application before start of works (formal incentive effect)

e) restrictions on enterprises' behaviour

f) requirement of keeping employment for a number of years

g) prohibition of closing facilities elsewhere

h) other?

All these parameters have a certain relevance, especially the first three (a, b and c). Certain restrictions (such as e, f and g) were also present before the current rules and are widely known to companies. Changes in the guidelines are not as crucial in terms of these points,

but less predictability in the interpretation and application of the rules, *e.g.* by the Commission.

51) What alternative public support (national and/or EU funds) do enterprises consider?

Environmental and research-and-development subsidies are now also clearly considered by companies. These are not subject to the regional-aid guidelines. Although the focus is different, it is sometimes possible to take out parts of a larger investment project as these parts may be eligible for such State aid. In such cases, they become more important than subsidies under the regional aid guidelines, as the requirements are less restrictive. EY also takes these subsidies into account and ask more detailed questions to companies on the nature of their investments to see if they may be eligible. Some companies are not always able to provide information at the required level of detail, *e.g.* a detailed investment list. Then companies have to do their own homework and go through the investment to see what may be environmental or R&D. This can all be relevant in the search for a new location.

A3.4 EXPERT INTERVIEW – FDI CENTER

A3.4.1 Introduction

On 19 March, at 3 pm, we conducted an expert interview on the enterprise decision making process when choosing a location for an investment project and the role of regional State aid in this process place.

Andreas Dressler and Luigi Mercuri from FDI Center were the interviewed experts. Hans Friederiszick, Ela Glowicka and Paula Mäkelä from E.CA Economics asked questions and took notes.

The interview was based on the interview guide approved by the Commission in the inception report dated 13 February 2019. All questions refer to regional State aid granted in 2014–2018 (unless explicitly specified otherwise). The replies will be shared with the Commission.

A3.4.2 Expert profiles

Andreas Dressler has provided advice in the field of foreign direct investment (FDI) and corporate location for 23 years. He started his career at KPMG in the US and later moved to Europe, where he founded an office dealing with location decision in KPMG. His clients come from around the world. Mr Dressler has been involved in negotiating investment incentive packages globally, from Brazil to Eastern Europe. He has also taken care of the notification process for State aid at the Commission. After leaving KPMG, he started the FDI Center, a small company focused on advising promotion agencies, local authorities, federal and state governments.

Luigi Mercuri has been working on FDI, market entry and expansion for 10 years. He began his career at an Italian think tank (ISIAMED), focussing on trade and investment relations between Italy, the Mediterranean and Central Asia. He then worked for the Korean German Chamber of Commerce in Seoul and the Italian Central Financial Risk & Rating Agency (CRIF). He subsequently joined the Berlin office of the Italian Trade & Investment Agency, before venturing into the consulting sector since 2016. As consultant he supports companies in their internationalisation processes, and local, regional or national agencies in attracting FDI. Furthermore, he cooperates with international institutions and governmental organisations. His most recent engagement is a project to verify the Research & Innovation Ecosystem and the FDI attractiveness of Estonia for the Commission.

A3.4.3 Questions on enterprise decision making

52) What is the typical decision process when choosing a location for an investment?

We need to distinguish between the ideal process and practice. Ideally, it is a very structured process. It starts with a broad geographic coverage, where regions are selected based on some case-specific measure, for example, the distance to a certain area, time zone, currency or language. Second, choice criteria are defined, *i.e.* what is important, and what is the weight/rank of the criteria. Third, data is gathered and the potential locations are narrowed down to city/metropolitan area/NUTS 2 level. Subsequently, more detailed data on, for example, costs are gathered. Next, the sites are visited and meetings with authorities, property owners, universities *etc.* are organised. The final stage involves incentive negotiations. The decision process can take from three months to one year, sometimes four to five years.

Sometimes companies try to bypass this process, both small and large. For example, a Japanese multinational wanted to decide after two weeks, after visiting five cities in Eastern Europe. The reason for this is that often companies underestimate the complexity of the decision process. For example, it may not be possible to move data servers from one country to another. Another issue adding to the complexity is that site selection is about trade-offs and different people within a company may have diverging views on what is important. In our company we use the Analytical Hierarchy Process to weigh different criteria in a structured manner. Decision-making process in large versus small companies is not so different. However, young companies tend to differ from others in the sense that they tend to move more quickly. Perhaps there is less corporate structure in the way to slow down the process. Young companies tend to also be less interested in incentives, but more on the availability of workforce. In addition to this, a more thorough decision-making process is usually carried out in cases where access to natural resources is important and required.

When it comes to intra-EU investment, incentives play a smaller role. Those investments are more driven by market access reasons, and not so many cost-driven investments are made nowadays (compared to 12 years ago). Companies moving from outside the EU ask for incentives more often (the US, China). A customer from China may ask us to look for a location with maximal cash incentives. US investors are also conditioned for incentives. They are used to incentives as this business was born in the US during the great depression when the southern states tried to attract investors from the north.

Especially for firms coming from the US, the need to comply with all EU regulations may come as a shock: In the US there is very little regulation that would limit the investor's ability to negotiate a good deal with local authorities. Getting a "good deal" in Europe is much harder.

53) What are the most important regional factors considered in the investment location decision?

The answer depends on the sector and type of project:

a) Tax regime is a driving factor for any headquarters project. Currently, Amsterdam and Switzerland are overrun by companies setting up headquarters. For this type of projects, the possibility of tax savings is crucial. Investors with high profit-margins, *e.g.* medical sector, are likely to emphasise tax regime in the site selection. Ireland is also an attractive location for them due to relatively low corporate taxes.

b) Investment cost (availability of skilled workforce, infrastructure, *etc.*) is important for all types of projects.

c) Operating cost (workforce, energy, *etc.*) is key for investment projects in the manufacturing sector.

d) Regional industry/sectoral clusters – mainly for manufacturing

e) Proximity to customers and suppliers – mainly for manufacturing

f) Possibility of expansion – both available land and workforce is relevant, also workforce' retention rate.

g) Investment incentive – for all types of projects

h) Quality of institutions – by quality we understand, for example, the transparency, clarity and stability in terms of all the permits that investors have to apply for and get in order to carry out the investment process. This is important for all types of projects.

i) Macroeconomic trends

j) Administrative effort required

k) Expatriate life quality

l) Weather and climate play a crucial role in many sectors. For example, a region with seismic activity is excluded for investors from the pharma sector or for data centres, because they use very sensitive machinery. Risk of flooding and natural disasters also plays a significant role. Average temperature plays a role in sectors where cooling is required.

m) Predictable and safe EU legislative framework – this is crucial for investments in financial services and also for the pharmaceutical sector where products must get EU approval.

n) Other? The availability of transportation infrastructure (roads, highways, port, airport) is important.

In general, availability of workforce is the top factor. Investors go to regions where they are able to find people with certain skills. When evaluating regions, they undertake an extremely detailed assessment. Sometimes they even organise mini recruitments fares during the first site visit, to assess the quality of workforce on a small sample. If a region has an institution with detailed information on workforce available in the region, this is very advantageous for investors. For example, the Agentur Für Arbeit in Berlin is an institution offering investors data on the availability and the quality of workforce with a certain skill profile.

In many locations, investors have difficulties to find skills they require. Regions often offer workforce that has a different skills profile than the one needed by investors. For example, in Estonia there are many university graduates and PhDs but one firm had difficulties in finding enough mechatronics and electrotechnicians. Cooperation with universities and vocational training institutes helps to address these difficulties. A clear recommendation would be to replace cash benefits to investors with measures supporting investor's access to workforce. For example, money to the educational programs and vocational trainings in the region to equip employees with the skill profile required by individual investors would be highly effective in attracting investors to regions. In this respect, the training aid guidelines in the EU are very restrictive. The required structure of the training programs is such that the entire benefit from the training goes to the people trained and cannot be appropriated by companies.

54) Do companies make a separate qualitative and quantitative analysis?

a) What are the most important qualitative factors?

b) What are the most important quantitative factors?

i) What are the thresholds that need to be met?

c) How are both those qualitative and quantitative factors valued against each other in a final investment decision?

Each location decision is based on three sets of factors:

- **Cost comparison analysis** is quantitative: one-off investment cost and ongoing costs for the next ten years would be typically predicted, *e.g.* wages, cost of natural resources, utility cost, which is not possible to get for ten years in Europe, while in the US it is normal. We do the predictions as part of our advice. Typically, we would look at the development of the cost in the past and extrapolate it into the future. Also investment incentives are factored in this calculation. In the US, an investor would normally get an offer letter with a value number. In the EU, it is difficult to get a value of State aid that an investor can get. It depends on too many factors and agencies: both local authority and the Commission. Available programs can also be very vague. In addition, it is often not clear who is responsible for coordinating the aid. In Germany, it works better and authorities typically can give an estimated State aid amount. Initially, the cost comparison would be done for 12-15 locations, but a detailed calculation would focus on four to five locations.

- **Quality comparison** relates to supply chain and workforce availability. Also here quantitative methods are used, locations are ranked, although they are subjective. For example, the difference between a score of 69 and 73 is not that clear. Political stability is a relevant quality criterion: if elections are coming up soon, it is a red flag for the location (after the change in the government, offered incentives may be changed as well, local politicians before elections like to go to press and promise new projects).

- **Subjective assessment** is based on good and bad feelings, who we like most and feel most confident with. Sometimes it is just one local person that wins the project. Sufficient language skills are key.

Typically selection works by elimination: locations with red flags in one or another criterion are eliminated until there is one location left.

55) Do companies select a specific region because regional investment State aid is available?

Incentives are always part of the project. Sometimes State aid is just one of many criteria, other times it is a standalone project – location decision was made and the company negotiates the best possible incentive package, making sure that it was not missing anything, getting everything possible from the government, checking that the offer is realistic/compliant with the State aid rules.

Enterprises from China and the US are the most likely to look for investment incentives. In addition, capital intensive projects have incentives to locate in areas with incentives (*e.g.* in manufacturing, machinery, automotive, aerospace, medical devices). New start-up companies also need incentives, since they do not have capital. For example, Tesla will not build a factory without incentives, because it has no capital. Risky projects require incentives to mitigate risk, for example projects to build factories of batteries for electric cars went to Poland, Hungary, Germany – all risky projects relying on projections of e-car sales.

56) Do companies decide not to invest because no regional investment State aid is available?

Yes, unavailability of investment State aid can shift projects from one region to another. Big companies have teams whose only job is negotiating incentive schemes around the

world, *e.g.* Amazon. They have more bargaining power than small or medium sized firms. State aid rules in Europe limit this negotiating power by restricting the menu from which regions can make an offer.

57) Is the availability of regional State aid a qualitative or quantitative factor?

a) How important is the availability of regional State aid? How much weight does it have overall?

See answer to question 3.

58) Do companies care about what type of State aid is offered?

Yes, depending on the project. Headquarters projects, projects with high profit-margins, prefer tax breaks. Start-ups without own capital or risky projects favour cash up front.

59) Does the maximum State aid intensity play a role?

a) To what extent can a State aid intensity of 5%, 10%, 15%, 20%, *etc.* change the decision making of a company?

Maximum aid intensity confuses investors: when they look at the map, they believe they will get the maximum aid level. They do not understand this is only a theoretical maximum. Maximum aid intensity may be used as an initial target and steers expectations to the upper limit.

Notification thresholds strongly discourage investors, but most of the time the amount of aid is very clearly above or below. For larger projects with the State aid amount close to the threshold, the project is likely to be structured in a way to avoid the notification. This can lead to reducing the size of the project.

60) Did you experience a change in the importance of regional State aid under the new guidelines 2014-2020 compared to the previous period 2007-2013?

No change perceived.

61) In what type of projects do large enterprises typically invest in the 'c' areas? *E.g.* expansions or diversifications of their current sites, new investments (some statistics might perhaps also help)

Have not seen any.

62) How do all the considerations above differ for

a) Small/medium enterprises and large enterprises

b) Industry/sector? In particular hotel accommodation and food services, wired telecommunications activities, manufacture of parts and accessories for motor vehicles, manufacture of motor vehicles, trailers and semi-trailers, manufacture of other plastic products, manufacture of tools, manufacture of pharmaceutical preparations, manufacture of metal structures and parts of structures, machining.

c) Enterprises from outside EU and those located in the EU

EU competes with other regions globally for investment, but it is not helping Member States to compete internationally. There is too little information available and the State aid rules are too restrictive.

Recommendation: for projects of common European interest it is possible to get more aid than just via RAG 2014, but only under special circumstances. These rules could be relaxed and promoted more. Also funds for trade and internationalisation could be promoted more: they are destined for SMEs, sometimes used by authorities to receive favours from companies. Compared to regional State aid, they are handed out more easily, checked less thoroughly, but larger in terms of volume.

Language used by authorities can be a barrier between the authorities and investors. For example, Commissioner Almunia used a depreciating language, suggesting that State aid is a bad thing and that investors are unfairly taking advantage of State aid.

A3.4.4 Investment and localisation trends

63) In the period 2014-2020, what were the global trends in locating investments?

64) How did they differ for

a) Small/medium/large enterprises

b) Industry/sector

c) Enterprises from outside EU and those located in the EU

65) Had the change of Regional Aid Guidelines and GBER in 2014 any influence on these trends?

In Europe, FDI is decreasing according to the latest numbers from 2018 by the United Nations Conference on Trade and Development ("UNCTAD"). In developing countries FDI still increases, but it declines in Western Europe. FDI by the US companies in Europe has also declined - the money, which would have normally been reinvested abroad, moved back to the US. The average size of projects declined both in terms of jobs created and capital expenditure.

Large companies are global nowadays, they have entered where they wanted and they rather grow into a new market. Moreover, large companies have their own location selection office and they do not need external advice.

Big manufacturing investment projects in Europe are scarce nowadays. Investors prefer to go to markets, which are not saturated as the EU. A sign of this is that Czech Republic moved its staff from investment promotion to investment retention. They rather promote expansion of existing locations.

The problem in Europe is that whilst Europe is typically at the cutting edge of technology at the early stages of product lifecycle, it is typically not able to maintain its position as the product reaches maturity. This can be seen by the fact that FDI projects still taking place are mainly in new technology sectors: electric vehicles, insect-based feed for aquaculture, meat substitutes, carbon fibre and new materials, drones, robotics. The value chain of these factories is huge. We should try to make sure that we are able to keep these investment projects in Europe once the production expands.

Worldwide, many countries do not apply competition policy rules on State aid, but it is rather considered as a part of industrial policy. Money is available for investors. For example, Thailand has a huge incentives fund to support investments in new technologies such as robotics and new materials, which is successfully helping to attract investors. Only few regions can afford not to offer investment incentives. For example, British Columbia (has oil and gas) and California (competitive enough, has private capital market compensating absence of State aid).

Globally, offering incentives is a zero-sum game. They play a role, not always necessary, but often required.

A3.4.5 The role of regional State aid over the 2014-2020 period

66) What are the weaknesses and the strengths of the current rules on regional State aid from investors' perspective?

See answer to questions 2 and 11.

67) What are the most important parameters of the current rules on regional State aid that are relevant for investment location decisions? Do they affect the location decisions in reality?

a) restrictions on project eligibility

b) maximum State aid intensities

c) individual notification thresholds

d) requirement to submit State aid application before start of works (formal incentive effect)

e) restrictions on enterprises' behaviour

f) requirement of keeping employment for a number of years

g) prohibition of closing facilities elsewhere

h) other?

None of these is unusual, there are always eligibility requirements like a commitment to retain jobs, claw back provisions (money paid back if obligations are not fulfilled), or sustainability conditions. In the EU, there is a legalistic approach to these requirements.

68) What alternative public support (national and/or EU funds) do enterprises consider?

As mentioned above, companies are interested in support in finding, training and retaining workforce with an appropriate skill profile. In the EU, alternatives to regional State aid could be training aid, but it would need to be less restrictive. Within current guidelines, projects of common European interest and funds for internationalisation (structural funds) have advantages over regional State aid.

Recommendations:

- An alternative to regional State aid, which would be appreciated by investors, is non-cash aid for training workforce, *e.g.* funds for vocational training, developing networks of educational institutions, *etc.* These might have snowball effects for the region, including politically positive spill over effects.

- Aid for project of common EU interest should be made less restrictive and promoted more.

- Funds for internationalisation (often coming from structural funds) easier to get than State aid.

- More transparency – information on all incentive agreements should be made available, so that investors know what is available under certain conditions region by region. This information would frame negotiations, make clear what is available for a similar project in a similar location. CzechInvest offers this information on the website, but we are not aware of other authorities doing this.

A3.5 EXPERT INTERVIEW – PWC

A3.5.1 Introduction

On 10 April, at 4 pm, we conducted an expert interview on the enterprise decision making process when choosing a location for an investment project and the role of regional State aid in this process.

Dr Barbara Koncz from PwC Hungary was the interviewed expert. Hans Friederiszick and Ela Glowicka from E.CA Economics asked questions and took notes.

The interview was based on the interview guide approved by the Commission in the inception report dated 13 February 2019. All questions refer to regional State aid granted in 2014–2018 (unless explicitly specified otherwise).

A3.5.2 Expert profile

Dr Barbara Koncz, Director at PwC Hungary, joined PwC Hungary's tax advisory team in 2008. She has extensive experience in State aid advisory, including regional, training and research and development-related benefits. Before joining PwC, she worked at the Ministry of Economy and Transport and at ITDH Zrt. for three and a half years, where she was responsible for investment promotion and state subsidies. Her main clients are important players in the automotive, information technology and pharmaceutical industries whom she assists with both taxation and State aid-related issues. Barbara graduated from Eötvös Loránd University's Faculty of Law, and she earned an undergraduate degree in economics from Széchenyi István University. She is a certified tax advisor.

A3.5.3 Enterprise decision making

69) What is the typical decision process when choosing a location for an investment?

Location decisions are done by company headquarters. Since Hungary does not have many headquarters, typically large enterprises reach out to the PwC network elsewhere in Europe at the early stage to prepare the long list of countries to consider. PwC Hungary typically gets contacted by colleagues from Germany and Belgium (Excellence Center). If countries from Central and Eastern Europe are on the list, we get involved in the process. I remember only one project where we worked on the long list of 10-15 countries, but already at that stage the cost of employment played the key role.

When the project comes to us, we get a short list of countries, within in the EU most frequently Slovakia and Poland (closest competitors), Czech Republic, Hungary and Serbia. We collect the required country information: tax regime, employment cost, availability of public roads, airports, *etc.* Once one country is selected, we look for a specific location in the country.

Another type of the decision process is when several specific locations in a country are already preselected on the short list (*e.g.* three cities). We collect specific data on these locations, *e.g.* workforce pool within 50 km from the site; and country-level macroeconomic data in addition.

In 95% of cases we are involved at the stage where competition between countries is still relevant. Many countries come into consideration, because CEE countries are small, so that transportation to other countries is not too costly. Within Europe the strongest competitors for Hungary are Poland and Slovakia; Poland has a bigger pool of potential workforce. Bulgaria and Romania are strong competitors too.

70) What are the most important regional factors considered in the investment location decision? For example:

a) Tax regime

b) Investment cost (availability of skilled workforce, infrastructure, *etc.*)

c) Operating cost (workforce, energy, *etc.*)

d) Regional industry/sectoral clusters

e) Proximity to customers and suppliers

f) Possibility of expansion

g) Investment incentive

h) Quality of institutions

i) Macroeconomic trends

j) Administrative effort required

k) Expatriate life quality

l) Weather and climate

m) Predictable and safe EU legislative framework

n) Other?

In the last two years, the availability of workforce pool is the critical issue. Previously it was mainly employment cost, because the pool was always there. The geographical proximity to certain markets or ports often matters and here Hungary is a strong competitor being close to the European southern ports and major European markets.

71) Do companies make a separate qualitative and quantitative analysis?

a) What are the most important qualitative factors?

b) What are the most important quantitative factors?

i) What are the thresholds that need to be met?

c) How are both those qualitative and quantitative factors valued against each other in a final investment decision?

See answer to question 1.

72) Do companies select a specific region because regional investment State aid is available?

State aid counts at the stage when there are only two to three specific locations on the short list. The final push to go for one of the locations can be the availability and amount of State aid.

All main competitor countries operate regional cash subsidy schemes and these are generally available. The regional maximum aid intensity and the cash that the government can provide can be the final factor to choose one or the other location site.

73) Do companies decide not to invest because no regional investment State aid is available?

See answer above.

74) Is the availability of regional State aid a qualitative or quantitative factor?

a) How important is the availability of regional State aid? How much weight does it have overall?

At the stage of the long list (country level), State aid it is just one of many relevant criteria. One would look at maximum aid intensity, but at the country level it is not precise. In Hungary the maximum aid intensity can vary from 0 to 50%.

Once specific locations are compared (short list), it comes to the amounts available and the role in the overall project profitability.

75) Do companies care about what type of State aid is offered?

Cash is king, especially for Asian investors. Tax benefits are also frequently used, but they are more risky: investors must make orderly profits to benefit from tax breaks. In addition, tax breaks matter only in the future, the investor cannot feel them in the hand when launching the project. Tax benefits matter more in times when high profits are there. Besides profit level the ratio of the corporate income tax in Hungary was significantly decreased in the last couple of years, which makes the full utilisation of the tax benefit more difficult.

76) Does the maximum State aid intensity play a role?

a) To what extent can a State aid intensity of 5%, 10%, 15%, 20%, *etc.* change the decision making of a company?

See answer to question 4.

Reaching the maximum State aid intensity level with cash is not typical in Hungary. Typically the State aid package has about 30% cash and 70% tax benefit, but the actual ratio depends on several factors. The share of cash could be higher for big, flagship investments when there is strong competition from other regions/countries.

Hungarian schemes give the possibility to reach the maximum aid intensity with cash subsidies and tax benefit. Investors submit requests for tax benefit up to the max intensity, but the utilisation depends on project's profitability and cash availability.

77) Did you experience a change in the importance of regional State aid under the new guidelines 2014-2020 compared to the previous period 2007-2013?

Before 2014 Hungary had bad experiences with notified regional State aid and since 2014 investors do not go above the notification thresholds, unless if the investment is very large (but this did not happen a lot in the recent period). Companies ask for amounts below the thresholds, to avoid uncertainty and the possibility of losing all money if prohibited. Besides these risks, the length of the local agreement procedure is also a burden.

In 2013, there was a rush in December to finalise contracts with authorities on regional aid for investments. Investors wanted to avoid uncertainty about the scope of new guidelines, the decreasing regional maximum aid ratio and they wanted to avoid the obligation to notify to the Commission. In December 2013, an unusually high number of agreements between aid granting authorities and investors were signed, as companies were willing to speed up the usually 6-12 months-long administrative procedure for a cash grant.

78) In what type of projects do large enterprises typically invest in the 'c' areas? *E.g.* expansions or diversifications of their current sites, new investments (some statistics might perhaps also help)

I have seen 2-3 cases where the company wanted to extend capacity, but could not utilise State aid for it because it was located in a 'c' region. As a result, they increased the capacity

without the subsidy. If they had another location in close proximity within Europe, they might have decided to make the investment in those other locations, mostly outside of HU.

79) How do all the considerations above differ for

a) Small/medium enterprises and large enterprises

I usually work with multinational big companies, do not deal with SMEs, so I cannot comment on small/medium enterprises.

b) Industry/sector? In particular hotel accommodation and food services, wired telecommunications activities, manufacture of parts and accessories for motor vehicles, manufacture of motor vehicles, trailers and semi-trailers, manufacture of other plastic products, manufacture of tools, manufacture of pharmaceutical preparations, manufacture of metal structures and parts of structures, machining.

During the last ten years, the type of investments attracted by Hungary has been moving from low value-added manufacturing projects looking for low employment cost to high value-added manufacturing with sophisticated technology looking for high quality, educated workforce. The higher value-added, the more qualified workforce required.

c) Enterprises from outside EU and those located in the EU

For investors from outside EU it is very important to get a "VIP" treatment by the local authorities. I can think of one project, which was dropped completely just because the municipality governor was not friendly. Asian investors expect a one-stop shop – want to receive all needed information via an investment agency.

A3.5.4 Investment and localisation trends

80) In the period 2014-2020, what were the global trends in locating investments?

81) How did they differ for

a) Small/medium/large enterprises

b) Industry/sector

c) Enterprises from outside EU and those located in the EU

82) Had the change of Regional Aid Guidelines and GBER in 2014 any influence on these trends?

There was a natural change. Previously, the cost of employment in Hungary was low and we mainly had low value-added investments coming. Recently, there was a shift in the value chain and Hungary climbed up to higher value-added investments, while low value-added ones moved further to the east.

Overall investment amounts in Hungary were announced 2018 to be the highest in history in the yearly investment gala by the minister of foreign affairs and trade. This was against expectations: the market expected a decrease because of increased employment cost. A possible explanation is that in 2018 there were a few very large investments, *e.g.* BMW invested up to EUR 1 billion.

In the past the State aid policy of authorities in Hungary was: the more workforce hired, the more subsidy offered. Nowadays, this is less relevant because of technological change and less labour-intensive manufacturing. Previously, a EUR 100 million investment would create 3,000 jobs. These days, even a EUR 1 billion would create around or less than 1,500

jobs. Nowadays authorities want to attract new technologies rather than big employers. To achieve this, authorities offer higher cash subsidies per new worker.

A3.5.5 The role of regional State aid over the 2014-2020 period

83) What are the weaknesses and the strengths of the current rules on regional State aid from investors' perspective?

The uncertainty and long process duration related to the individual notification of State aid is a major weakness. The uncertainty relates to the whole amount of the subsidy, not just the amount above the notification threshold – it may be better for the investor to get just threshold amount, but for sure, than to risk the full amount be prohibited.

Another weakness is the lack of clarity regarding the interpretation of relocation (prohibition of closing facilities elsewhere).

84) What are the most important parameters of the current rules on regional State aid that are relevant for investment location decisions? Do they affect the location decisions in reality?

a) restrictions on project eligibility – Not relevant.

b) maximum State aid intensities – Hungary has a good position in this respect. There are many undeveloped regions, which will remain at 50% maximum aid intensity in the next period.

c) individual notification thresholds are the decision making factor for large investments. Investors are reluctant to go for a higher subsidy if it has to be notified, because of the uncertainty and the excessive duration of the notification procedure.

d) requirement to submit State aid application before start of works (formal incentive effect) – this is a formality included in the subsidy schemes. It requires to a four page excel sheet to be filled in, not an obstacle with a well-established business plan.

e) restrictions on enterprises' behaviour expansion vs new investment – yes, this limits investors, because they cannot increase capacity when they would like to. We have had such discussions with investors.

f) requirement of keeping employment for a number of years – In Hungary, we have a five year maintenance period for workforce even for asset-based investments. After 2009, companies were struggling to respect the commitment. In the past, the authorities were very strict on this issue. More recently, in certain cases it is possible to negotiate with the government and commit to a regional headcount instead of legal entity-specific head count, which gives investors more flexibility.

g) prohibition of closing facilities elsewhere – the interpretation of the current relocation rule is unclear. No guidelines were issued for the modified relocation rules so far, so the precise interpretation is unclear. For example, how many jobs need to be closed in Germany (while many are opened in Hungary) to call it a relocation, closing two would qualify? Due to this uncertainty, subsidies are more risky when making investment decisions.

h) other?

85) What alternative public support (national and/or EU funds) do enterprises consider?

Public support to investors has become more and more light:

- Other types of State aid, *e.g.* training subsidies, R&D subsidies, although the project must fit. For example, one investment could be split (without any overlap) into a development centre subsidised with R&D aid and a manufacturing factory part subsidised via regional aid. Environmental aid plays an increasing role as investors want to be energy efficient.

- VIP treatment for investors is very helpful. For example, Asian investors want to have an appointed government representative handling all issues, project manager for the investor. BMW had it for its recent big investment in Hungary.

- It is common for local authorities to reduce the local tax rates to attract investors, but this would be available to everyone.

APPENDIX 4 CASE STUDIES

[…]

APPENDIX 5 SUPPLEMENTARY FDI ANALYSIS

This appendix contains supplementary material – available data, figures and fixed effects regression results -for the analysis of the FDI data.

A5.1 DESCRIPTION OF AVAILABLE DATA ON FDI

We start the description of the available FDI data by briefly summarising important distinctions w.r.t. to the available FDI information.

Types of FDI information

An important distinction with respect to FDI-information is between "flows" and "stocks" of FDI:

- FDI flows: record the value of cross-border transactions related to direct investment during a given period.
- FDI stocks: measure the total level of direct investment at a given point in time.

FDI flows therefore provide a measure of investments during a particular period, whereas FDI stocks provides a measure of the total level of investment that has accumulated over time. It is important to note that FDI stocks do not coincide with the accumulated FDI flows. One the one hand, this is due to the fact that statistics on stock of FDI present the current value of the assets, which might have changed compared to when the original investment was made (as measured by the FDI flows). In addition, also other adjustments (*e.g.* rescheduling or cancellation of loans or debt-equity swaps) cause the two measures to differ.[70]

When FDI information is presented according to the directional principle, a further distinction is typically made in terms of the direction from the perspective of the reporting country. In this respect, a distinction is made between "inward" and "outward" investments (EQCD 2008):

- **Inward investments**: the influence giving rise to the investment originated abroad, and that it resulted in the establishment by a non-resident direct investor of a direct investment enterprise resident in that economy.
- **Outward investments**: the influence giving rise to the investment originated within the compiling economy, and that it resulted in the establishment by a resident direct investor of a direct investment enterprise abroad.

Available FDI information

To analyse the impact of the availability of regional investment on FDI, detailed information on FDI is required. Ideally, this information should satisfy the following criteria:

1. **Information on FDI flows**: FDI flows provide a direct, contemporaneous, measure of the level of investment. In contrast, FDI stocks provide an indication of the current value of all investments that have occurred over time, not just the contemporaneous investments.
2. **Long-time coverage**: Foreign direct investments can take a considerable amount of time to materialise and are often "lumpy" in nature. To obtain a reliable

[70] Source: https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Foreign_direct_investment_(FDI) (accessed on 29 August 2019).

measure of the development of FDI over time, it is therefore important to consider a significantly long period.

3. **Worldwide geographical coverage (or at least all extra-EU countries)**: To analyse extra-EU investments, it is important that data is available with respect to these countries. Ideally, this data should also contain the destination of the investment (as to identify investments into the EU).

4. **Disaggregated data (preferably firm-level) with respect to the industry and firm size**: In order to analyse whether the effects differ across industries and firm sizes, disaggregated data is needed, preferably, at the firm level.

Publicly available FDI statistics are very rich on most of these criteria except firm-level disaggregation. Firm-level data has recently been constructed by the EC Joint Research Centre (Foreign Ownership Database), but the data are not publicly available and therefore not considered here.[71] The following table lists the most important official data sources with respect to the value of FDI at the country-level.[72]

Table 18: Country-level information on FDI*

	Time period**	Types of FDI information	Geographical coverage**	Origin / Destination information
UNCTAD - bilateral FDI	2001-2012	Flows and stock	Worldwide (206 countries)	Bilateral (origin and destination)
UNCTAD – WIR annex tables	1990-2018	Flows and stock	Worldwide (207 countries)	Aggregated information by country (separately for "Inward" and "Outward")
IMF – CDIS	2009-2017	Stock	+/- 121 (reporting) countries	Bilateral (origin and destination)
Eurostat – EU direct investments (BPM6)	2013-2017	Flows and stock	Mainly EEA-countries (reporting countries)	Bilateral (origin and destination)
OECD	2005-2018	Flows and stock	OECD countries	Bilateral (origin and destination)

Source: Own analysis.

[71] The database is the 'Foreign Ownership Database' (FOWD) and contains firm-level data on foreign owned firms for the EU28-countries for the period 2007-2016.

[72] There also exists other data sources that contain firm-level statistics on the activities of multinational enterprises (*e.g.* turnover, persons employed, *etc.*). Examples of such databases include the OECD's 'Activities of Mulinatinatinal Entreprises' (AMNE) and Eurostat's 'Foreign Affiliates Statistics' (FATS). As these datasets do not focus on the value of investments, they are not considered for the analysis in this report.

Notes: only data sources containing direct information on the value of FDI (stock or flows) are included; ** Coverage varies across countries and/time periods.*

For the analysis, we have focused on data provided by UNCTAD, in series of tables that accompanies the World Investment Report (WIR).[73] The choice of this dataset is motivated by a number of important advantages:

- Data is provided on **FDI flows**, which are preferable over FDI stock to analyse the development of FDI over time. Such information is not always provided in other data sources (*e.g.* the IMF's CDIS data).

- **Consistent information** is provided for a **long period of time (1990-2018)**. Consistency is an important consideration, as some of the datasets have break points due to important changes in the underlying methodology.[74]

- The geographical coverage of the data is **worldwide** (207 countries), which enables to identify both the level of FDI into the EU, as well as the level of FDI globally. The latter aspect is important, as there is a significant trend in the level of global FDI, which should be taken into account when analysing the development of FDI to the disadvantaged areas in the EU.

The dataset does also have one important disadvantage, as it only contains information on inward and outward FDI that is **aggregated by country**. It contains the total level of FDI inflows (*i.e.* investments made by foreign investors into the country) for each of the relevant countries, as well as the total level of FDI outflows (*i.e.* investments made into foreign countries). It does not have bilateral data that shows the combination of both types of information (*i.e.* for each country, the origin and destination of the relevant FDI inflows and outflows).

The lack of bilateral data in the UNCTAD dataset implies that the total level of FDI to the disadvantaged areas in the EU can be calculated. Useful analyses can be performed using these data by comparing the level and flows of FDI in the EU and individual Member States to those globally (and calculating the share in global inward FDI flows).

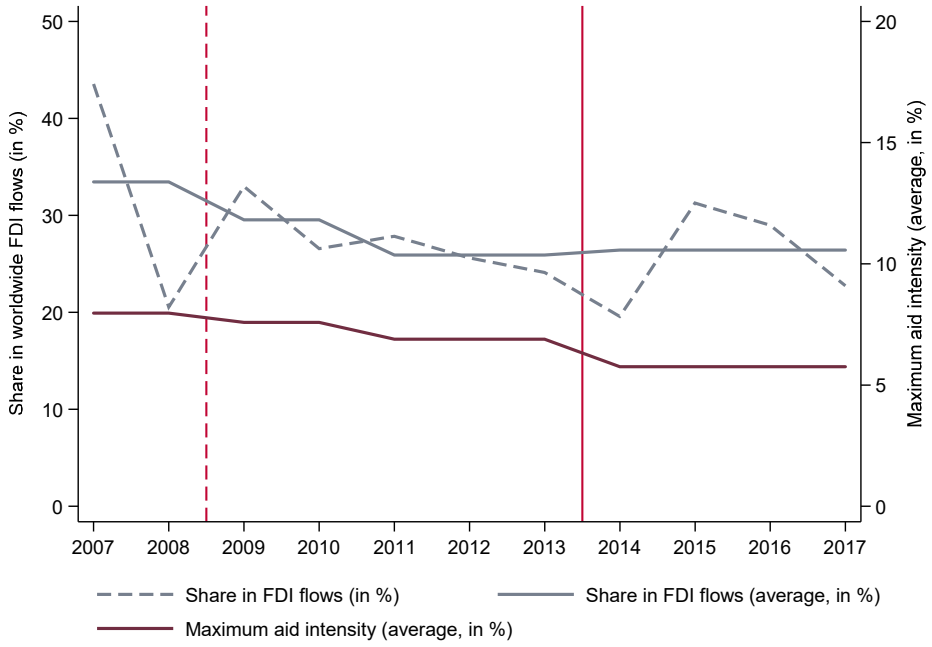
A5.2 EU28 DEVELOPMENT, WEIGHTED BY REGIONAL GDP

Figure 50 shows the development of FDI flows and maximum aid intensity at the EU28-level, when the regional aid intensities are weighted by regional GDP (instead of regional population).

[73] FDI inflows, by region and economy, 1990-2018 (https://unctad.org/Sections/dite_dir/docs/WIR2019/WIR19_tab01.xlsx (accessed on 29 August 2019)).

[74] For example, the information is Eurostat is only provided as of 2013 as of this point FDI is reported according to the directional principle.

Figure 50: Development of FDI flows and average maximum aid intensity – EU28 – weighted by regional GDP

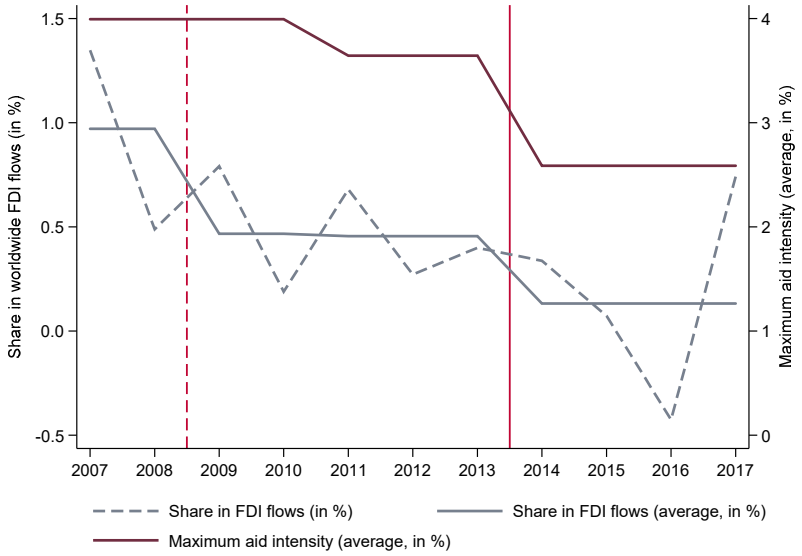


Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional GDP (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis.

A5.3 DEVELOPMENT BY MEMBER STATE

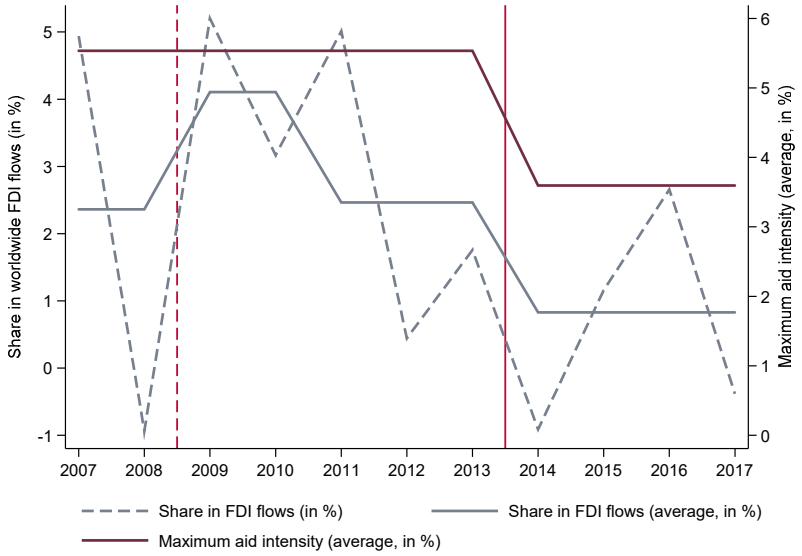
The following figures from Figure 51 to Figure 78 show the development of FDI flows and maximum aid intensity for each Member State separately.

Figure 51: Development of FDI flows and average maximum aid intensity – Austria (AT)



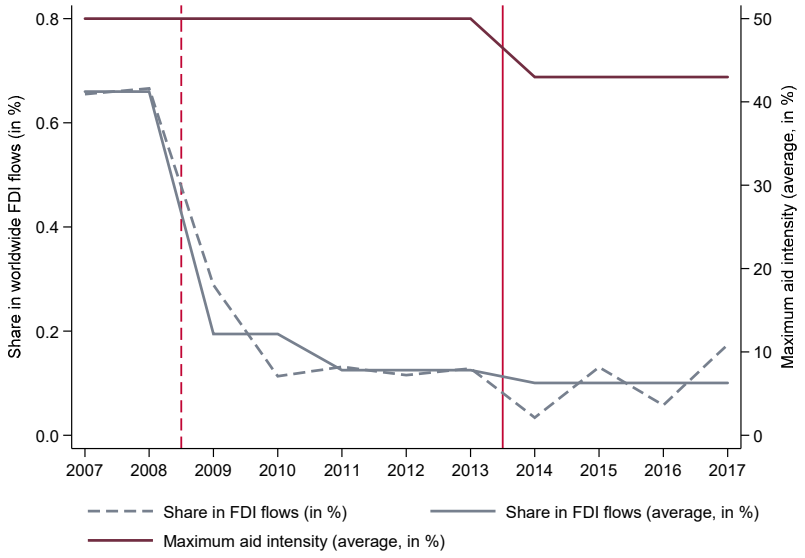
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 52: Development of FDI flows and average maximum aid intensity – Belgium (BE)



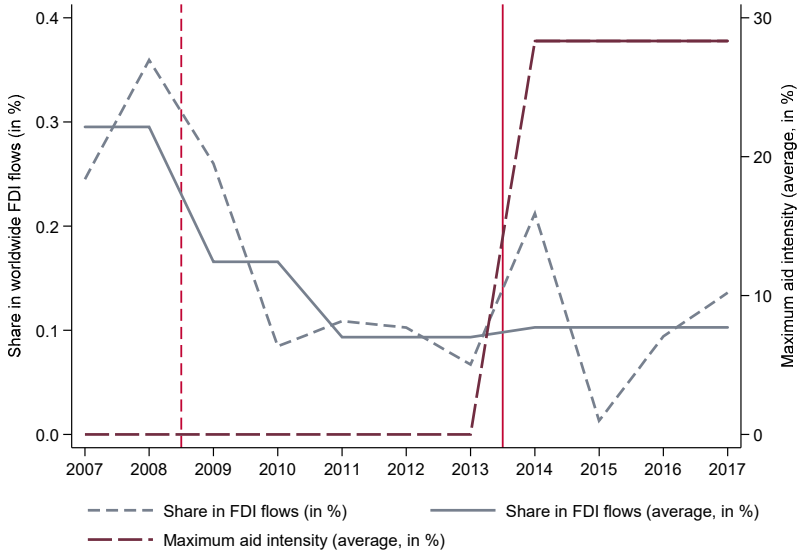
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 53: Development of FDI flows and average maximum aid intensity – Bulgaria (BG)



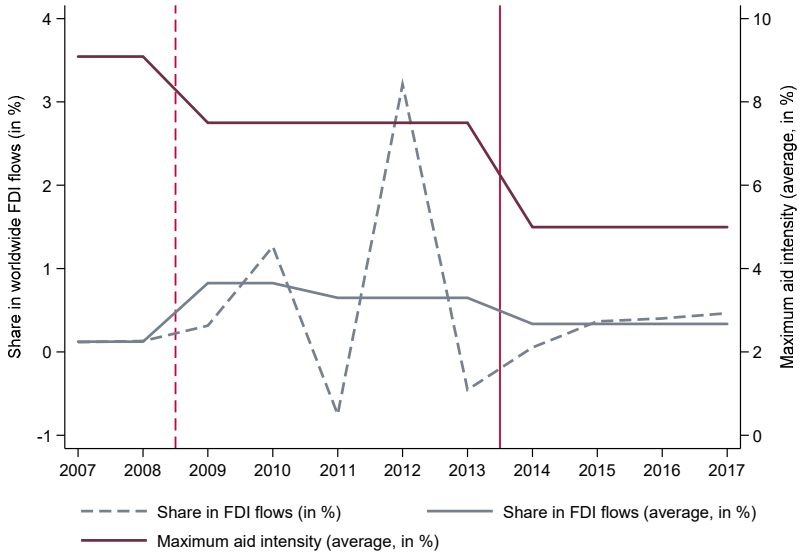
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 54: Development of FDI flows and average maximum aid intensity – Croatia (HR)*



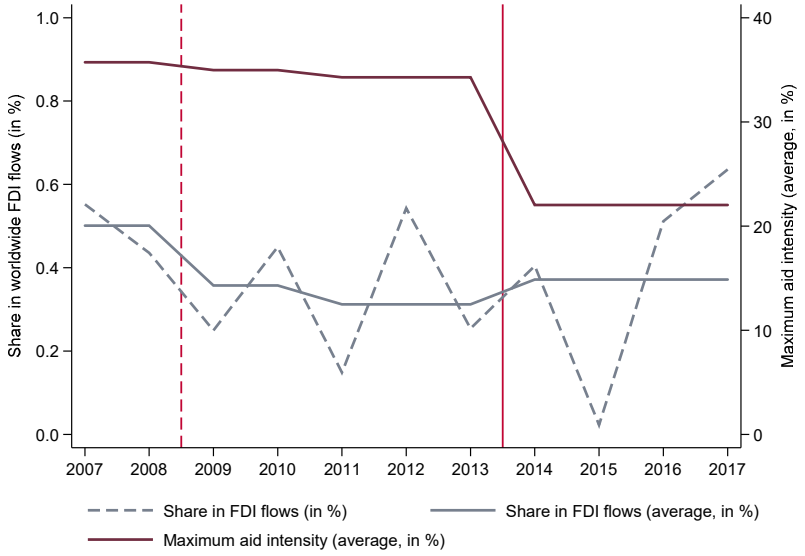
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
*Notes: *: Croatia was not a Member not an EU Member State throughout the entire period 2007-2017 (accession on 1 July 2013); (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).*

Figure 55: Development of FDI flows and average maximum aid intensity – Cyprus (CY)



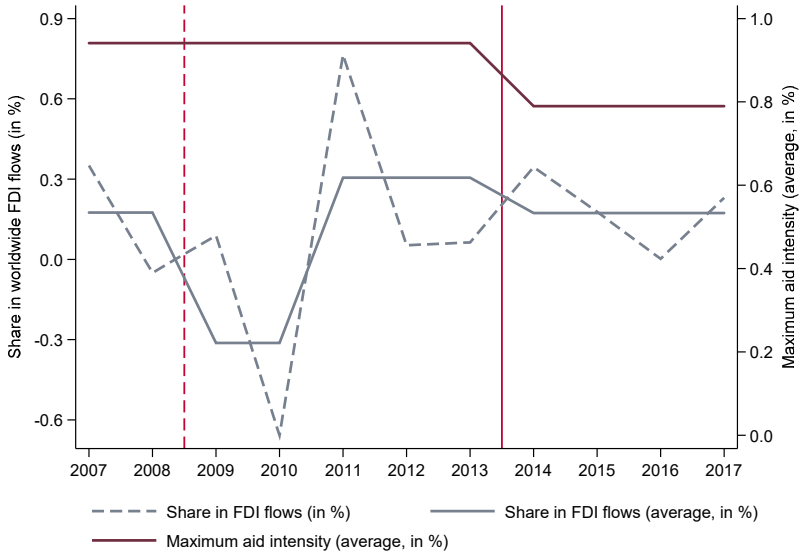
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 56: Development of FDI flows and average maximum aid intensity – Czech Republic (CZ)



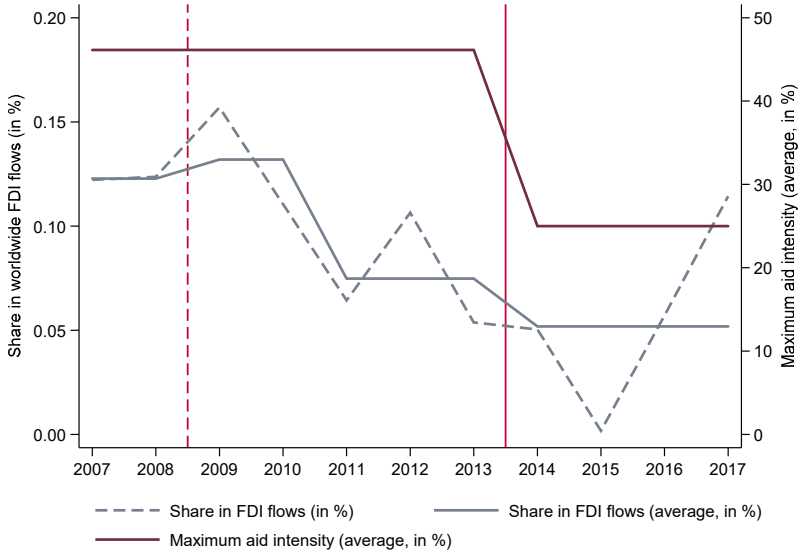
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 57: Development of FDI flows and average maximum aid intensity – Denmark (DK)



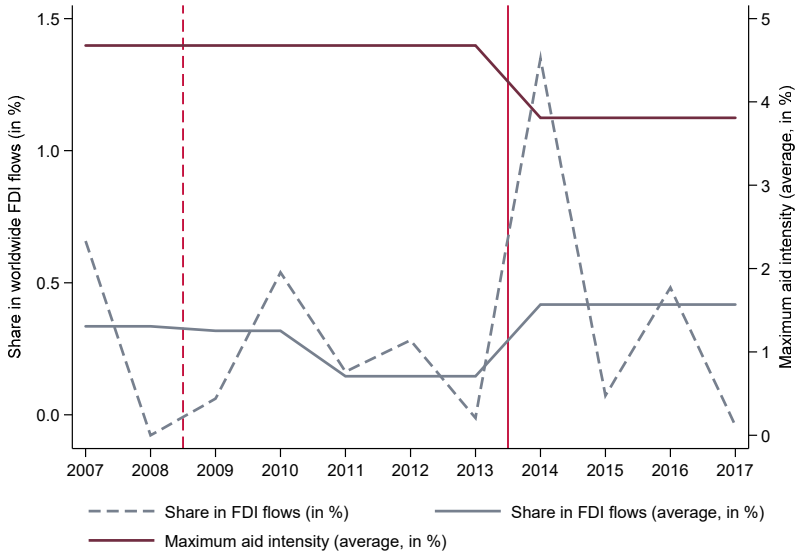
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 58: Development of FDI flows and average maximum aid intensity – Estonia (EE)



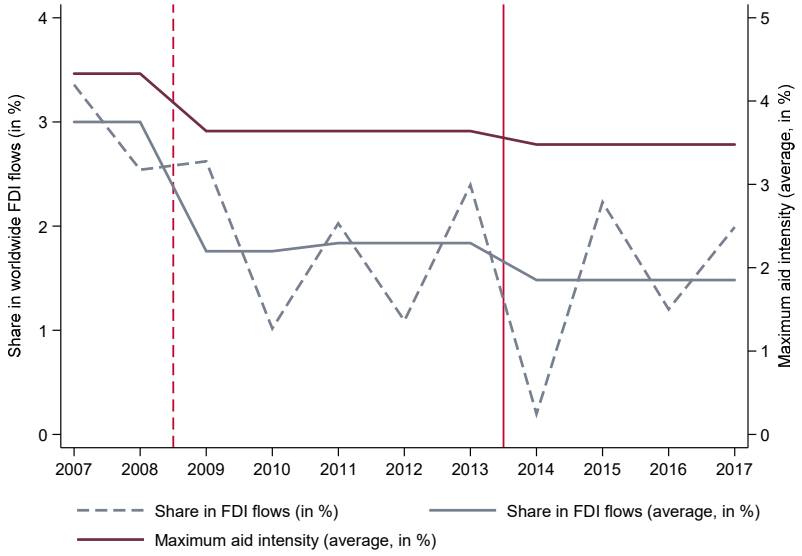
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 59: Development of FDI flows and average maximum aid intensity – Finland (FI)



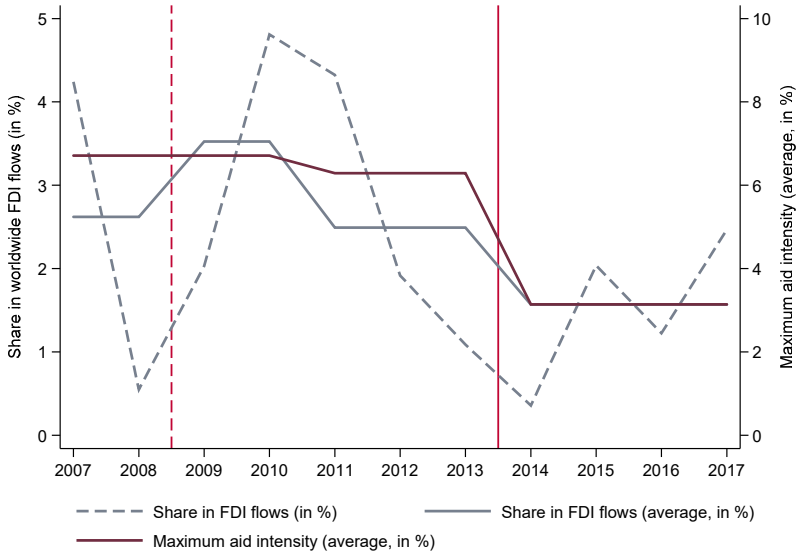
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 60: Development of FDI flows and average maximum aid intensity – France (FR)



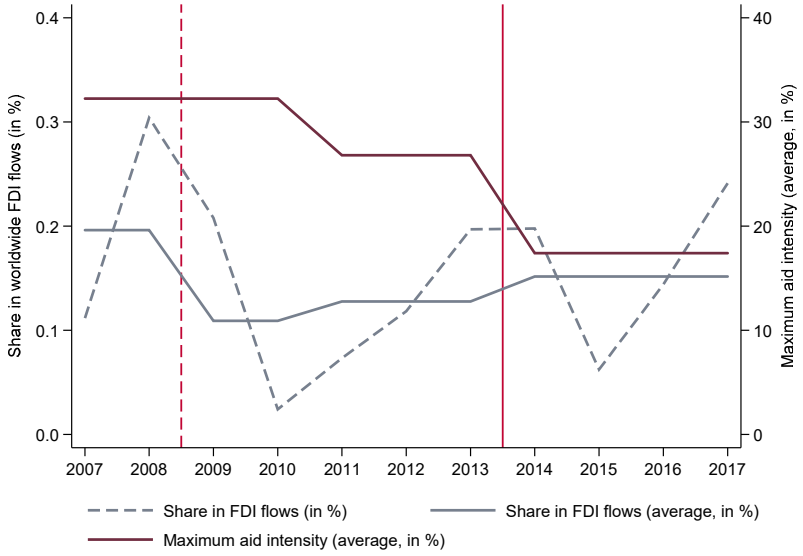
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 61: Development of FDI flows and average maximum aid intensity – Germany (DE)



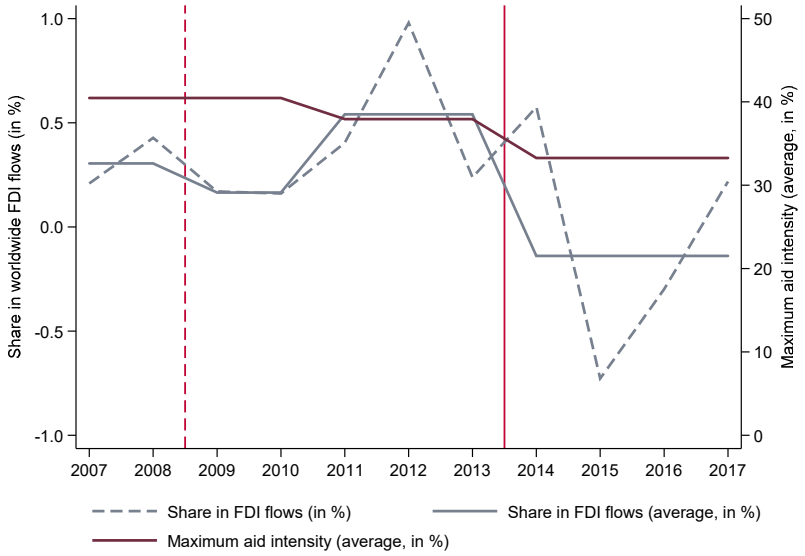
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 62: Development of FDI flows and average maximum aid intensity – Greece (EL)



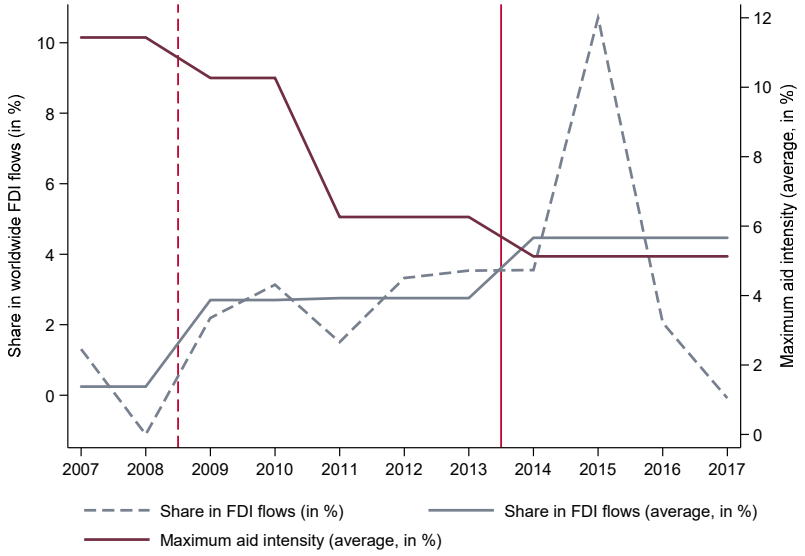
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 63: Development of FDI flows and average maximum aid intensity – Hungary (HU)



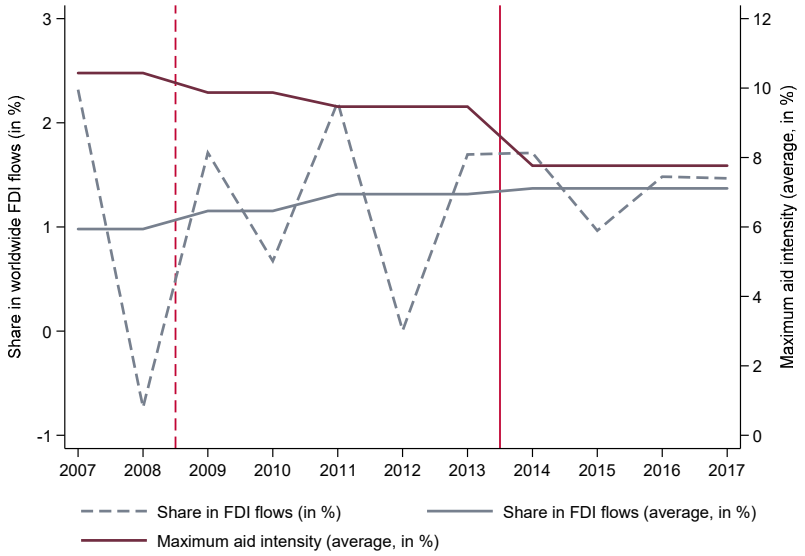
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 64: Development of FDI flows and average maximum aid intensity – Ireland (IE)



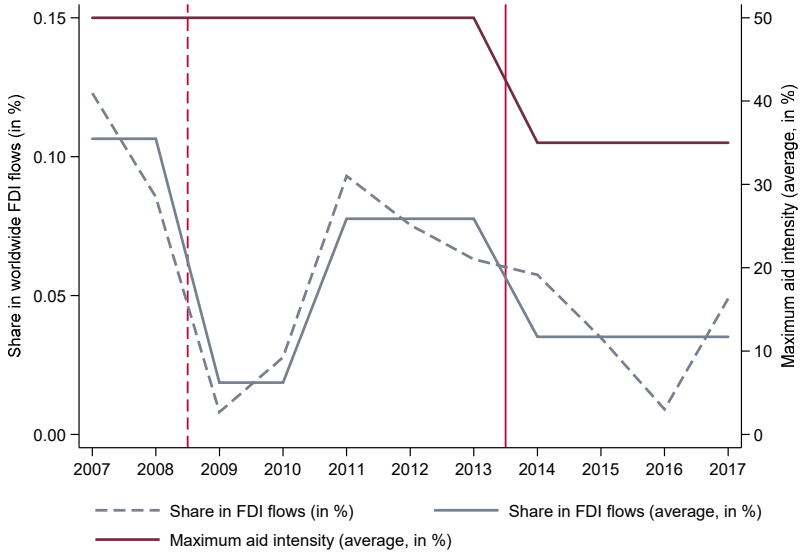
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 65: Development of FDI flows and average maximum aid intensity – Italy (IT)



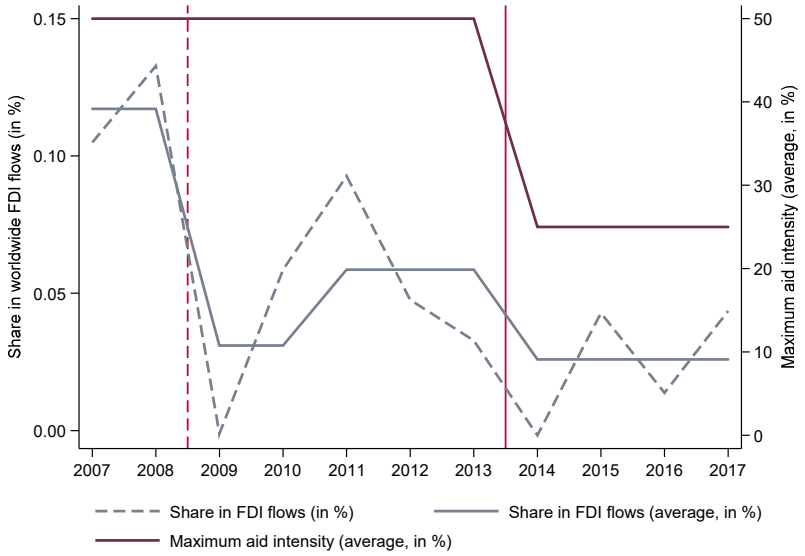
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 66: Development of FDI flows and average maximum aid intensity – Latvia (LV)



Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 67: Development of FDI flows and average maximum aid intensity – Lithuania (LT)

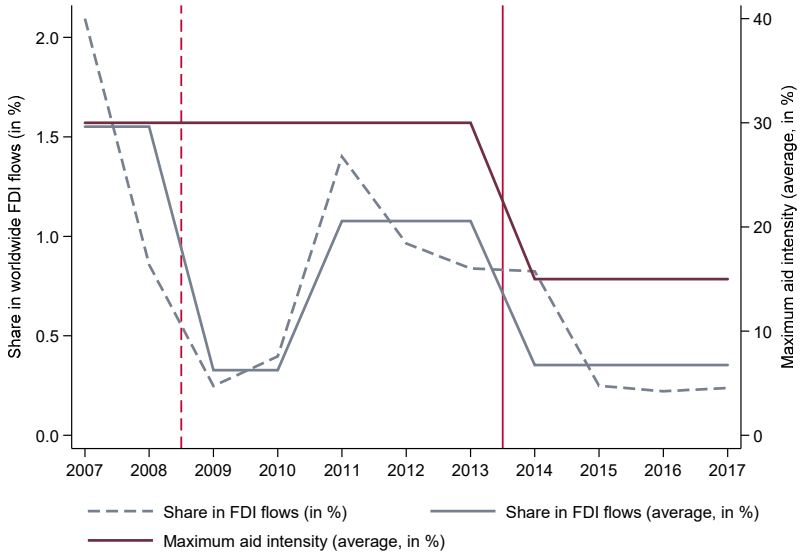


Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 68: Development of FDI flows and average maximum aid intensity – Luxembourg (LU)

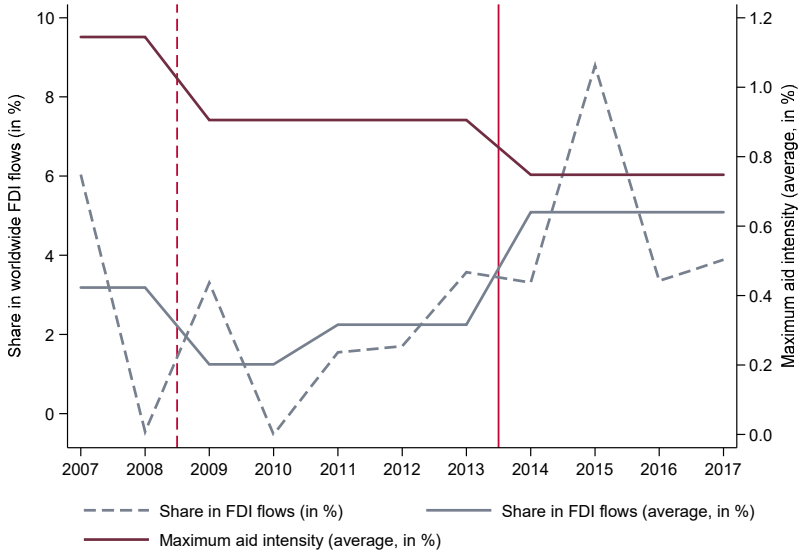
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 69: Development of FDI flows and average maximum aid intensity – Malta (MT)



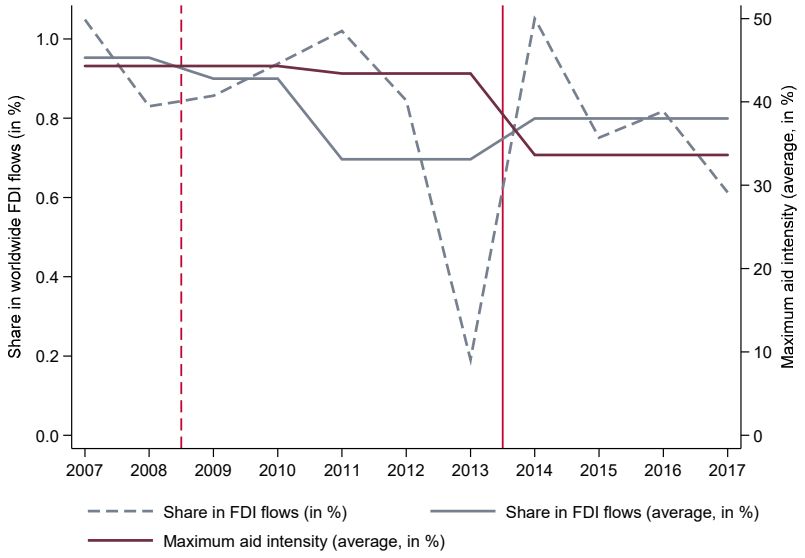
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 70: Development of FDI flows and average maximum aid intensity – Netherlands (NL)



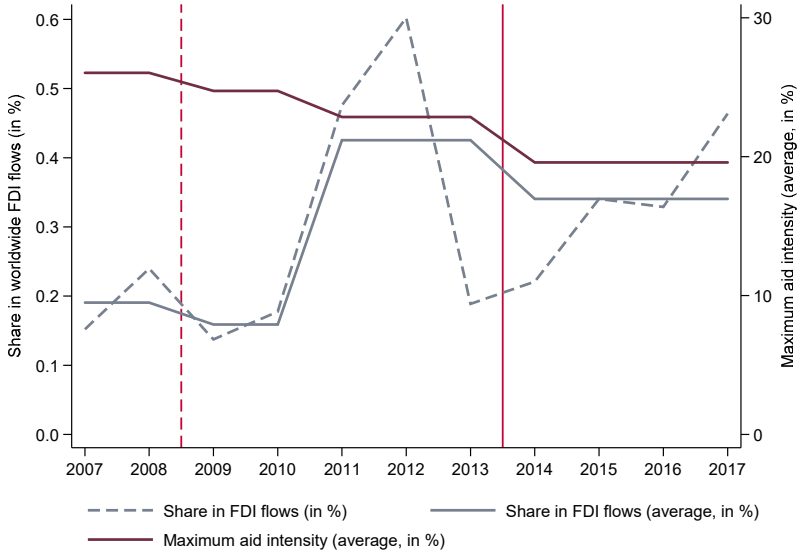
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 71: Development of FDI flows and average maximum aid intensity – Poland (PL)



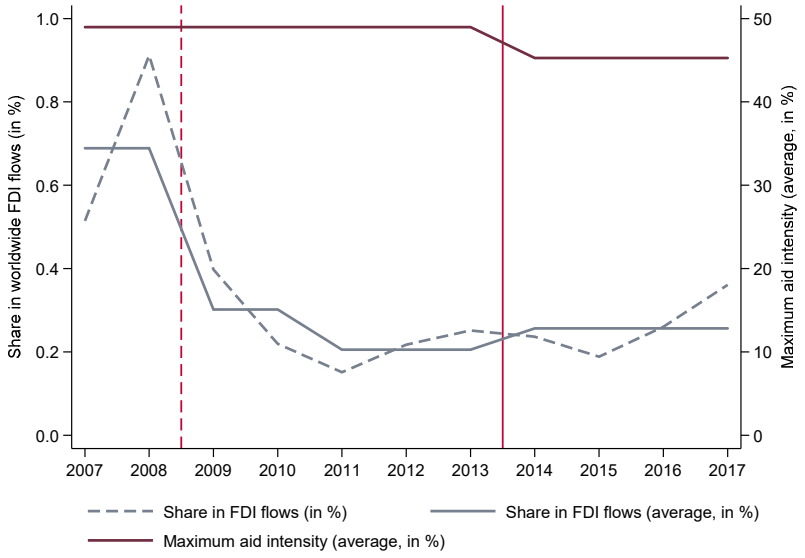
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 72: Development of FDI flows and average maximum aid intensity – Portugal (PT)



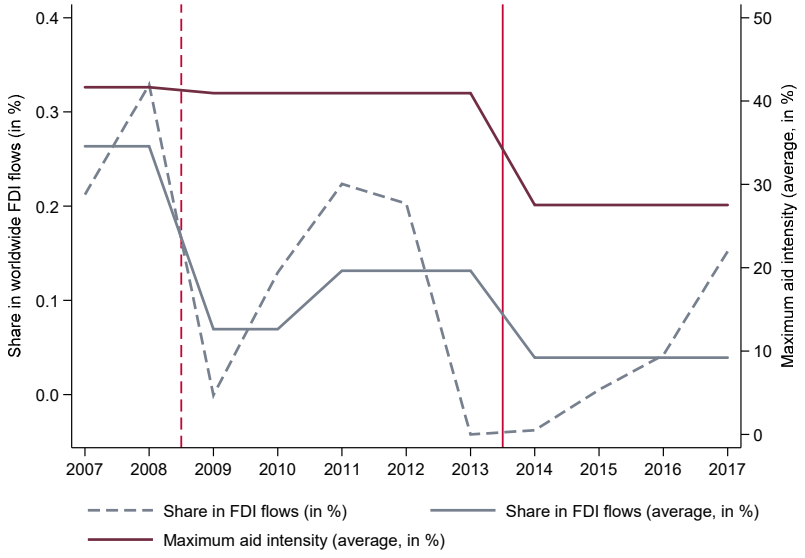
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 73: Development of FDI flows and average maximum aid intensity – Romania (RO)



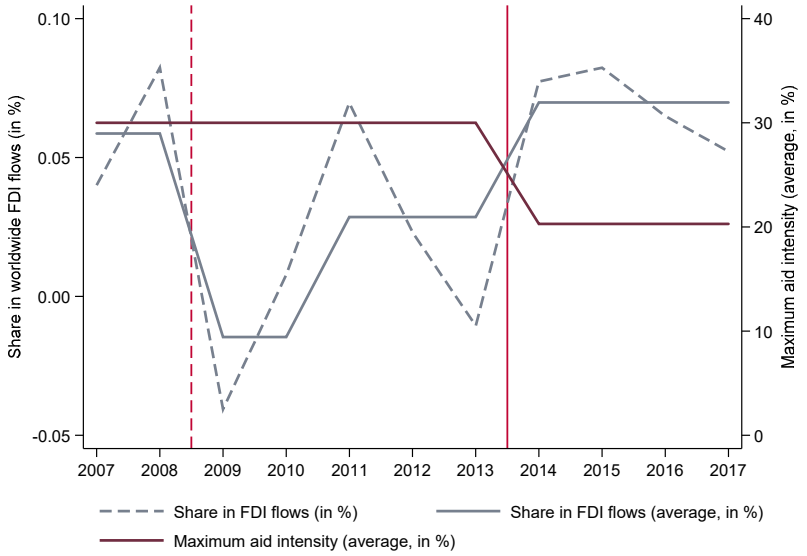
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 74: Development of FDI flows and average maximum aid intensity – Slovakia (SK)



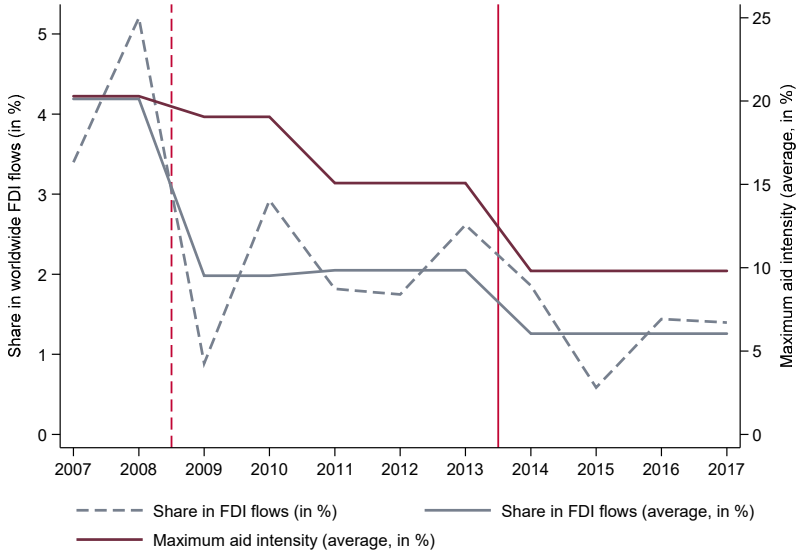
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 75: Development of FDI flows and average maximum aid intensity – Slovenia (SI)



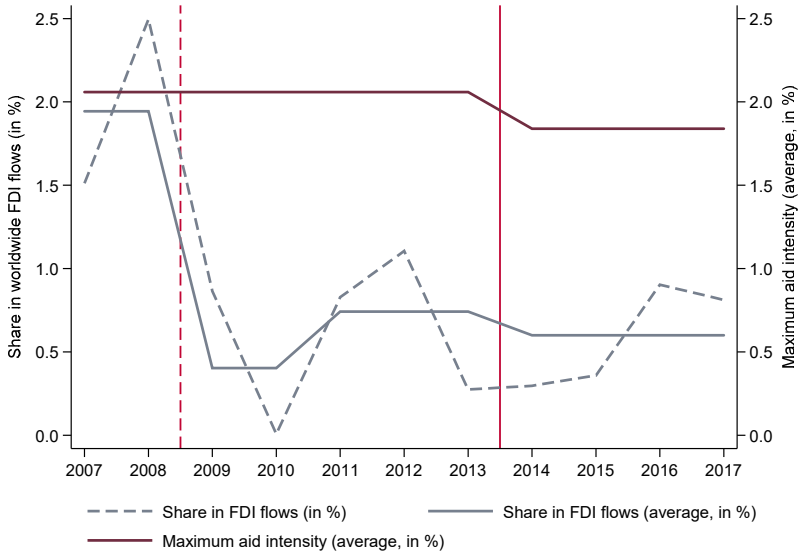
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 76: Development of FDI flows and average maximum aid intensity – Spain (ES)



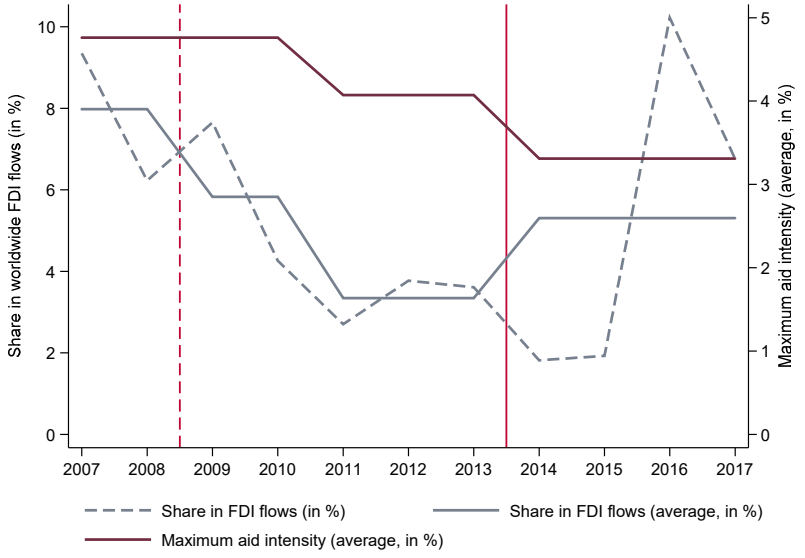
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 77: Development of FDI flows and average maximum aid intensity – Sweden (SE)



Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

Figure 78: Development of FDI flows and average maximum aid intensity – United Kingdom (UK)



Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020).
Notes: (i) Aid intensity weighted by regional population. (ii) The solid red line indicates the end of the RAG 2007. The dashed red line indicates the end of the 2007-2008 financial crisis. (iii) Negative shares indicate that the value of FDI inflows was (temporarily) negative (i.e. instances where disinvestment exceeded investment, yielding negative net FDI inflows). For these cases, the shares in FDI should not be interpreted literately, but only as the ratio of these negative FDI flows to the worldwide FDI flows (the latter is always positive).

A5.4 REGRESSION ANALYSIS

This section contains the result of 'fixed effects' regressions carried out to measure the relation between the average (maximum) aid intensity and share in (worldwide) FDI flows of the Member States.

Under certain assumptions, regression analysis allows to estimate the impact of maximum aid intensity on FDI flows, by isolating the impact from other relevant factors. A 'fixed effects' regression is specific version of a regression model, which under certain assumptions, allows to control for factors that differ across Member States, but do not vary over time. For this purpose, no information on these time-invariant factors is required. Intuitively, a 'fixed effects' regression estimates the impact of maximum aid intensity on FDI by comparing how these two variables relate to the corresponding country-specific averages over time. If FDI flows of a particular Member State were lower than (the country-specific) average when also the average maximum aid intensity was lower than the (country-specific) average (and vice versa), this would be indicative of a relationship between these two variables. By only comparing aid intensities and FDI flows to country-specific averages (*i.e.* comparing the variation *within* the Member State), factors that vary *across* Member States and constant over time are irrelevant. The fixed effects regression therefore provides a convenient way of measuring that impact of aid intensity, controlling for factors that vary over Member States, but are constant over time. A limitation of the fixed effects regression is, however, that it does not control for factors that vary over Member States and over time.

To evaluate the impact of a State maximum aid intensity, it can be tested whether the effect is "statistically significant". Statistical significance provides an indication of how likely it is that the "true" effect is in fact zero. This true effect might differ from the effect estimated based on the data at hand, as only a limited sample of observations is available (as opposed to the entire 'population' of all possible data realisations). By default, statistical significance is computed at the 10, 5, and 1% level. These significance levels indicate that with 90%, 95% and 99% probability the estimated effect is not equal to zero.

A criterion for the explanatory power of a regression model is the R-squared coefficient of determination. The R-squared coefficient indicates which proportion of the variation of FDI flows can be explained by variation in the included explanatory factors. The R-squared coefficient takes values between zero and one. A value of zero would indicate that the variation in the factors taken into account cannot explain the variation of the dependent variable. The maximum explanatory power, on the other hand, is indicated by a value of one. For a fixed effects regression, the R-squared that is of relevance only considers the variation over time *within* countries (the so-called 'within R-squared'), due to the fact that all factors are vary across countries (but not over time) have been isolated (or controlled for).

Table 19 provides the estimated regression results. Three different model specifications are presented (labelled M1 – M3). The estimated coefficient for 'average (maximum) aid intensity' should be interpreted in the following way: It is the expected average increase in the share in FDI flows (measured in %) if the average (maximum) aid intensity were to be increased by 1 percentage point. The coefficient in the first model, M1, therefore indicates that an increase in the average maximum aid intensity of 1 percentage point would increase a country's share in world FDI flows by 0.006 percentage point. The number of starts (*, **, ***) indicates the level of significance, such that that it cannot be rejected (from a statistical point of view) that the effect is fact zero (at the 10, 5 and 1% significance level).

In the baseline model (M1), the country-level average maximum aid intensity is obtained by weighting the regional maximum aid intensities by regional population. The model is estimated using data for all EU28 countries (excluding Croatia) for the period 2009-2017 (excluding the financial crisis period). A small number of observations for which FDI flows were negative and are also excluded. As indicated, the estimated effect is positive, but it is not statistically different from zero. The explanatory power of average maximum aid

intensity for FDI flows (in terms of the variation over time) is very small. Only 0.1% of the observed (within country) variation over time in FDI flows can be explained by (within country) variation in the average maximum aid intensity.

The following columns (M2-M3) provide variations that test the robustness of the result of the baseline model. In model M2, the maximum aid intensities are weighted by regional GDP instead of regional population. Model M3 again uses population weighting, but also includes the financial crisis period 2007-2008. The results of both models are similar to that of the benchmark model M1.

Table 19: Fixed effects regressions results

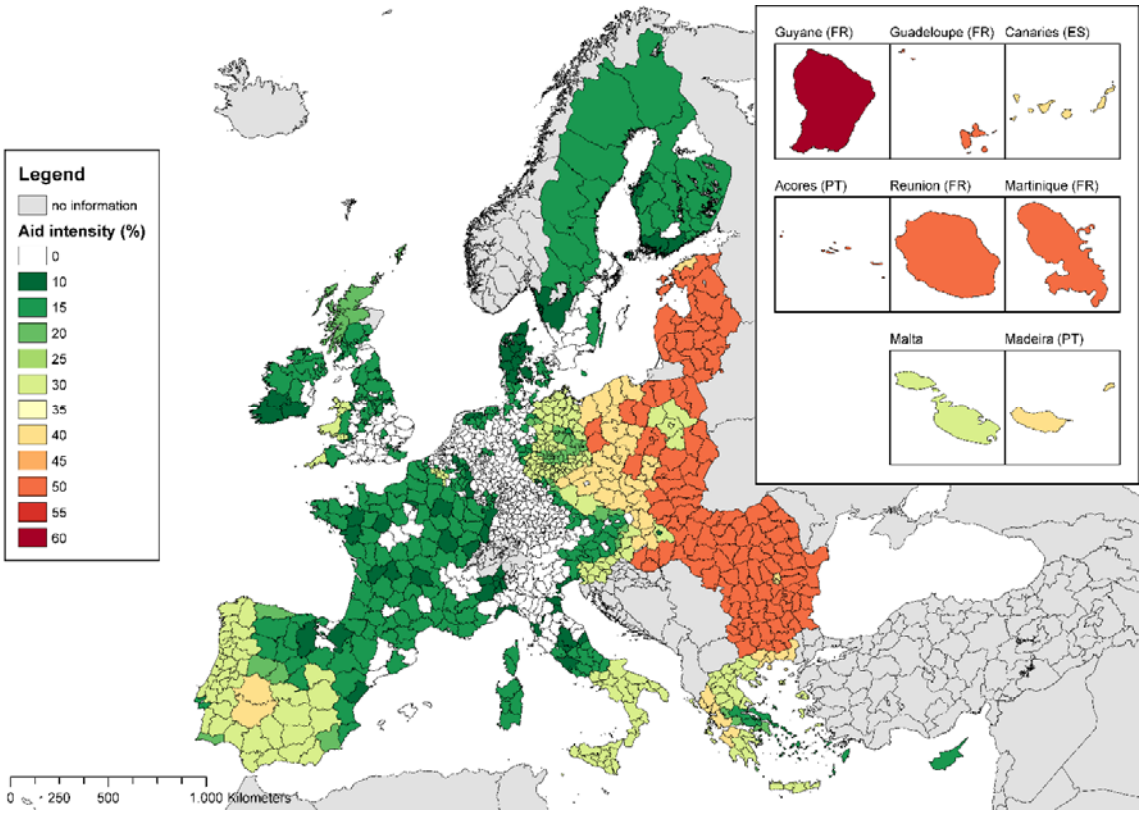
	M1: baseline specification	M2: intensity weighted by GDP	M3: including 2007-2008
Average (maximum) aid intensity	0.006	0.005	0.012
Constant term	0.989***	1.016***	0.911**
Number of observations	223	223	270
R-squared (within)	0.001	0.000	0.003

*Note: Significance level: * p<0.1, ** p<0.05, *** p<0.01.*
Source: Own analysis based on UNCTAD data and regional aid maps (2007-2013/2014-2020)

Overall, the regression analysis therefore indicates a positive relation between average maximum aid intensity and FDI flows. However, it cannot be rejected (from a statistical point of view) that the true effect is in fact zero. It should, however, be noted that the extent the regression analysis is performed using highly aggregated country-level information on FDI flows and maximum aid intensity. This implies two important limitations: First, there is a significant loss of information compared to more detailed regional (*e.g.* NUTS 3) information. Secondly, the number of data points is limited (at most 270 observations in model M3). These two factors limit the ability of obtaining a precise estimate of the true effect, especially when compared to regression models using regionally aggregated data. Nonetheless, the results from the fixed effects regression provide useful insight on the relation between FDI and maximum aid intensity when differences across countries have been accounted for (under certain assumptions).

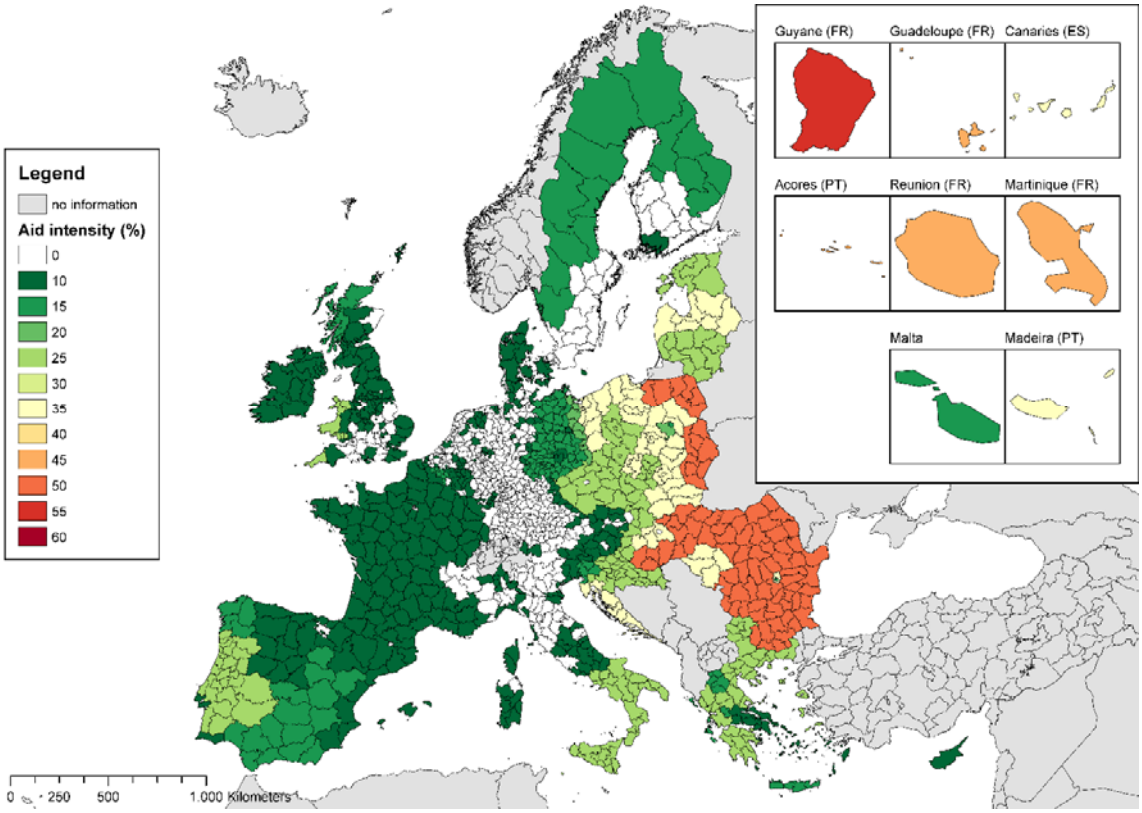
APPENDIX 6 REGIONAL AID MAPS

Figure 79: Maximum aid intensities in the RAF 2007 for the years 2011-2013 at the NUTS 3 level



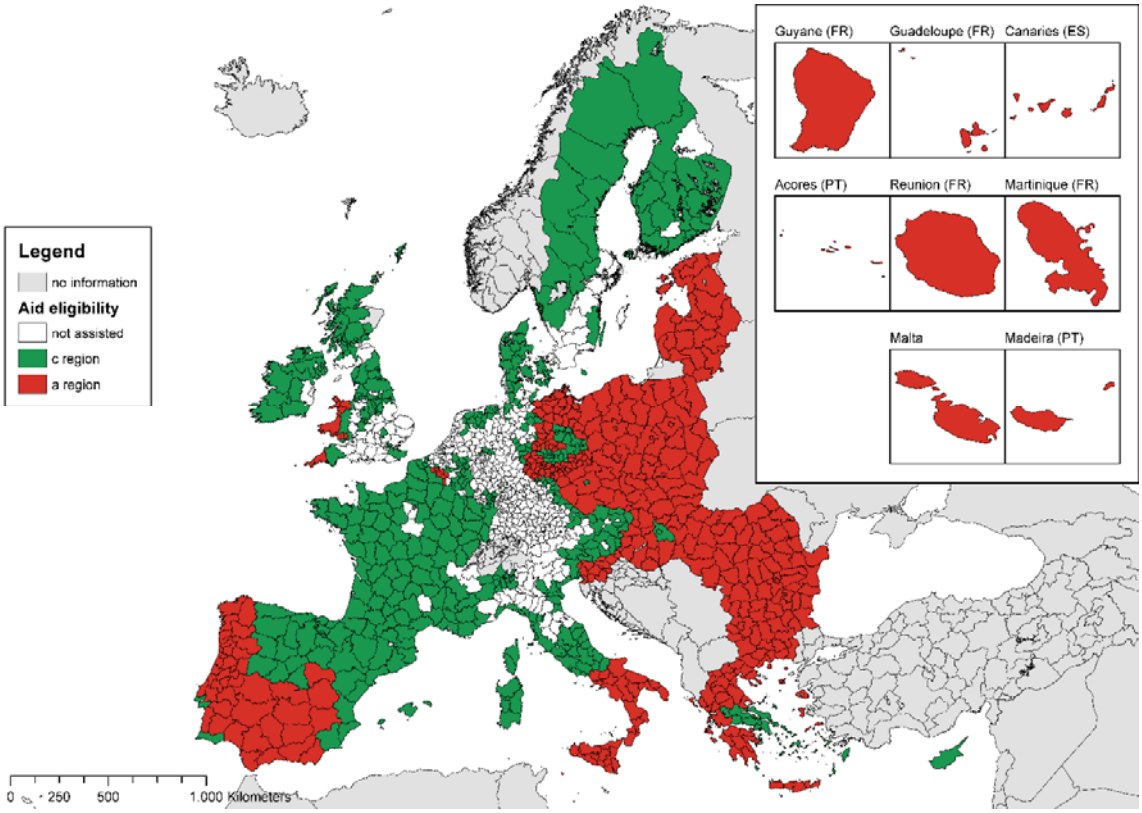
Source: Own analysis based on European Commission. © EuroGeographics for the administrative boundaries.
Note: Croatia is not presented in the map, as it is a Member State of the EU only since July 2013 and, consequently, not concerned by the RAF 2007.

Figure 80: Maximum aid intensities in the RAF 2014 for the years 2014-2017 at the NUTS 3 level



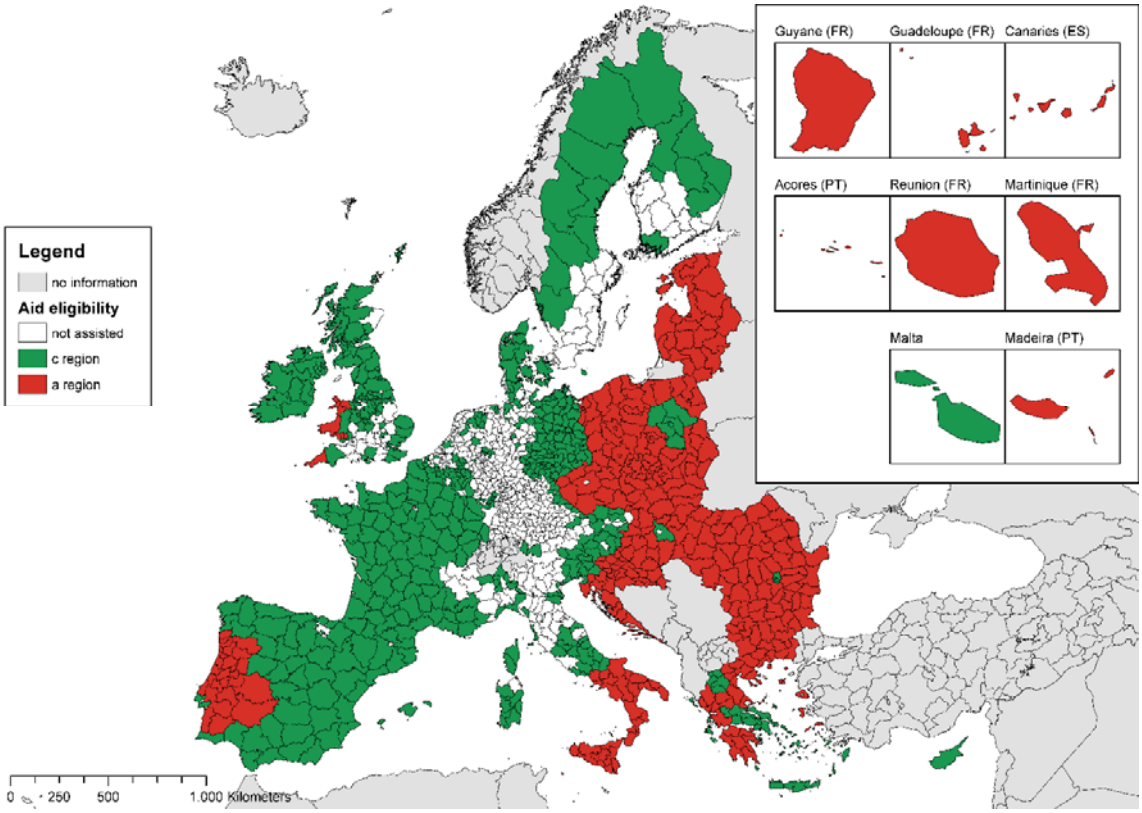
Source: Own analysis based on European Commission. © EuroGeographics for the administrative boundaries.

Figure 81: Aid eligibility in the RAF 2007 for the years 2011-2013 at the NUTS 3 level



Source: Own analysis based on European Commission. © EuroGeographics for the administrative boundaries.
Note: Croatia is not presented in the map, as it is a Member State of the EU only since July 2013 and, consequently, not concerned by the RAF 2007.

Figure 82: Aid eligibility in the RAF 2014 for the years 2014-2017 at the NUTS 3 level



Source: Own analysis based on European Commission. © EuroGeographics for the administrative boundaries.

APPENDIX 7 DESCRIPTION OF THE STATE AID DATA

The Study uses data on actual regional State aid spent over the two recent RAF periods (RAF 2007 and RAF 2014) by exploiting data on aid reported by the Member States under the State Aid Scoreboard. This data is provide by the Commission for the purposes of the project[75] (Scoreboard Database) and is analysed as a primary source of information on regional aid spent. The following two complementary data sources are then used, to complete missing information: Search on State aid cases notified to the Commission[76] (EC search Database) and State aid transparency public search[77] (TAM Database). This allows us to allocate a case figuring in the Scoreboard Database to a particular regional aid framework and exclude cases that are not of direct interest to the Study.

For the purpose of our preliminary analysis, we define *regional aid* as aid that had *regional development* as its primary objective.[78] This simple definition needs to be adjusted to account for four main limitations of the Scoreboard Database. First, the definition of what type of aid (national as compared to both national and EU) covers *regional development* changes over time. In particular, for the period prior to 2014, it only covers national funding, while for the period afterwards it covers both national and EU funding. Hence, to have a consistent definition across the two regional aid frameworks, we correct our definition of *regional* aid for the period prior to 2014 by adding to the reported figure also EU funding, as provided in the Scoreboard database (referred to as correction 1 in Table 20).

Second, *regional aid* which has *regional development* as its primary objective may be assigned according to different primary and/or secondary laws. Similarly, the distinction between "Regional aid – Investment aid (Art.14)" and "Regional aid – Operating aid (Art.15)" is provided for the RAF 2014 whereas it is not the case for the period prior to 2014. Excluding operating aid from the analysis is hence not possible by solely relying on information provided in the Scoreboard Database. Complementing information from the EC search Database and TAM Database, we are able to isolate cases which are not of direct interest to the Study and can be excluded. These are operating aid cases, as well as cases regarding the aviation, broadband, or energy sectors. We also exclude from the analysis cases which are referred to as noncompliant with State aid rules, cases referring to aid to governments to implement the interactive State aid system (SARI), or cases specifically granted under a different primary/secondary legal basis, as defined in the Scoreboard database (referred to as correction 2 in Table 20).

Third, we add cases regarding large investment projects ("LIP")[79] as they are not provided in the Scoreboard Database. Information regarding the actual aid spent,[80] as well as region (NUTS 3) concerned using the EC search Database (referred to as correction 3 in Table 20).

Forth, the analysis based on the Scoreboard Database itself allows only accounting for the year in which the indicated amount was spent. However, information on the RAF under which the aid was granted is not provided. Complementing information from the EC search Database and TAM Database, we are able to attribute cases to a particular regional aid framework, distinguishing between cases granted under the RAF 2014, the RAF 2007 or under an older framework. This correction allows us to account for the fact that while aid

[75] We refer here to the file containing data on regional investment and operating aid reported by Member States under the State Aid Scoreboard provided by European Commission for the purpose of the project, provided to the Consortium under the name "2018 SCB - overview dataset for fitness check.xlsx".

[76] https://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=3 (accessed on 29 August 2019).

[77] https://webgate.ec.europa.eu/competition/transparency/public?lang=en (accessed on 29 August 2019).

[78] We will discuss below some drawbacks of this definition.

[79] Initial investments with eligible costs exceeding EUR 50 million, calculated at prices and exchange rates on the date of award of the aid, see RAG, paragraph 20 (l).

[80] For cases for which only the overall budget was provided, yearly aid spent was assumed to be evenly distributed across the years for which aid was granted.

may have been granted under the RAF 2007, it may actually be spent in the years following 2013. We exclude aid granted under older RAFs (referred to as correction 4 in Table 20).

Table 20: Scoreboard database for the years 2007-2017 – steps in creating final sample for analysis[81]

	Total aid (2007-2017) in M EUR
Scoreboard Database – preliminary	130,255.6
Correction 1 – Correcting variable definition	+ 38,954.1
Correction 2 – Isolating investment aid	- 53,525.4
Correction 3 – Adding omitted LIP cases	+ 2,131.9
Correction 4 – Exclude cases under older RAF	- 11,157.6
Scoreboard Database – final	100,729.1

Source: Own analysis based on Scoreboard Database, EC search database and TAM Database.

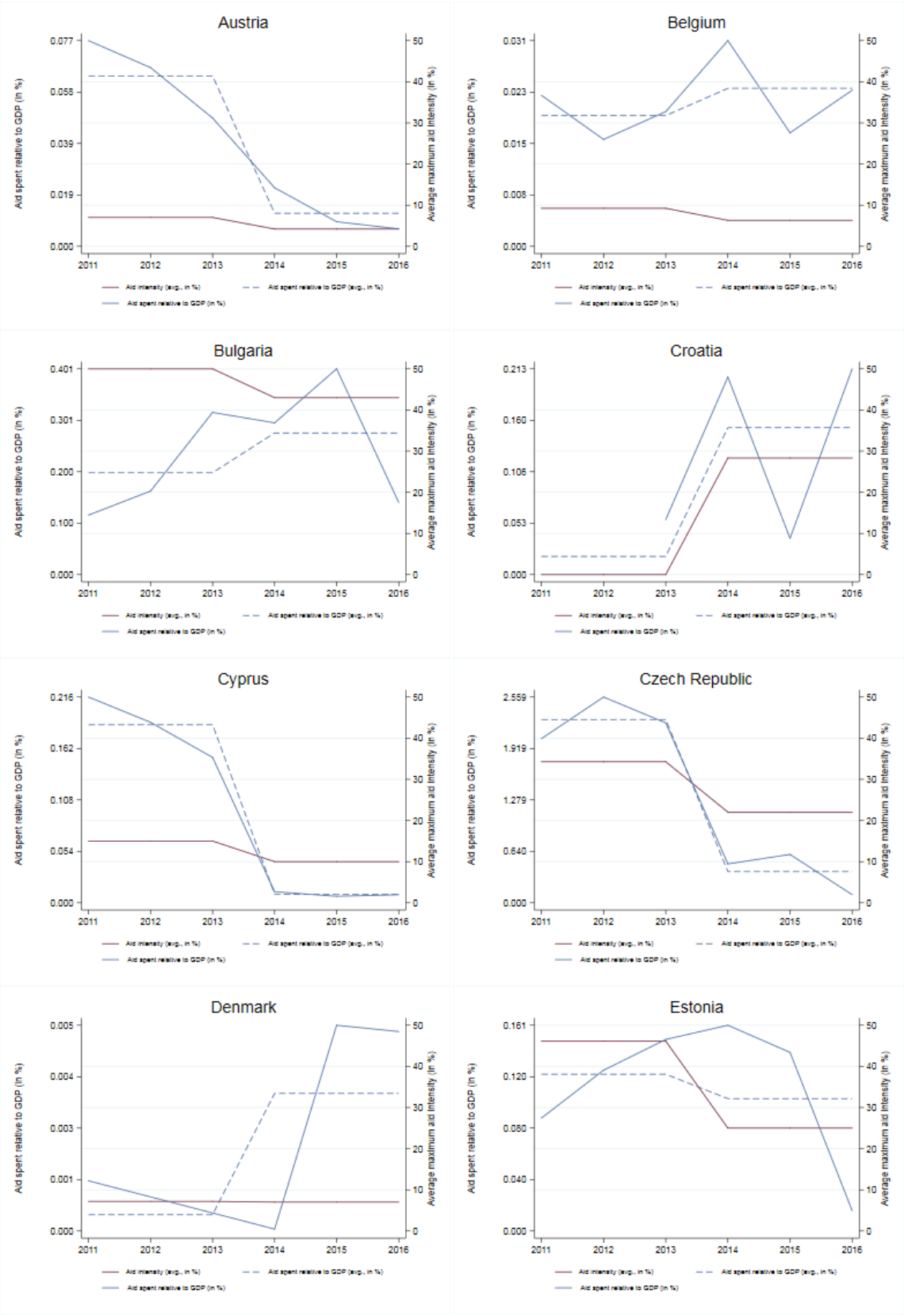
The main limitation of the Scoreboard Database for our disaggregated analysis is that the data provided does not consistently allow to assign the amount spent to a (NUTS 2 or NUTS 3) region. As a next step, we complete information on the region (NUTS 3) to which aid was granted, when this information was not provided in the Scoreboard Database. The allocation mechanism of aid to regions is largely based on desk research and by exploiting the complementary TAM Database and EC Search Database. In cases where no information is provided on the exact regions to which aid was attributed for a given case, we attribute aid to regions of a given country depending on the law under which aid was granted. As an example, for a given case, if aid was granted under Article 107(3) (a) TFEU, only 'a' areas of a given country will be assumed to have received aid. Aid is then equally allocated to between these areas.

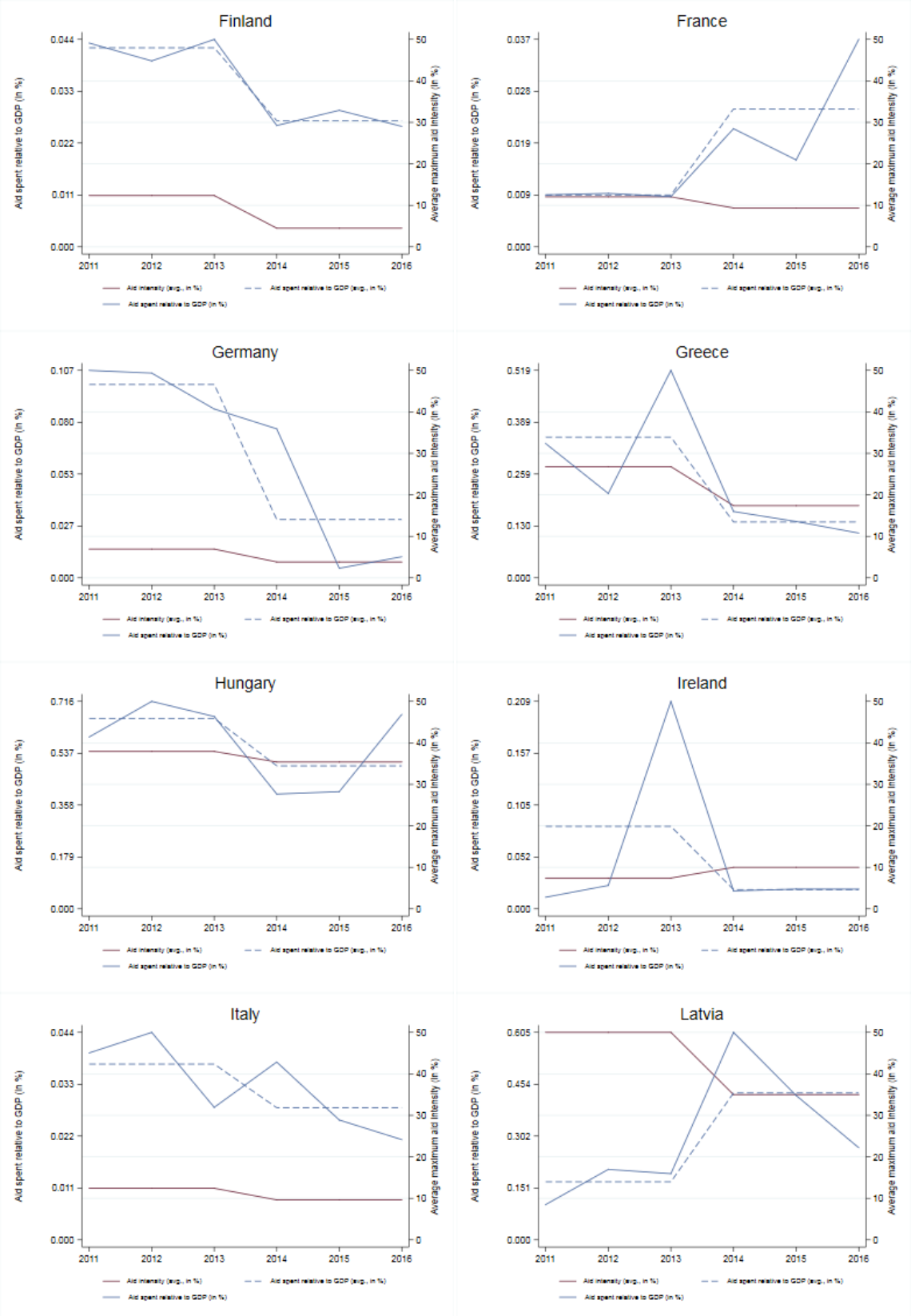
This allows us to allocate a case figuring in the Scoreboard Database to a particular region at the NUTS 3 level and exploit this information in our descriptive analysis (see Section 2.1.1) and econometrics model (see Appendix 10).

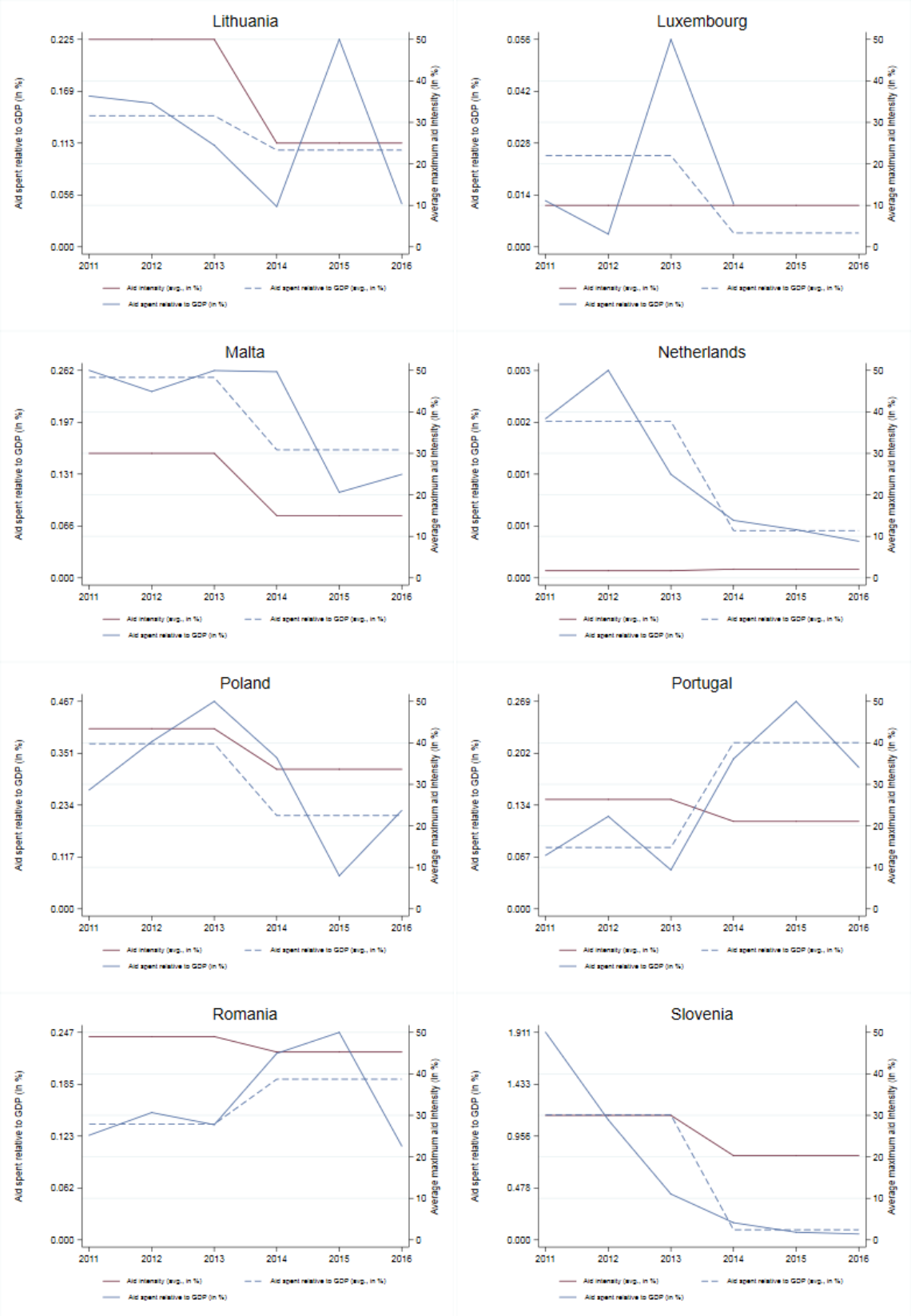
[81] Upon request, we can provide a table for a complete overview of excluded cases.

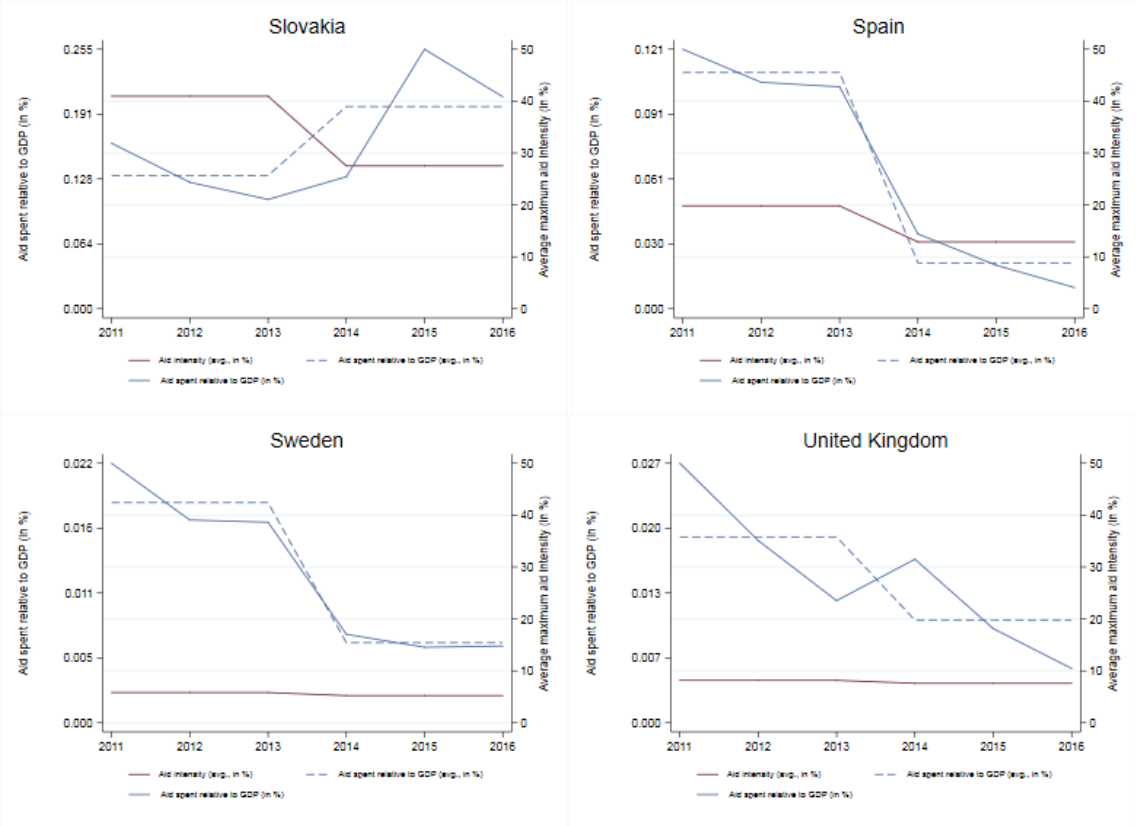
APPENDIX 8 STATE AID DATA – COUNTRY FIGURES

Figure 83: State aid spent (as % of GDP) and average maximum aid intensities across Member States for the years 2011-2016




Finland
France
Germany
Greece
Hungary
Ireland
Italy
Latvia
Aid spent relative to GDP (in %)
Average maximum aid intensity (in %)
2011
2012
2013
2014
2015
2016
Aid intensity (avg., in %)
Aid spent relative to GDP (avg., in %)
Aid spent relative to GDP (in %)


Lithuania
Luxembourg
Malta
Netherlands
Poland
Portugal
Romania
Slovenia
Aid spent relative to GDP (in %)
Average maximum aid intensity (in %)
2011
2012
2013
2014
2015
2016
Aid intensity (avg., in %)
Aid spent relative to GDP (avg., in %)
Aid spent relative to GDP (in %)



Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and European Commission.
Note: Country-level aid intensities are constructed by taking the average NUTS 3 level information weighted by regional population.

APPENDIX 9 DESCRIPTION OF THE AMADEUS DATA

A9.1 INTRODUCTION

The Study exploits firm-level data to construct regional (NUTS 3) measures of investment. Firm-level data on investment is sourced from Amadeus provided by Bureau van Dijk (2010). Amadeus is a comprehensive cross-country firm-level database in Europe available for economic and financial research. This database contains the name of all subsidiaries of a firm, its precise address, the NACE identifier as well as total fixed assets, where the latter variable was used to create a measure of investment.

This database allows us to look at individual firms' outcomes – especially at investment defined as total asset in a given year minus the total assets in the previous year. Once we have allocated a given firm to a given NACE sector in a given NUTS 3 region, we aggregate the variable of interest to create a measure of total investment at the regional level, distinguishing between investment made by the different sizes of enterprises: small, medium and large. This is a great advantage of the Amadeus database with respect to alternative data sources since it is not easy to find good quality data on investment at the regional level.

A9.2 CONSTRUCTION OF THE DATABASE FOR ANALYSIS

While the Amadeus is an extremely rich and broad source of firm financial information, its construction relies on a number of key steps, the details of which are presented below.

Our analysis covers the years 2010-2016, allowing to construct measures of investment for the years 2011-2016. The dataset covers firms from a broad range of industries and economies. We include firm data from all countries from the EU: Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, [82] Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the UK.

The financial information primarily derives from company accounts. Thus various cleaning steps are necessary before using the data for statistical purposes. The first key step is the choice of the type of financial accounts to be used in the analysis. Financial information is reported at different levels of aggregation: business group-level ("consolidated" or aggregated financial data consolidated across subsidiaries of the firm) and individual firm-level ("unconsolidated" information referring to an individual firm). In addition, firms' financial statement may be classified as providing limited financial information or no recent financial information. In more detail, Amadeus firms' financial statements are categorised into five groups:

- Unconsolidated accounts (U): unconsolidated financial accounts;
- Consolidated accounts – unconsolidated statement ($C2_u$): unconsolidated reporting basis derived from firms' consolidated financial accounts;
- Consolidated accounts – consolidated statement ($C2_c$): consolidated reporting basis derives from firms' consolidated financial accounts;
- Consolidated accounts with no companion unconsolidated statements (C1): consolidated reporting basis derived from firms' consolidated financial accounts;
- Limited financial information (LF): missing financial information and no mention on whether data are provided from consolidated or rather unconsolidated accounts;

[82] Financial information for Denmark are only provided for the years 2011-2016, and hence allow constructing measured of investment only for the years 2012-2016.

- No recent financial accounts (NRF): financial information of firms for which no data are provided for the last three years and no mention on whether data provided from consolidated or rather unconsolidated accounts.

The following table summarises the raw data obtained from Amadeus, distinguishing between these different groups of financial statements provided.

Table 21: Amadeus database for the years 2010-2016, by country and financial type of data provided

	Total N	U	$C2_u$	$C2_c$	C1	NRF	LF
Austria	1.067.722	81,1%	0,4%	0,3%	0,0%	2,9%	**15,4%**
Belgium	2.630.820	98,4%	0,2%	0,2%	0,0%	1,0%	**0,1%**
Bulgaria	2.295.307	78,0%	0,0%	0,0%	0,0%	4,2%	**17,8%**
Croatia	637.592	95,8%	0,0%	0,0%	0,0%	3,8%	**0,3%**
Republic of Cyprus	27.825	29,4%	0,2%	0,2%	1,3%	8,8%	**60,1%**
Czech Republic	2.218.593	45,5%	0,0%	0,0%	0,0%	3,6%	**50,9%**
Denmark	1.246.496	76,0%	1,1%	1,0%	0,0%	0,3%	**21,6%**
Estonia	704.360	94,3%	0,0%	0,0%	0,0%	2,6%	**3,0%**
Finland	1.395.572	72,2%	2,0%	1,5%	0,0%	2,0%	**22,3%**
France	8.067.260	61,9%	0,4%	0,3%	0,0%	12,8%	**24,7%**
Germany	6.007.104	53,2%	0,4%	0,4%	0,2%	5,7%	**40,2%**
Greece	166.759	89,5%	1,9%	1,6%	0,0%	6,9%	**0,0%**
Hungary	2.740.820	94,5%	0,0%	0,0%	0,0%	4,4%	**1,0%**
Ireland	929.007	87,1%	0,1%	0,1%	0,5%	4,3%	**8,0%**
Italy	5.896.242	94,9%	0,6%	0,5%	0,0%	4,1%	**0,1%**
Latvia	669.698	93,0%	0,3%	0,2%	0,0%	3,4%	**3,0%**
Lithuania	607.628	14,5%	0,2%	0,2%	0,0%	0,1%	**85,0%**
Luxembourg	106.543	91,2%	0,9%	0,6%	0,0%	7,2%	**0,0%**
Malta	89.486	86,3%	0,1%	0,1%	0,1%	10,6%	**2,7%**
Netherlands	4.996.740	86,8%	0,3%	0,4%	1,0%	0,2%	**11,2%**
Poland	7.191.698	11,2%	0,1%	0,1%	0,0%	1,0%	**87,6%**
Portugal	2.143.090	96,4%	0,2%	0,2%	0,0%	2,7%	**0,4%**

	Total N	U	$C2_u$	$C2_c$	C1	NRF	LF
Romania	3.876.935	96,0%	0,0%	0,0%	0,0%	2,5%	**1,5%**
Slovakia	1.069.585	89,7%	0,1%	0,0%	0,0%	2,0%	**8,2%**
Slovenia	444.893	96,2%	0,0%	0,0%	0,0%	0,9%	**2,8%**
Spain	5.003.660	93,5%	0,4%	0,3%	0,0%	5,7%	**0,1%**
Sweden	3.340.041	71,0%	1,3%	1,1%	0,0%	0,5%	**26,2%**
UK	14.511.347	83,4%	0,2%	0,2%	0,7%	0,8%	**14,8%**
Total – EU28	**80.082.823**	**73,9%**	**0,3%**	**0,3%**	**0,2%**	**3,5%**	**21,8%**

Source: Own analysis based on Amadeus.

The choice to work with either consolidated or unconsolidated accounts clearly depends on the focus of the analysis. In our Study, we are interested is regional investment. Consequently, we want to ensure that investment is attributed to the region in which it is actually undertaken, and not where the mother company is registered. Therefore, we use the unconsolidated version of the Amadeus database, by taking both the unconsolidated accounts (U) and the unconsolidated statements derived from consolidated accounts ($C2_u$). In total, these accounts cover more than 74% of all observations in our sample. As we are not able to distinguish between the different levels of aggregation for the accounts with no recent financial statements, we exclude them from the analysis.

Table 22 shows that omitted financial accounts account for approximately 22% of all observations. Moreover, in some countries, this value is more pronounced. In the case of Poland, for instance, it amounts to nearly 88% of the observations. This may raise the question of the coverage of the Amadeus database.

To better understand potential biases coming from limited financial data in our analysis, we report the percentage of observations with limited financial information, distinguishing between different firm sizes as provided in the Amadeus database: very large,[83] large,[84] medium sized,[85] and small.[86] The table lists countries by highest percentages of limited financial data.

[83] Companies on Amadeus are considered to be very large when they match at least one of the following conditions: Operating Revenue >= 100 million EUR (130 million USD), Total assets >= 200 million EUR (260 million USD), Employees >= 1,000. Companies with ratios Operating Revenue per Employee or Total Assets per Employee below 100 EUR (130 USD) are excluded from this category. Companies for which Operating Revenue, Total Assets and Employees are unknown but have a level of capital over 5 million EUR (6.5 million USD) are also included in the category.

[84] Companies on Amadeus are considered to be large when they match at least one of the following conditions: Operating Revenue >= 10 million EUR (13 million USD), Total assets >= 20 million EUR (26 million USD), Employees >= 150; Not Very Large. Companies with ratios Operating Revenue per Employee or Total Assets per Employee below 100 EUR (130 USD) are excluded from this category. Companies for which Operating Revenue, Total Assets and Employees are unknown but have a level of Capital comprised between 500 thousand EUR (650 thousand USD) and 5 million EUR (6.5 million USD) are also included in the category.

[85] Companies on Amadeus are considered to be medium sized when they match at least one of the following conditions: Operating Revenue >= 1 million EUR (1.3 million USD), Total assets >= 2 million EUR (2.6 million USD), Employees >= 15, Not Very Large or Large. Companies with ratios Operating Revenue per Employee or Total Assets per Employee below 100 EUR (130 USD) are excluded from this category. Companies for which Operating Revenue, Total Assets and Employees are unknown but have a level of Capital comprised between 50 thousand EUR (65 thousand USD) and 500 thousand EUR (650 thousand USD) are also included in the category.

[86] In Amadeus, companies are considered to be small if they are not included in any other category.

Table 22: Limited financial data in the Amadeus database for the years 2010-2016, by country and firm size

	All	Small	Medium sized	Large	Very Large
Poland	88%	92%	51%	23%	0%
Lithuania	85%	93%	52%	2%	0%
Republic of Cyprus	60%	79%	13%	12%	7%
Czech Republic	51%	55%	35%	16%	9%
Germany	40%	54%	11%	11%	6%
Sweden	26%	31%	6%	4%	8%
France	25%	30%	5%	2%	1%
Finland	22%	25%	10%	3%	0%
Denmark	22%	25%	4%	2%	1%
Bulgaria	18%	18%	16%	14%	20%
Austria	15%	20%	4%	2%	1%
UK	15%	16%	2%	2%	3%
Netherlands	11%	13%	2%	1%	0%
Slovakia	8%	6%	24%	7%	6%
Ireland	8%	10%	1%	1%	1%
Estonia	3%	3%	0%	0%	0%
Latvia	3%	3%	0%	0%	0%
Slovenia	3%	3%	1%	5%	40%
Malta	3%	4%	0%	0%	0%
Romania	2%	2%	0%	0%	0%
Hungary	1%	1%	0%	0%	0%
Portugal	0%	1%	0%	0%	0%
Croatia	0%	0%	0%	0%	0%
Belgium	0%	0%	0%	0%	0%
Spain	0%	0%	0%	0%	0%
Italy	0%	0%	0%	0%	0%
Greece	0%	0%	0%	0%	0%

	All	Small	Medium sized	Large	Very Large
Luxembourg	0%	0%	0%	0%	0%
Total EU28	**21,8%**	**24,9%**	**7,6%**	**3,9%**	**2,5%**

Source: Own analysis based on Amadeus.

The table clearly shows that limited financial information is an issue, which is relevant for small and to a smaller extent for medium sized firms. Having this in mind, in our econometric analysis we perform robustness checks, excluding countries for which coverage of small firms may be an issue (arbitrary cut-off of 30%).

We undertake a number of further cleaning steps, following the suggestions by Kalemli-Ozcan, et al. (2015). The relevant corrections include: (1) keeping accounts that refer to entire calendar year in case of duplicate observations; (2) dropping observations for which country code created based on the Bureau van Dijk ID numbers does not correspond to country ISO code; (3) dropping firms if employment (in persons) is negative in any year; (4) dropping observations with missing Account Closing Date; (5) dropping observations with no fiscal information; (6) dropping firms if fixed assets are null for all years; (7) dropping firms that appear in only one year; (8) dropping firms which have negative sales or negative tangible fixed assets in any year.

In addition, we complete missing values using extrapolation and interpolation methods only if a firm had at most two missing years of data in between years for which complete information is provided.

While Amadeus classifies a firm to company size categories, these do not perfectly correspond to the Eurostat classification of firms.[87] To address this shortcoming, we reassign firms to the Eurostat classification. As shown in Table 22 below, this was undertaken by exploiting employment data. In the case of missing employment assumptions were made exploiting the Amadeus classification of firms.

Table 23: Eurostat versus Amadeus classification of firms

Eurostat classification of firms	Amadeus classification of firms
Large enterprises: 250 or more persons employed	Amadeus: very large
	Amadeus large, if employment > 249
	Amadeus large if no employment data provided
Medium-sized enterprises: 50 to 249 persons employed	Amadeus large if employment < 250
	Amadeus medium sized if employment > 49
	Amadeus medium sized if no employment data provided
Small (and micro) enterprises: less than 50 persons employed	Amadeus medium sized if employment < 50
	Amadeus small

Source: Own analysis based on Eurostat and Amadeus.

[87] Eurostat, https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Enterprise_size (accessed on 20 June 2019).

The focus of our analysis is regional investment, where regions are aggregated according to the NUTS level 3 regional classification. While the Amadeus database does not directly provide this information, it includes the postal code, city and region of a firm. These variables are then essential to assign a firm to a NUTS 3 code according to the following steps.

1) We exploit correspondence tables provided by Eurostat,[88] which establish a link between postal codes and NUTS level 3 codes in order to exploit information, which originally is coded only by postal codes.

While the completeness of postal codes is high for most countries, the case of Portugal and Poland requires additional steps.

2) We exploit the correspondence tables provided by Statoids,[89] which establish a link between administrative divisions in Portugal and NUTS 3 level codes.

3) We exploit the correspondence tables published by the Ministry of Administration and Digitisation and provided by the Commission on Standardisation of Geographical Names Outside the Republic of Poland,[90] which establish a link between city names and the different regional administration units.

4) We exploit the correspondence tables provided by Eurostat,[91] which establish a correspondence between local administrative units and NUTS 3 level codes. We recover the NUTS 3 level information by matching the data with the names under the different administration units in our database.

5) Finally, we exploit the correspondence tables provided by Eurostat,[92] which establish a correspondence between region names and NUTS 3 level codes.

Throughout these steps, based on translation codes provided by Eurostat, we reassign to NUTS 3 level codes for the NUTS 3 versions 2010 if information is provided under versions 2013 or 2016. We drop the few firms for which neither zip code, city nor region are provided. For the remaining firms, we complete the missing NUTS 3 information undertaking desk research. Our analysis excludes outermost regions.

Finally, we calculate the investment (I) of firm i of size s (s = *small, medium, large*) in region j in year t as the yearly change in firm-specific fixed assets:

$$I_{isjt} = FA_{isjt} - FA_{isjt-1}.$$

Once we have allocated a given firm to a given NACE sector in a given NUTS 3 region, we aggregate the variable of interest to create a measure of total investment at the regional level, distinguishing between investments made by the different sizes of enterprises:

$$I_{sjt} = \sum_i I_{isjt}.$$

We also generate an aggregated investment variable summing up the investment of all firms active in region j ($I_{jt} = \sum_i \sum_s I_{isjt}$). Thus, we are able to create a new and potentially

[88] Eurostat. Files with the correspondence tables between postcodes and NUTS 3 level codes for the NUTS versions 2010, 2013, 2016 (database), https://ec.europa.eu/eurostat/web/nuts/correspondence-tables/postcodes-and-nuts (accessed on 20 June 2019).
[89] Statoids. Files with the correspondence tables between administrative divisions in Portugal and NUTS 3 level codes for the NUTS version 2003 (database), http://www.statoids.com/ypt.html, (accessed on 20 June 2019).
[90] Commission on Standardisation of Geographical Names Outside of the Republic of Poland (database), http://ksng.gugik.gov.pl/urzedowe_nazwy_miejscowosci.php, (accessed on 20 June 2019).
[91] Eurostat. Files with the correspondence tables between local administrative units and NUTS 3 level codes https://ec.europa.eu/eurostat/web/nuts/local-administrative-units, (accessed on 20 June 2019).
[92] Eurostat. Files with the correspondence tables between regions and NUTS 3 level codes for the NUTS version 2010, https://ec.europa.eu/eurostat/fr/web/nuts/history (accessed on 20 June 2019).

more precise outcome as compared to those by Eurostat which can only provide total business investment in a NUTS 2 region. This is a great advantage of the Amadeus database.

APPENDIX 10 DETAILED ECONOMETRIC RESULTS

A10.1 INTRODUCTION

In this section, we extend the descriptive analysis of regional aid's effectiveness by implementing an econometric assessment at the disaggregated NUTS 3 level. This allows us to more precisely identify how the implementation of the RAF affects regional outcomes, in particular total business investment.[93] In order to do this, we exploit the variation generated by the introduction of the current RAF in 2014, which created heterogeneous changes in the eligibility criteria and, thus, different investment incentives across European regions. The focus on the *changes in the rules* is crucial as it allows to create comparator groups — some regions are affected by the changes while others are not— which enables us to identify how these (new) rules affect outcomes. This step is key to perform a sensible causal analysis, not necessarily to make a comparison with the past, but to understand the effectiveness of the rules.

The advantages of the econometric analysis are threefold. First, it can help to *assess the causality* of the relation between State aid rules and economic outcomes. Second, it helps *quantifying the extent* of the impact of the changes on outcomes (*e.g.*, how much more or less investment in a region is due to the change in State aid rules). Finally, it allows performing a *broad evaluation* of the current regional aid guidelines in light of their effect on levels of investment (and potentially other variables of interest) that could complement information obtained by the descriptive analysis, surveys, case studies and expert interviews.

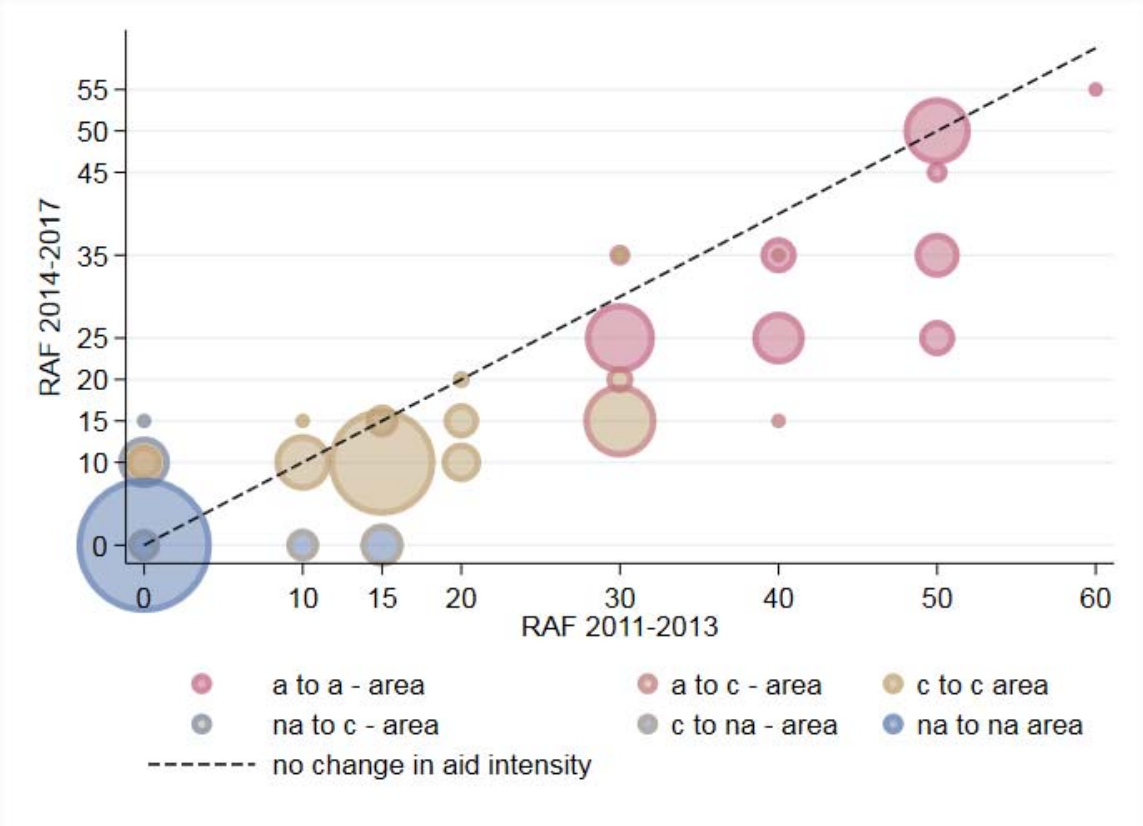
A10.2 EC POLICY RULES

The econometrics approach exploits the variation generated by the introduction of the current RAF in 2014, which created different changes in the eligibility criteria and, consequently, different investment incentives across European regions (see Section 2.1.3 for a detailed discussion of the Commission's policy rules in this regard).

Figure 84 below provides a graphical presentation of these heterogeneous changes across regions, which will be exploited in the econometric analysis. The horizontal axis represents the maximum aid intensity (*i.e.*, the aid as % GGE) for each region according to the RAF 2007 for the years 2011-2013, while the vertical axis represents the maximum aid intensity according to the RAF 2014 for the years 2014-2017. The inner colours of the circles represent the different types of regions in terms of aid eligibility during the 2014-2017 period: 'a' areas are represented in red, 'c' areas in orange, non-assisted regions in green. The colour of the border of the circles, instead, represent the types of regions during the period 2011-2013. The size of the dots in the diagram represents how many regions (NUTS 3) are in which category. This figure reports the sources of variation that are exploited in the econometric analysis. In particular, in a first step, we focus only on those regions that have seen a decrease in aid intensities (below the dashed line) and compare them to those eligible ('a' or 'c' regions) which have not seen a change in rules (represented as orange and red dots on the dashed line). This step aims at measuring the effect of the modulation of maximum aid intensity on investment. We then perform a second step to assess the effect of the restrictions on aid to LE's in 'c' areas, by comparing those 'c' areas on the dashed 45 degree line to similar non-eligible areas located on the origin of the diagram.

[93] As an extension, as presented in section A10.4.4, we also look at how RAF affects allocated aid itself.

Figure 84: Changes in maximum aid intensity and aid eligibility between two RAF periods

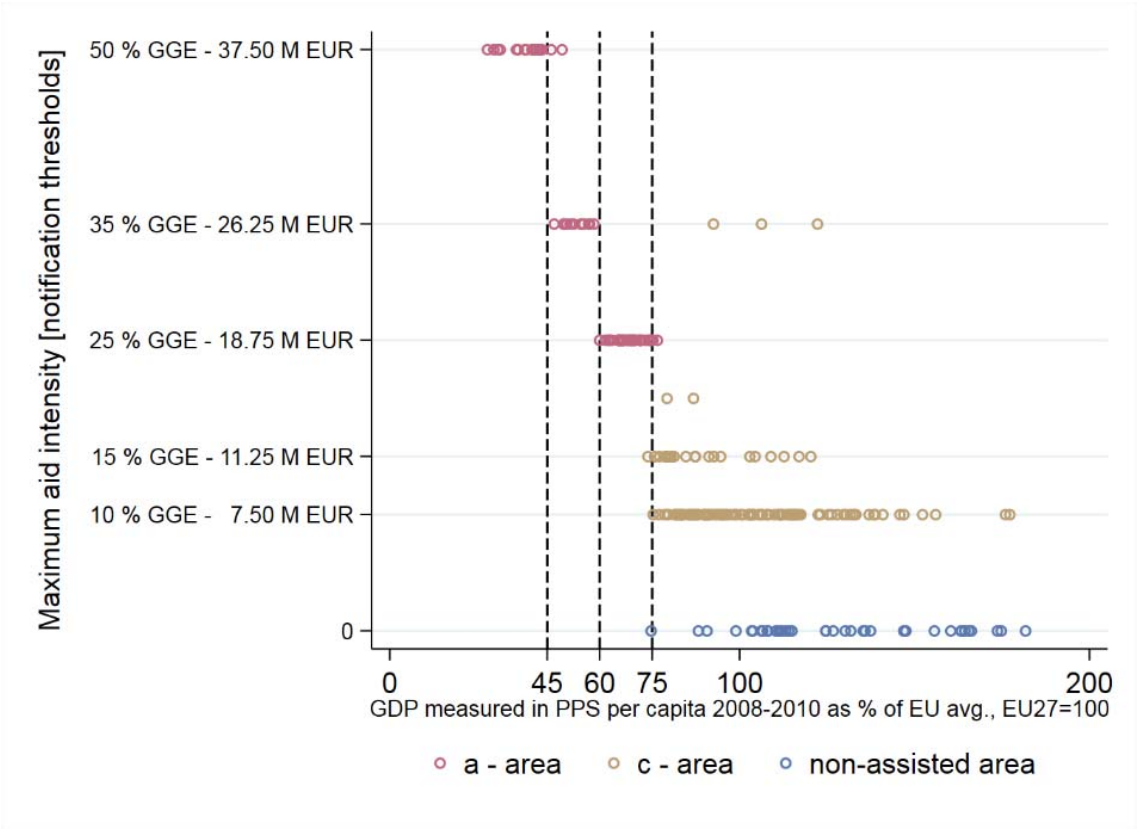


Source: Own analysis based on regional aid maps (2007-2013/2014-2020).
Note: (i) The term "na" refers to non-assisted area. (ii) The figure includes outermost regions. (iii) The change in the NUTS codification between NUTS 2003 (codification used for the RAF 2007) and NUTS 2010 (codification used for the RAF 2014) make it impossible to identify changes for the following regions NUTS 3 regions: DED43, FI1B1. (iv) Croatia is not presented in the figure, as it is a Member State of the EU only since July 2013 and, consequently, not concerned by the RAF 2007.

Thus, the focus of the identification strategy is to exploit the fact that similar regions faced different changes in the rules. Key for this approach is the use of disaggregated data at a small scale geographical area, the NUTS 3 level. Indeed, while policy rules are set mainly based on the economic outcomes of regions at the NUTS 2 level, there is a great deal of variation across NUTS 3 regions. This is explained graphically by Figure 85 - Figure 86.

Figure 85 summarizes the State aid rules depending on the GDP measured in PPS per capita as % of the EU average for NUTS 2 regions. The latter is presented on the horizontal axis of the figure. The vertical axis then reports the maximum aid ceilings (% GGE), as provided for the 2014-2017 period in the RAF 2014. The colours indicate whether an area is designated as an 'a' area (red), 'c' *area* (orange) or rather as a *non-assisted* area (green). The figure shows that, when focusing on NUTS 2 regions, aid intensities (in particular for 'a' areas) are directly related to economic outcomes, as expressed by GDP.

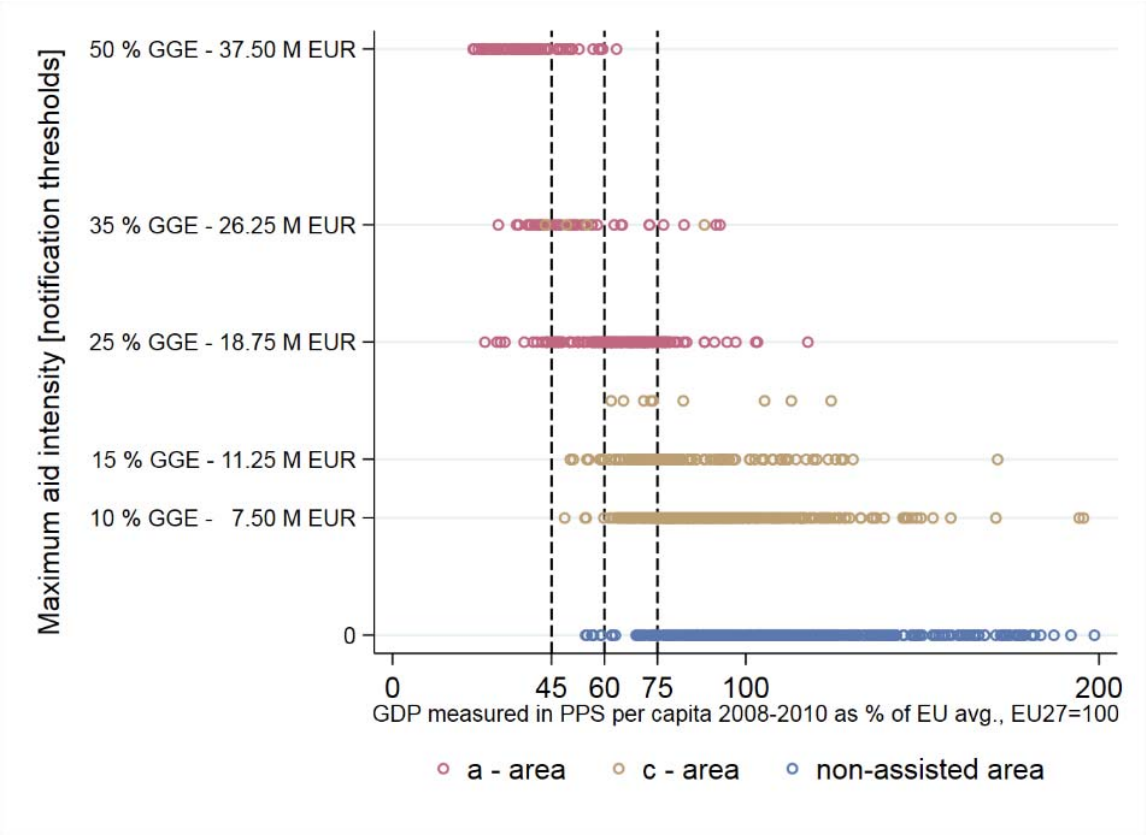
Figure 85: RAF 2014 rules to GDP measures in PPS per capita to the EU average at the NUTS 2 level



Source: Own analysis based on regional aid maps (2007-2013/2014-2020) and Eurostat.
Note: (i) The graph does not cover neither outermost regions, nor regions for which GDP measured in PPS per capita was not provided by Eurostat for 2008-2010. We are not in the possession of the original data that was actually used to establish regional aid maps at the time. For the sake of visual clarity it restricts values on the x-axis to values below 200. (ii) The points illustrating 'c' areas with aid intensities of 35% GGE refer to the following NUTS 2 regions: HU10, PL12 and RO32 - all NUTS 2 regions including the NUTS 3 region of the capital city with high GDP per capita and its surroundings with lower GDP per capita, so that at the NUTS 2 level the region was allocated 35% maximum aid intensity..

Analysing the GDP per capita in PPS as a share of the EU average at a more disaggregated NUTS 3 regional level (Figure 86), it appears that regions comparable in terms of their economic outcomes may have different regional State aid status. This is the case because there is substantial heterogeneity in GDP per capita within a NUTS 2 region. As an example, NUTS 3 areas with GDP at 50% of the EU average, may face aid intensities from 10% GGE to 50% GGE.

Figure 86: RAF 2014 rules to GDP measured in PPS per capita to the EU average at the NUTS 3 level



Source: Own analysis based on regional aid maps (2007-2013/2014-2020) and Eurostat.
Note: The regional aid framework designates regions as `a' areas based on GDP per capita to EU average at the NUTS 2 level, while the figure reports values at the more disaggregate NUTS 3 level. The graph does not cover neither outermost regions, nor regions for which GDP measured in PPS per capita was not provided by Eurostat for 2008-2010. We are not in the possession of the original data that was actually used to establish regional aid maps at the time. For the sake of visual clarity it restricts values on the x-axis to values below 200.

Figure 85 and Figure 86 above also help explain how EU policy rules as set by the regional aid guidelines may affect firms' investment incentives *via* their two main effects. Firstly, higher aid intensities translate into higher investments given the same own financial contribution. Secondly, maximum aid intensities are also positively correlated with notification thresholds. Firms may have an incentive to stay right below the notification threshold to avoid the (potentially costly) notification procedure. An increase in notification thresholds relaxes this constraint and may provide incentives for higher investment. This is particularly relevant for larger investments close to the threshold.

A10.3 Evaluation questions

The focus of our Study is the relationship between State aid rules as set up by the RAG 2014 and investment incentives. Two questions are of key interest for this evaluation exercise, each involving a separate and complementary empirical strategy.

In the first step, we look at the effects of the reduction in the maximum aid ceilings introduced in the RAF 2014 on aggregate regional investment (section A10.4). Our identification strategy relies on the variation generated by the introduction of the RAF 2014, which created heterogeneous changes in the eligibility criteria and, thus, different investment incentives across regions. The focus on the *changes in the rules* is crucial as it allows to create comparator groups — some regions eligible to receive aid are

affected by the changes (those encountering reductions in maximum aid intensities) while others are not (those which have seen no change in maximum aid intensities).

In the second step, we focus on the impact of the other restrictions on aid to LE's in 'c' areas (eligibility of projects) introduced in the RAF 2014 on levels of investment as well as regional development (section A10.5). Here we look at 'c' regions that did not change maximum aid ceilings between the RAF 2007 and the RAF 2014, and compare those to similar regions that were non-assisted in both periods. The focus of the analysis is to assess whether there are any differences in investment behaviour of large enterprises between the two types of regions following the introduction of the RAF 2014. In particular, since we focus on 'c' regions that did not face a change in the maximum aid intensities – but did change the eligibility rules for large enterprises – we can cleanly separate the effect of the additional restrictions from the effect of the change of the ceilings. To make sure that the "treated" c regions are comparable to those in the control group, we use a propensity score matching method to account for selection on observables. This approach allows selecting those non-assisted regions that are as similar as possible to the c regions along the list of observed characteristics.

The remainder of the chapter describes in detail separately for each step the datasets used, the empirical and identification strategy, as well as the results.

A10.4 EFFECT OF THE REDUCTION IN THE MAXIMUM AID INTENSITIES

A10.4.1 Datasets

Our analysis relies on an original regional dataset that we created for the Study and combines four main sources.

Eligibility and aid intensities data. Assessing the effectiveness of the RAF 2014 involves exploiting information on the policy rules themselves. These include two main tools: (1) establishing maximum aid intensities expressed as the percentage (%) of eligible costs of investment which may be covered with State aid and (2) defining a region as an 'a' area, 'c' area or as non-eligible to receive aid. These are provided by the Commission at a NUTS 3 level. Table 24 summarizes these rules for the regions included in our analysis. The table shows that, in our sample, 620 regions in our sample have encountered a decrease in the average maximum aid intensity, where the average maximum aid intensity decreased from 25 percentage points to 16 percentage points. This was accompanied by a decrease in the proportion of regions assigned as 'a' areas.

Table 24: Summary statistics on aid intensity and eligibility per NUTS 3 region for the years 2011-2016

Variables	Δ Aid intensities	N of NUTS3 regions	Mean	Std. Dev.	Min.	Max.
Aid intensities (in %)						
2011-2013	-	142	34.51	19.00	10.00	50.00
2014-2016	-	142	34.51	19.00	10.00	50.00
2011-2013	Decrease	620	25.45	11.39	10.00	50.00
2014-2016	Decrease	620	16.03	8.95	0.00	35.00
Eligible a - areas (in %)						
2011-2013	-	142	59.86	49.08	0.00	100.00
2014-2016	-	142	59.86	49.08	0.00	100.00
2011-2013	Decrease	620	50.65	50.01	0.00	100.00
2014-2016	Decrease	620	32.74	46.94	0.00	100.00
Eligible c - areas (in %)						
2011-2013	-	142	40.14	49.08	0.00	100.00
2014-2016	-	142	40.14	49.08	0.00	100.00
2011-2013	Decrease	620	49.35	50.01	0.00	100.00
2014-2016	Decrease	620	60.00	49.00	0.00	100.00
Non-eligible areas (in %)						
2011-2013	-	142	0.00	0.00	0.00	0.00
2014-2016	-	142	0.00	0.00	0.00	0.00
2011-2013	Decrease	620	0.00	0.00	0.00	0.00
2014-2016	Decrease	620	7.26	25.95	0.00	100.00

Source: Own analysis based on regional aid maps (2007-2013/2014-2020)

Table 25 then presents the number of NUTS 3 regions included in the analysis by country and distinguishing between the type of changes in terms aid intensity and eligibility taking place between the RAF 2007 and the RAF 2014.

Table 25: Summary statistics on the number of NUTS 3 regions included in the analysis by country and changes in maximum aid intensity and eligibility between the RAF 2007 and the RAF 2014

Country	aa - 0	aa - minus	ac - minus	cc - 0	cc - minus	cna - minus	Total
Austria	0	0	0	0	20	1	21
Belgium	0	0	7	3	13	0	23
Bulgaria	23	5	0	0	0	0	28
Cyprus	0	0	0	0	1	0	1
Czech Republic	0	13	0	0	0	0	13
Estonia	0	5	0	0	0	0	5
Finland	0	0	0	7	0	9	16
France	0	0	0	11	69	1	81
Germany	0	0	67	3	55	17	142
Greece	0	31	12	0	8	0	51
Hungary	12	6	0	0	0	1	19
Ireland	0	0	0	2	2	0	4
Italy	0	27	0	11	19	9	66
Latvia	0	6	0	0	0	0	6
Lithuania	0	10	0	0	0	0	10
Malta	0	0	1	0	0	0	1
Netherlands	0	0	0	1	4	3	8
Poland	14	46	2	0	0	0	62
Portugal	0	24	0	0	2	0	26
Romania	36	4	1	0	0	0	41
Slovakia	0	7	0	0	0	0	7
Slovenia	0	8	4	0	0	0	12
Spain	0	2	17	5	19	0	43
Sweden	0	0	0	6	0	3	9
United Kingdom	0	9	0	8	49	1	67
Total	85	203	111	57	261	45	762

Source: Own analysis based on regional aid maps (2007-2013/2014-2020).
Note: `0' refers to no change in maximum aid intensity between the RAF 2007 and the RAF 2014; `minus' refers to a decrease in maximum aid intensity between the RAF 2007 and the RAF 2014; `aa' refers to regions which were assigned as `a' area under the RAF 2007 and `a' area under the RAF 2014; `ac' refers to regions which were assigned as `a' area under the RAF 2007 and `c' area under the RAF 2014; `cc' refers to regions which were assigned as `c' area under the RAF 2007 and `c' area under the RAF 2014; `cna' refers to regions which were assigned as `c' area under the RAF 2007 and as non-assisted area under the RAF 2014.

Amadeus data. Addressing the question on the effectiveness of regional aid in terms of its actual effect on investment involves exploiting regional data on the level of investment itself. Such data is not easily available at a disaggregated NUTS 3 level as needed for our econometric analysis.[94] Firm-level data was obtained from the Bureau van Dijk's Amadeus database (Bureau van Dijk. 2010). We use the unconsolidated version of the Amadeus database.[95] This database contains the name of all subsidiaries of a firm, its precise address, the NACE identifier as well as usual variables such as fixed assets. Thus, this database allows us to create a measure of firm's investment - defined as total fixed assets in a given year minus the total fixed assets in the previous year (see Appendix 9 for more information on the construction of the database). Specifically, we calculate the investment (I) of firm i of size s (s = *small, medium, large*) in region j in year t as the yearly change in firm-specific fixed assets:

[94] Eurostat provides data on gross fixed capital formation at the NUTS 2 level of aggregation. As explained in section 4.2.1.2, it is only at a smaller geographical area that we are able to find regions that are similar in terms of their economic outcomes (GDP), but facing different policy rules.
[95] These include information retrieved from unconsolidated financial statements as well as unconsolidated data provided in consolidated financial statements.

$$I_{isjt} = FA_{isjt} - FA_{isjt-1}.$$

Once we have allocated a given firm to a given NACE sector in a given NUTS 3 region, we aggregate the variable of interest to create a measure of total investment at the regional level, distinguishing between investments made by the different sizes of enterprises:

$$I_{sjt} = \sum_i I_{isjt}.$$

We also generate an aggregated investment variable summing up the investment of all firms active in region j ($I_{jt} = \sum_i \sum_s I_{isjt}$). Thus, we are able to create a new and potentially more precise outcome as compared to those from Eurostat which can only provide total business investment in a NUTS 2 region. This is a great advantage of the Amadeus database.

The key variable of interest in the econometric analysis is total regional investment (for all firms or firms in the different size classes) in a region expressed as a percentage of the region's GDP. Table 26 provides summary statistics on investment for the sample of NUTS 3 regions used in the econometrics analysis and distinguishing between different sizes of enterprises.[96] In particular, we exploit information on total investment for 762 NUTS 3 regions. These are eligible regions, which either have seen no change in aid rules (142 regions) or faced a decrease in aid intensities (620 regions). The data covers the years 2011-2016, that is, it is providing information on the two recent regional aid guidelines periods: the RAF 2007 and the RAF 2014.

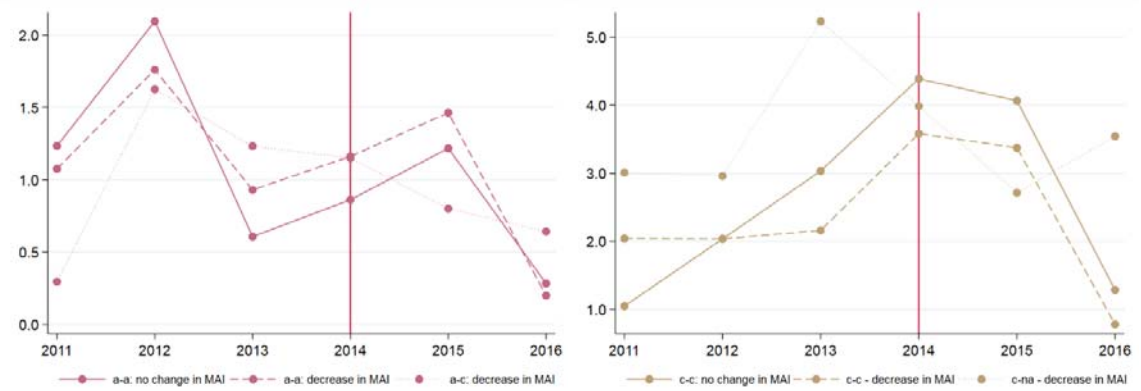
Table 26: Summary statistics on total investment to GDP in percentages per NUTS 3 region for the years 2011-2016

Variables	Δ Aid intensities	N of NUTS3 regions	Mean	Std. Dev.	Min.	Max.
Total investment - all firms						
2011-2013	-	142	2.98	6.85	-21.77	78.85
2014-2016	-	142	2.77	7.88	-25.07	70.04
2011-2013	Decrease	620	2.98	6.34	-17.36	85.08
2014-2016	Decrease	620	2.61	7.69	-28.21	94.71
Total investment - large firms						
2011-2013	-	142	1.60	5.52	-24.38	54.92
2014-2016	-	142	1.77	6.86	-21.81	65.12
2011-2013	Decrease	620	1.74	6.07	-19.30	103.01
2014-2016	Decrease	620	1.80	7.06	-28.59	96.89
Total investment - medium firms						
2011-2013	-	142	0.67	2.23	-20.06	21.48
2014-2016	-	142	0.68	1.77	-5.84	18.56
2011-2013	Decrease	620	0.71	1.37	-13.87	13.17
2014-2016	Decrease	620	0.56	1.75	-28.31	29.29
Total investment - small firms						
2011-2013	-	142	0.71	1.28	-4.72	10.21
2014-2016	-	142	0.31	2.50	-30.00	29.84
2011-2013	Decrease	620	0.53	1.16	-18.49	8.70
2014-2016	Decrease	620	0.25	1.57	-21.23	31.43

Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).
Note: (i) We exclude from the analysis, the smallest and largest 1% of the observations. (ii) Non assisted region are not included in the analysis.

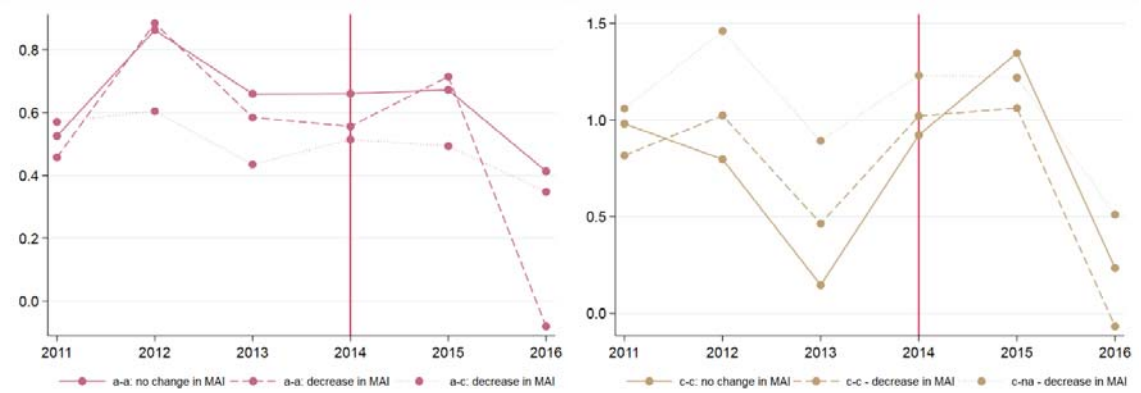
[96] Note that since investment is defined as the change in total asset from one year to the other, it might take negative values.

Figure 87: Evolution of total investment of large firms to GDP in percentages per NUTS 3 region for the years 2011-2016



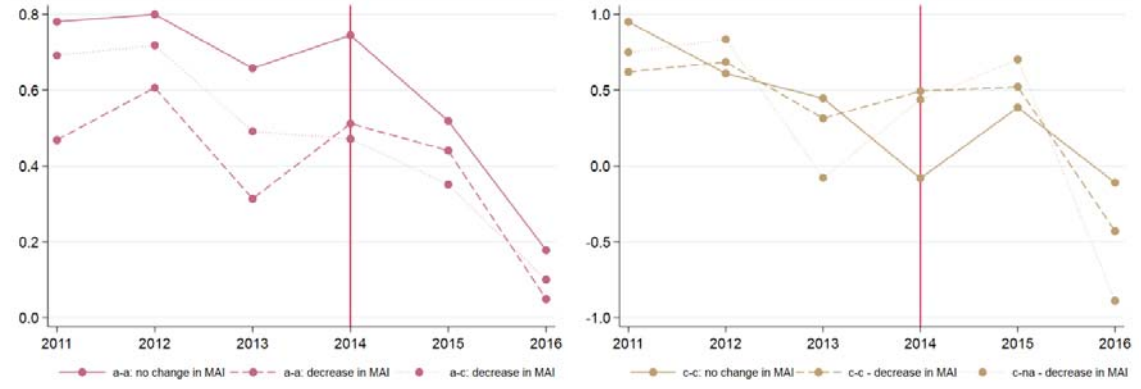
Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).
Note: MAI refers to maximum aid intensities.

Figure 88: Evolution of total investment of medium firms to GDP in percentages per NUTS 3 region for the years 2011-2016



Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).
Note: MAI refers to maximum aid intensities.

Figure 89: Evolution of total investment of small firms to GDP in percentages per NUTS 3 region for the years 2011-2016



Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).
Note: MAI refers to maximum aid intensities.

Regional State aid spent. As an extension of the Study (see section A10.4.4), our analysis also uses data on actual regional State aid spent over the two recent RAF periods (RAF 2007 and RAF 2014) by exploiting data on aid reported by the Member States under the State Aid Scoreboard for the years 2011-2016. This data is provided by the Commission for the purposes of the project[97] (Scoreboard Database) and is analysed as a primary source of information on regional aid spent. To overcome missing information, the following two complementary data sources are then used: Search on State aid cases notified to the Commission[98] (EC search Database) and State aid transparency public search[99] (TAM Database) (see Appendix 7 for more detailed information on the construction of the final database). As a result, we exploit in our analysis information on aid spent at a NUTS 3 regional level of aggregation. However, as opposed to the Amadeus data on investment above, we cannot distinguish between the different firm sizes.

Table 27 reports some descriptive statistics regarding aid spent broken by the two respective RAF periods (corresponding to 2011-2013 and 2014-2016 in our data). It also reports summary statistics separately for those regions that have seen no change in aid intensities between the respective RAF periods and those that were exposed to a decrease in aid intensities. The table shows that the decrease in aid spent was more pronounced for regions that have encountered a decrease in aid intensities (decrease from an average of EUR 18 million to EUR 7 million).

Table 27: Summary statistics on aid spent in M EUR at NUTS 3 level for the years 2011-2016

Variables	Δ Aid intensities	N of NUTS3 regions	Mean	Std. Dev.	Min.	Max.
Aid spent (in M EUR)						
2011-2013	-	142	9.03	11.14	0.00	58.44
2014-2016	-	142	7.78	8.12	0.00	40.35
2011-2013	Decrease	620	18.21	41.20	0.00	444.13
2014-2016	Decrease	620	7.17	9.97	0.00	86.94

Source: Own analysis based on Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).

Regional characteristics data. Data on investment and aid spent is complemented with regional NUTS 3 level data. These will be exploited in the econometric analysis of the Study to control for time-varying factors at a regional level, which may potentially affect investment. In particular, we consider population density as expressed by the number of inhabitants per square kilometre, employment rate as expressed by the ratio of employed to total population in the age group 15-64, GDP in PPS per capita in percentage (%) of the EU average. Descriptive statistics of these variables are summarized in Table 28 for the sample of regions used in our econometrics analysis.

[97] We refer here to the file containing data on regional investment and operating aid reported by Member States under the State Aid Scoreboard provided by European Commission for the purpose of the project, provided to the Consortium under the name "2018 SCB - overview dataset for fitness check.xlsx".
[98] https://ec.europa.eu/competition/elojade/isef/index.cfm (accessed on 29 August 2019).
[99] https://webgate.ec.europa.eu/competition/transparency/public?lang=en (accessed on 29 August 2019).

Table 28: Summary statistics on regional characteristics at NUTS 3 level for the years 2011-2016

Regional covariates	Δ Aid intensities	N of NUTS3 regions	Mean	Std. Dev.	Min.	Max.
Population density (Inhabitants per km2)						
2011-2013	-	142	161.19	407.00	2.00	3,599.90
2014-2016	-	142	161.37	410.96	1.90	3,636.60
2011-2013	Decrease	579	350.94	795.62	7.10	7,260.70
2014-2016	Decrease	579	356.64	814.90	7.00	7,454.60
Employment wrt to population 15-64						
2011-2013	-	142	0.59	0.14	0.29	1.20
2014-2016	-	142	0.58	0.16	0.23	1.14
2011-2013	Decrease	575	0.58	0.18	0.13	1.48
2014-2016	Decrease	575	0.58	0.18	0.13	1.52
GDP in PPS to EU average in %						
2011-2013	-	142	65.84	37.00	22.00	260.00
2014-2016	-	142	64.72	32.65	22.00	211.00
2011-2013	Decrease	579	79.66	23.69	23.00	217.00
2014-2016	Decrease	579	79.43	23.67	23.00	231.00

Source: Own analysis based on Eurostat and regional aid maps (2007-2013/2014-2020).
Note: Because of the change in the regional NUTS codification throughout the period of our analysis, regional characteristics are missing for some of the NUTS 3 regions in our sample.

A10.4.2 Empirical model and identification strategy

The focus of our Study is the relationship between State aid rules as set up by the RAG 2014 and investment incentives. In this section we look specifically at the role of the modulation of maximum aid intensities. Thus, in our empirical model, we study how the potential availability of State aid, *i.e.* the eligibility criteria as well as aid ceilings, affects aggregate regional investment.

Our identification strategy relies on the variation generated by the introduction of the RAF 2014, which created heterogeneous changes in the eligibility criteria and, thus, different investment incentives across regions. The focus on the *changes in the rules* is crucial as it allows to create comparator groups — some regions are affected by the changes while others are not — which enable us to identify how these (new) rules affect outcomes.

The key step of our analysis looks at how the change in the RAF rules affect total investment in the region. This is, we believe, the most direct and robust way of looking at the influence of (new) State aid rules. First, it allows looking at the potentially different reactions of different enterprises, as we can partition investment between small, medium, and large firms. Second, it allows us to encompass the potential within-region spill-overs from aid-supported firms to other firms in the same regions - although only in a rough way (see section A10.4.5 for a discussion of this issue).

Our econometric analysis relies on a multivariate panel regression model. The main variable of interest to assess the impact of the regional aid is total regional investment as a percentage of GDP.[100] As discussed in section A10.4.1, investment at the regional level is defined as the sum of the investment of all firms active in that particular region – either in total or partitioned by firms' size classes. In a difference-in-difference setting, we compare the evolution of investment in those regions where the eligibility criteria worsened (from 'a' to 'c' or from 'c' to non-assisted) and/or aid intensities were reduced after the introduction of the RAF 2014 to the investment in those 'a' and 'c' regions where these changes did not happen. The estimation excludes regions, which faced an increase in aid

[100] We also tried alternative specifications where the dependent variable was measured either as total amount of investment or as investment per capita. Results are consistent. We choose this specification as this relative measures cleans out the effect of different regional sizes across the different Member States. Notice also that this analysis could in principle be extended to studying other regional performance indicators that measure the indirect impact of the regional aid such as GDP growth or employment. These variables could be determined by an increased investment activity spurred by the allocated aid. Finally, to assess whether the aid had distortive effects on competition one could look at outcomes such as the number of firms. In this report, we do not look at these additional dimensions as it exceed the scope of the study.

intensities or were defined as *non-assisted* in both regional aid frameworks. The following regression is estimated:

$$y_{jt} = \alpha_1 + \beta_1 \times post_t + \gamma_1 \times Treat_{jt} \times post_t + \delta_1 * X_{jt} + \eta_{1j} + \eta_{1jt} + \varepsilon_{1jt}, \qquad (1)$$

where the regional outcomes (y) — investment to GDP — in region *j* in time *t* is explained by time varying variables at the regional level (*X*), NUTS 3 fixed-effects (η_j), as well as NUTS 2-specific time trends (η_{jt}), which should capture important drivers of investment decisions.[101] The error term ε_{jt} is assumed to be correlated within NUTS 3 regions to account for heteroscedasticity and autocorrelation, thus standard errors are clustered at that level.[102]

The key variables for our analysis are *'post'* and *'Treat'*. The coefficient estimate of the former measures the evolution of investment in eligible regions that did not face a change in the maximum aid intensities or their eligibility status following the introduction of the RAF 2014. This represents the counterfactual development for the regions facing changes, had these not happened. The variable *'Treat'* is a dummy indicating whether the aid intensities were reduced or the eligibility criteria were worsened in region *j* after the introduction of the RAF 2014.[103] This variable represents a so-called 'treatment'.

Because the adjustments in eligibility and maximum aid intensity are centrally decided at the European and Member State levels according to more or less automatic criteria based on GDP or other indicators as employment and were focused on NUTS 2 regions, these changes can be credibly considered exogenous to investment in the NUTS 3 regions.[104] This is particularly true as we further control for observable characteristics, NUTS 3 fixed-effects, as well as overall investment trends at the NUTS 2 level. Therefore, the estimate for the coefficient γ measures can be cautiously interpreted as the causal impact of the treatment (*i.e.* change of maximum aid intensity or eligibility) on investment: *i.e.* the additional change in investment that the treated regions observed compared to the control ones.[105]

Throughout our analysis, we consider three specifications. Under our first specification (referred to ***M1*** in tables reported in section A10.4.3), the basic definition of the change in the aid intensities (*'Treat'*) is a simple dummy capturing whether the maximum aid intensity in region *j* has become less generous following the introduction of the RAF 2014. By using this simple dichotomous dummy, we compare the investment behaviour in regions that faced a change in aid intensity and eligibility to the investment behaviour in regions that did not. Figure 84 gives an intuition about this variable. All dots below the 45-degrees line represent treatment regions, that is regions that encountered a decrease in the aid intensities between the respective regional aid frameworks. All red and orange dots on the 45-line represent control regions.[106]

[101] It would not be possible to identify trends at the NUTS 3 level.

[102] We tried different correlation structures (*e.g.* correlation at the NUT2 or country level) and results do not change.

[103] Because the focus of the study is to look at the impact of the decrease of the maximum aid ceilings introduced in 2014, we dropped from the analysis regions with a positive change. In any case, these were mainly regions that were not subjected to European regulation before 2014 like Croatia.

[104] Indeed, the Commission set a target of the percentage of European regions to be supported and set cut-offs for the eligibility criteria and the maximum aid intensities, which are mostly function of average EU GDP at the NUTS 2 region. There is quite some heterogeneity in GDP across NUTS 3 region within a NUTS 2 region, which helps our identification strategy.

[105] Indeed Figure 87 - Figure 89 show that treated and control area show similar evolution pattern in investment before the treatment. The existence of such "common trend" supports our identification strategy.

[106] We drop from the analysis all regions that were non-assisted during the entire sample period (2011-2017). Moreover, we also dropped regions with a positive change because the focus of the analysis is to look at the impact of the decrease of the maximum aid ceilings introduced in 2014. In any case, the only regions with positive changes where regions that were not subjected to European regulation before 2014 like Croatia.

Yet, this basic approach does not account for potential heterogeneity across regions as these differ both in the size of the change in the percentage of eligible costs and their eligibility ('a', 'c', or non-assisted). Thus, under our second specification (referred to ***M2*** in tables reported in section A10.4.3), we further fine-tune the definition of the treatment and control groups. We split the simple dummy in several dummies measuring the amount of the reduction in maximum aid ceilings due to the introduction of the RAF 2014. Specifically, we look at reductions by 5, 10, 15, or 25 percentage points.

This allows for more heterogeneity in the treatment status but not in the control group. The latter is still defined by all regions that did not observe a negative change. These might however be quite different from one another as they can be either 'a' or 'c' areas. Therefore, under our third specification (referred to ***M3*** in tables reported in section A10.4.3) we address the above issue and refine the control group depending on whether a region was an 'a' or 'c' area before the introduction of the RAF 2014. Here, we also amend the model further to take into account the changes within 'a' areas and from 'a' to 'c' areas, as well as changes within 'c' areas and from 'c' to non-assisted areas. This step essentially partitions the data in two groups. In the first group, for instance, we compare 'a' areas that did not face a decrease in maximum aid intensity (the control group) to areas that faced decrease, distinguishing between those areas that remained 'a' areas and those that switched to 'c' areas between the two regional aid frameworks. In the second group, we compare 'c' areas that did not face a change in aid intensities (control) to areas that faced a decrease aid intensities distinguishing between those that stayed 'c' areas and those that became *non-assisted* areas. As shown in Figure 86, within the two groups (red dots for 'a' areas and yellow dots for 'c' areas), observations are quite comparable in terms of GDP per capita in PPS to EU average, making the control groups and, thus, the estimation of the treatment effect more reliable.[107]

Finally, under each specification considered, we also analyse how the effect of the change in State aid rules varies by enterprise size (and, potentially, sector). Specifically as discussed in section A10.4.1 we define three variables of interest: investment by large firms (more than 249 employees), medium firms (between 50 and 249 employees), and small firms (less than 50 employees). Partitioning investment in this way might help us to better understand the mechanism through which State aid rules affect investment incentives.

A10.4.3 Results

Table 29, Table 30, and Table 31 report the results of the three specifications discussed in the previous sections. All tables are built in a similar fashion. The first column reports the results obtained by using total investment in a given NUTS 3 region, while the next three columns report the results obtained by using the investment of large, medium, and small firms respectively.

[107] Note that the definition of 'a' and 'c' areas as well as of the aid intensities is done at the NUTS 2 level. Indeed, almost all NUTS 2 regions are placed within the right brackets in the left panel. For instance, all regions with a GDP per capita below 45% of the EU average are defined to be 'a' regions with maximum aid intensity of 50%. However, there is quite some dispersion in the GDP per capita across NUTS 3 regions within a NUTS 2 region as represented in the second panel.

Table 29: Regressions on investment to GDP (in %) at the NUTS 3 level, distinguishing between large, medium and small enterprises – specification *M1*

	All	Size L	Size M	Size S
Control group: no change in aid intensity or eligibility				
post	2.44***	1.61**	0.61***	0.22
	[0.85,4.03]	[0.047,3.18]	[0.20,1.03]	[-0.12,0.56]
post × *Treat*	-0.65	-0.71	-0.12	0.17
	[-2.30,1.00]	[-2.33,0.91]	[-0.51,0.27]	[-0.18,0.53]
Fixed effects	yes	yes	yes	yes
Clustered SE	yes	yes	yes	yes
NUTS2 trends	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes
Observations	4,288	4,288	4,288	4,288

95% confidence intervals in brackets

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).

Table 29 present our simplest specification. The positive and significant coefficient of the '*post'* variable indicates a general increase (by over 2 percentage points) in investment levels for control areas, and this for all size categories bundled together. Instead, regions that faced a restriction of their potential State aid support (either because the aid intensities decreased or because they switched from being 'a' to being 'c' areas) observed a decrease of investment to GDP by more than 0.5 percentage point if compared to the control group measured by the coefficient estimates of the variable '*post x Treat*'. However, this effect is not significant and not large enough to offset the positive general trend. The same pattern can be found for large companies and medium-sized companies, whereas for small companies there is a general increase in investment, but no decrease for changing criteria.

Since there are significant differences across areas and size of decrease in aid ceilings, in the second step, we account for the treatment intensity, *i.e.* the size of the decrease in aid ceilings.

Table 30: Regressions on investment to GDP (in %) at the NUTS 3 level, distinguishing between large, medium and small enterprises – specification *M2*

	All	Size L	Size M	Size S
Control group: no change in aid intensity or eligibility				
post	2.63***	1.74**	0.66***	0.23
	[1.01,4.26]	[0.14,3.33]	[0.24,1.08]	[-0.11,0.58]
post × *Treat (-5 p.p.)*	0.30	0.13	-0.011	0.18
	[-1.52,2.12]	[-1.64,1.91]	[-0.42,0.40]	[-0.20,0.56]
post × *Treat (-10 p.p.)*	-2.17*	-2.61**	0.058	0.38
	[-4.38,0.040]	[-5.00,-0.22]	[-0.46,0.57]	[-0.12,0.88]
post × *Treat (-15 p.p.)*	-1.94**	-1.61*	-0.40*	0.079
	[-3.74,-0.13]	[-3.38,0.16]	[-0.86,0.050]	[-0.31,0.46]
post × *Treat (-25 p.p.)*	-7.03***	-5.58**	-1.29**	-0.17
	[-12.1,-1.93]	[-10.6,-0.52]	[-2.29,-0.28]	[-0.97,0.64]
Fixed effects	yes	yes	yes	yes
Clustered SE	yes	yes	yes	yes
NUTS2 trends	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes
Observations	4,288	4,288	4,288	4,288

95% confidence intervals in brackets

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).

Table 30 shows again the general tendency for control areas that did not change their eligibility criteria nor aid intensities: an average increase in investment after 2014 by over 2 percentage points. Looking at different changes in ceilings, it now appears that for all companies a decrease of more than 10 percentage points in maximum aid intensity leads to a relative decrease in investment when compared to the control group by 2.2 percentage points; although this decrease still does not offset the general increase in investment. Moreover, the larger the change in aid intensities, the larger effects become in absolute value. Indeed, for the largest change (25 percentage points), the negative effects of this change (7.03 percentage points) offset the effect of the control group on investment measured by the 'post' coefficient. The exact same pattern can be found for large, medium-sized companies, and even for small companies, though in the latter case it is not significant.

Table 31: Regressions on investment to GDP (in %) at the NUTS 3 level, distinguishing between large, medium and small enterprises – specification *M4*

	All	Size L	Size M	Size S
Control group: a areas with no change in aid intensity or eligibility				
post	0.35	0.16	-0.0039	0.20
	[-1.62,2.32]	[-1.69,2.00]	[-0.24,0.23]	[-0.079,0.48]
post × Treat (a to a area with decrease in aid intensity)	0.28	0.011	0.17	0.10
	[-2.01,2.56]	[-2.11,2.13]	[-0.24,0.57]	[-0.22,0.42]
post × Treat (a to c area with decrease in aid intensity)	0.27	0.12	0.16	-0.018
	[-2.10,2.63]	[-2.10,2.35]	[-0.27,0.59]	[-0.38,0.35]
Control group: c areas with no change in aid intensity or eligibility				
post × Sample (c)	4.08**	2.78*	1.21***	0.093
	[0.97,7.19]	[-0.26,5.81]	[0.48,1.95]	[-0.55,0.74]
post × Treat (c to c area with decrease in aid intensity)	-1.09	-0.90	-0.35	0.16
	[-3.41,1.22]	[-3.22,1.42]	[-0.95,0.24]	[-0.38,0.71]
post × Treat (c to na area with decrease in aid intensity)	-3.13**	-3.22**	-0.38	0.46
	[-6.02,-0.25]	[-6.35,-0.079]	[-1.05,0.29]	[-0.26,1.18]
Fixed effects	yes	yes	yes	yes
Clustered SE	yes	yes	yes	yes
NUTS2 trends	yes	yes	yes	yes
Regional controls	yes	yes	yes	yes
Observations	4,288	4,288	4,288	4,288

95% confidence intervals in brackets
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).

If we then further split up in the different areas ('a' and 'c'), it becomes clear that almost all effects take place within changes in the 'c' areas and this mostly for large companies. In 'c' areas that did not change their aid ceilings (the controls) investment increased by on average 4.1 percentage points, while investment decreased in treated 'c' areas. Yet, these decreases that range between 1.1 and 3.1 percentage points do not compensate the overall effect. Again, most of these effects come from the behaviour of large enterprises.

When we also consider changes in area eligibility, the interpretation does not significantly change. The same results are obtained whether the large firms remained assigned to a 'c' area (with a lower maximum aid intensity) or rather were designated as *non-assisted* area.

A10.4.4 Extension

As an extension, in a similar fashion, we look at how the State aid rules affect the amount of regional aid effectively allocated mimicking the empirical model presented in section A10.4.2 and concentrating on actual aid spent increase of investment. The following regression is estimated:

$$\ln(AID)_{jt} = \alpha_2 + \beta_2 \times post_t + \gamma_2 \times Treat_{jt} \times post_t + \delta_2 * X_{jt} + \eta_{2j} + \eta_{2jt} + \varepsilon_{2jt}, \quad (2)$$

where the regional outcomes (AID) — aid spent — in region *j* in time *t* is explained by time varying variables at the regional level (X) as well as NUTS 3 fixed-effects (η_j) as well as NUTS 2-specific time trends (η_{jt}), which should capture important drivers of investment

decisions.[108] The error term ε_{jt} is assumed to be correlated within NUTS 3 regions to account for heteroscedasticity and autocorrelation, thus standard errors are clustered at that level.[109]

Again, we present the three specifications discussed in the previous sessions that account for the heterogeneity in treated and control regions. While focusing on aid spent represent a perhaps more intuitive way to assess the impact of changes in the State aid rules, we are no longer able to distinguish the differential impact by different firm sizes.

Table 32 reports our results. In all specifications, we estimate negative effects of the treatment, *i.e.* a worsening of the eligibility criteria and/ or aid ceilings implies a reduction of effectively allocated aid. This effect is however only significant in some specifications. The most clear-cut results are reported in column 4. A decrease of aid ceilings in 'a' areas, a change of eligibility from 'a' to 'c' areas, as well as a change of eligibility from 'c' area to *no-eligibility* area reduce aid spent by 28 to over 30%.[110]

[108] Since aid spent cannot take negative values, unlike our investment variable, we can take the logarithm.

[109] Also in this case, we tried different correlation structures (*e.g.* correlation at the NUTS 2 or country level) and results do not change.

[110] The interpretation of the coefficient of a dummy variable in a log linear regression is that the switch of the dummy from zero to 1 leads to a percentage change which is calculate as $100 \times [\exp(\gamma_2) - 1]$.

Table 32: Regressions on aid spent (in log) at the NUTS 3 level for all model specifications[111]

	M1	M2	M3
Control group: no change in aid intensity or eligibility			
post	0.057	0.097*	0.094
	[-0.048,0.16]	[-0.0089,0.20]	[-0.027,0.22]
post × *Treat*	-0.058		
	[-0.16,0.045]		
post × *Treat (-5 p.p.)*		0.077	
		[-0.026,0.18]	
post × *Treat (-10 p.p.)*		-0.067	
		[-0.19,0.058]	
post × *Treat (-15 p.p.)*		-0.43***	
		[-0.55,-0.30]	
post × *Treat (-25 p.p.)*		-0.11	
		[-0.28,0.057]	
post × *Treat (a to a area with decrease in aid intensity)*			-0.25***
			[-0.42,-0.082]
post × *Treat (a to c area with decrease in aid intensity)*			-0.32***
			[-0.46,-0.18]
Control group: c areas with no change in aid intensity or eligibility			
post × *Sample (c)*			0.0030
			[-0.20,0.20]
post × *Treat (c to c area with decrease in aid intensity)*			0.094
			[-0.047,0.23]
post × *Treat (c to na area with decrease in aid intensity)*			-0.25***
			[-0.44,-0.069]
Fixed effects	yes	yes	yes
Clustered SE	yes	yes	yes
NUTS2 trends	yes	yes	yes
Regional controls	yes	yes	yes
Observations	4,288	4,288	4,288

95% confidence intervals in brackets
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Own analysis based on Amadeus, Scoreboard Database, EC search database, TAM Database and regional aid maps (2007-2013/2014-2020).

A10.4.5 Robustness checks

We perform a number of alternative specifications to check the robustness of our results. Firstly, we consider alternative definitions of our variable of interest (investment), respectively investment in absolute terms (M EUR) and investment *per capita* (M EUR per person). Our conclusions remain robust to the alternative definitions.

Secondly, our main analysis is based on the definition of total business investment in a region. Note that this variable can be potentially split between the investment of the firms already active in a region (expansion investment) and the investment of the firms starting operating in the region at time (greenfield investment). We introduce subsamples and perform the analysis separately for the two types of investment. While, our main results are driven by expansion investment, given the quality of the Amadeus data, we prefer not to make this distinction as the measure of greenfield investment may be too noisy.

[111] We introduce a transformation of aid, by adding 1 to it. This allows us to include in our regression aid spent in log for observations with null aid.

Thirdly, in all specifications above we control for time-varying factors at a regional level, which may potentially affect investment. However, due to a change in regional NUTS codification, these are missing for a number of observations in our sample (approximately 45). Our results remain robust to introducing specifications without regional covariates.

Finally, we perform checks by excluding countries for which the quality of the Amadeus data may be disputable due to a high percentage of limited financial information reported. In particular, we exclude those countries for which limited financial accounts for more than 30% of all observations (see Appendix 9). Our conclusions remain valid and robust to this sample restriction.

A10.4.6 Further issues

These preliminary results allow us to provide some insights on the Commission's evaluation questions, regarding the effectiveness of regional State aid, in particular of the modulation of maximum aid ceilings. First, we find that the larger the reductions in maximum aid intensities between the two regional aid frameworks, the larger (negative) effects on total investment. Second, these results differ between the different types of areas and between large, medium-sized and small enterprises. We find the most robust impact for large enterprises, less so for medium-sized companies, and virtually no impact on small companies. In addition, the largest impact occurs in 'c' areas and much less in 'a' areas. Finally, we observe that the negative impact on total investment is strongest within 'c' areas that worsened their attractiveness, and this is particularly true for large enterprises.

Our analysis has some drawbacks. First, the quality of the econometric analysis depends on the quality of the data. So far, we have focused on data aggregated at the NUTS 3 regional level. Potentially, these data could also be disaggregated at the in industry-region level. The main disadvantage of this approach is that the investment series become very volatile since there are often few firms active in a given region and sector. This problem becomes even more prevalent once we look at the differential behaviour of large, medium, and small firms. It implies that changes in one or two firms, which could be outliers, might influence the results.

Second, because of the major measurement issues with the data obtained from the Scoreboard Database, including the variable measuring the effective aid spent, we cannot draw meaningful conclusions based on this variable at this stage. Moreover, and more importantly, in most cases it is impossible to precisely allocate the aid to specific regions if the scheme is at the super-regional or national level. We have therefore searched for additional information on each and every State aid case contained in the Scoreboard Database and developed an allocation mechanism as was described in the Appendix 7. Clearly, the resulting aid variable is measured with errors.

Third, the effects of the financial crisis on regional development can be a strong confounding factor in the econometric analysis (Friederiszick, T. 2017). We introduced NUTS 2 region-specific time trends to (partially) account for this issue.

Further issues remain beyond of the scope of this Study. Spillovers within and across regions is quite likely to be important but difficult to handle econometrically. [112] To some extent, the choice of focusing on aggregate regional investment can help us capturing within-region spillovers. Indeed, we estimate how the change in the general State aid rules affects overall incentives to invest in the region. This might be directly through effectively allocated aid or indirectly though the fact that the aid-supported investment spurred additional investment (what we would call within-region spillovers). Instead, it is more difficult to assess across-regions spillovers. On the one hand, one could use a model with spatial lags in the dependent variable to assess how investment in neighbouring regions affected investment in the focal region. These models with spatial lags are however very cumbersome to be estimated. Moreover, such models can still not directly assess how the

[112] Spillover effects or local agglomeration effects might be important as discussed in Ramboll and Martix. (2012). *Ex post* Evaluation of Regional Aid Guidelines 2007-2013, Final report on behalf of the European Commission.

change in aid intensities and eligibility criteria of neighbouring regions affect investment in the focal region.

The analysis could also be expanded to study longer-term effects. One simple approach would be to consider an autoregressive model for investment, including the lagged dependent variable. However, this comes at the cost of using much less robust estimation methods like the system GMM estimator for dynamic panel data proposed by Arellano and Bover (1995) and is hence not preferable (Arellano and Bover 1995).

A10.5 Effect of the restriction on the eligibility of projects imposed on aid to LEs in `c' areas

A10.5.1 Datasets

Eligibility and aid intensities data. Assessing the effects of restrictions on the eligibility of projects imposed on aid granted to LEs in 'c' areas involves exploiting information on 'c' regions that *did not* face a change in the maximum aid intensities. This is necessary to exclude the potential confounding effect of this additional policy change. The evolution of investment in these regions is then compared to the evolution of investment in similar non-assisted regions. The letter are selected through a matching procedure to be those regions that are as similar as possible to the treated 'c' regions along a list of observable characteristics. The necessary information at a NUTS 3 level is provided by the Commission.

The numbers of regions used in the final estimation are summarized in Table 35.

Variables used for propensity score matching. Our empirical strategy relies on the choice of non-assisted areas that had *ex ante* the same attractiveness for regional investments in terms of observable characteristics as those assigned as 'c' areas and which have seen no change in maximum aid intensities between the RAF 2007 and the RAF 2014.

Variables used in this procedure include rate growth-trends and levels at the NUTS 3 regional level provided by Eurostat: employment rate, GDP in PPS per capita, as well as labour productivity in terms of GDP in PPS per-worker. In particular, we focus on average values of these variables in the period 2008-2009, that is the two last periods prior to the time period of our analysis.

Summary statistics of the variables used in the propensity score matching procedure are summarized in Table 36.

Amadeus dataset. For what concerns investment, as discussed in Section A10.4.1, we exploit data at the disaggregated NUTS 3 level from the Bureau van Dijk's Amadeus database. The key variable of interest in the econometric analysis is total regional investment undertaken by large firms in a region expressed as a percentage of the region's GDP. In addition, we complement this by total regional investment undertaken by small and medium enterprises. Table 33 provides summary statistics on investment for the sample of NUTS 3 regions used in the econometrics analysis.

Table 33: Summary statistics on total investment to GDP in percentages per NUTS 3 region for the years 2011-2016

Variables	Type of area	N of NUTS3 regions	Mean	Std. Dev.	Min.	Max.
Total investment - large firms						
2011-2013	Control non-assisted areas	37	4.98	13.25	-7.15	85.49
2014-2016	Control non-assisted areas	37	7.70	15.97	-20.34	83.22
2011-2013	Treated c areas	41	2.19	7.36	-24.38	54.92
2014-2016	Treated c areas	41	3.90	10.61	-14.20	65.12
Total investment - small and medium firms						
2011-2013	Control non-assisted areas	37	1.17	1.88	-4.25	9.83
2014-2016	Control non-assisted areas	37	0.78	3.79	-14.45	15.49
2011-2013	Treated c areas	41	1.59	3.45	-19.09	12.45
2014-2016	Treated c areas	41	1.09	4.78	-28.42	26.98

Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).
Note: (i) We exclude from the analysis, the smallest and largest 1% of the observations.

Regional development. As an additional step, assessing the impact of the restrictions on regional development, we complement our data with information on gross value added (GVA) provided at the fine NUTS 3 level of aggregation by Eurostat. Table 34 provides summary statistics on regional GVA expressed in million euros, distinguishing between treated 'c' areas which have seen no change in aid intensity to control comparable non-assisted regions.

Table 34: Summary statistics on GVA (in million EUR) per NUTS 3 region for the years 2011-2016

Variables	Type of area	N of NUTS3 regions	Mean	Std. Dev.	Min.	Max.
Gross value added						
2011-2013	Control non-assisted areas	37	9,479.68	9,122.95	768.70	51,581.00
2014-2016	Control non-assisted areas	37	10,254.09	9,860.41	806.40	57,819.00
2011-2013	Treated c areas	41	9,919.73	7,742.91	1,170.45	33,268.79
2014-2016	Treated c areas	41	10,308.74	7,825.14	1,218.78	31,738.41

Source: Own analysis based on Eurostat and regional aid maps (2007-2013/2014-2020).

A10.5.2 Empirical model and identification strategy

We adopt a difference-in-differences methodology to reach a clear identification of the casual effects other restrictions on aid to LE's in 'c' areas (eligibility of projects) introduced in the RAF 2014 on levels of investment and regional development. This is similar to the empirical strategy pursued in Section A10.4.2, however in this case the treatment and control group are differently defined. We compare 'c' areas that did not face a change in maximum aid intensities to non-eligible areas. Thus, those areas that were the control regions in the previous analysis are now the 'treated' ones. The main variable of interest is total regional investment as a percentage of GDP. The following regression is estimated:

$$y_{jt} = \alpha_1 + \beta_1 \times post_t + \gamma_1 \times \text{Treat}_{jt} \times post_t + \eta_{1j} + \eta_{1jt} + \varepsilon_{1jt}, \quad (3)$$

where the regional outcomes (y_{jt}) — investment to GDP — in region j in time t is explained by NUTS 3 fixed-effects (η_{1j}), as well as NUTS 2-specific time trends (η_{1jt}), which should capture important drivers of investment decisions. The error term ε_{1jt} is assumed to be correlated within NUTS 3 regions to account for heteroscedasticity and autocorrelation, thus standard errors are clustered at that level.

The key variables for our analysis are 'post' and 'Treat'. The coefficient 'post' measures the evolution of investment in regions assigned as non-assisted under both RAF periods. This represents the counterfactual development for the 'c' regions, had changes in restrictions regarding eligibility of projects not happened. The variable 'Treat' is a dummy indicating 'c' regions with no changes in maximum aid intensities between the RAF 2007 and the RAF 2014. This variable represents a so-called 'treatment'.

The choice of the control group is key. Our challenge is to identify those areas which were assigned as non-assisted, but that had *ex ante* the same attractiveness for regional investments of those assigned as 'c' areas. In this way, the areas that were non eligible for aid provide the counterfactual outcome for how treated 'c' areas would have otherwise performed.

As the allocation of the aid was not a random treatment, we perform a preliminary step designed to eliminate selection bias due to observable characteristics in our sample of regions by identifying appropriate treated and control groups through a propensity score matching procedure. We look for regions among the non-assisted that are as similar as

possible to the treated ones. We define the 'control' areas by focusing on a subset of regions that we pre-select via a matching procedure. This approach tries to mimic randomness in the treatment in the sense that it generates a control group that is as similar as possible to the treated group along several observable dimensions but at the same time is not exposed to the policy reform.

We perform a nearest-neighbour propensity score matching procedure with replacement to select non-assisted areas. We perform a logit regression to define the variable 'propensity score' on which we match each treated 'c' area with a control non-assisted areas with a similar score. In our matching procedure, we include rate growth-trends and levels at the NUTS 3 regional level: employment rate, GDP in PPS per capita, as well as labour productivity in terms of GDP in PPS per-worker. The matching is performed on the basis on average values of variables in the period 2009-2010, that is the two last periods prior to the time period of our analysis. By choosing a period well before the treatment, we are more confident of including only variables that are unaffected by the treatment and, thus, avoid spurious correlation.

Table 35 reports the number of NUTS 3 areas in the control and treatment by country used in out econometrics approach.

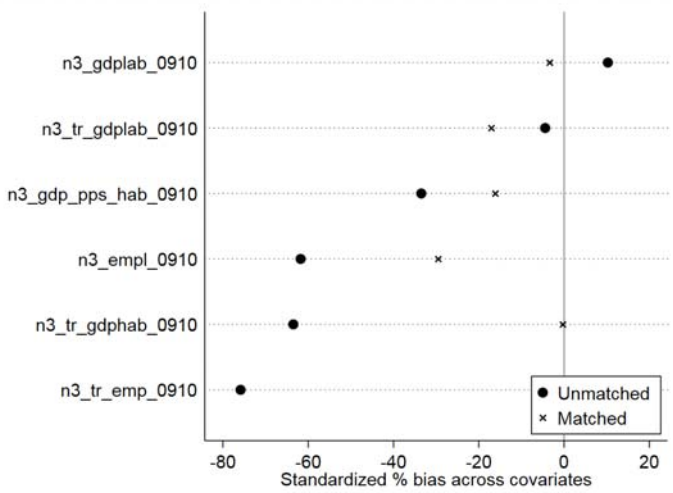
Table 35: Number of treated and control NUTS 3 areas by country

Country	Treatment	Control
Netherlands	1	4
Germany	2	9
Spain	2	
Belgium	3	3
Sweden	6	2
France	6	1
Finland	6	
Italy	7	10
United Kingdom	8	8
Total	41	37

Source: Own analysis based on Eurostat and regional aid maps (2007-2013/2014-2020).

The quality of the match is represented in Figure 90 and Table 36. In Figure 90, the bold dots denote the difference in the value of the variables between matched and control regions before the matching. The crosses represent the differences among treated and non-treated areas after the matching. The figure clearly shows that the sample obtained with the matching procedure is such that treated and non-treated areas are much more similar than the full sample before matching. This is confirmed by Table 36, where we observe that the matching procedure lead to a significant reduction of the bias along all observable dimensions.

Figure 90: Similarity among treated and control areas before and after the matching



Source: Own analysis based on Eurostat and regional aid maps (2007-2013/2014-2020).

Table 36: Similarity among treated and control areas before and after the matching

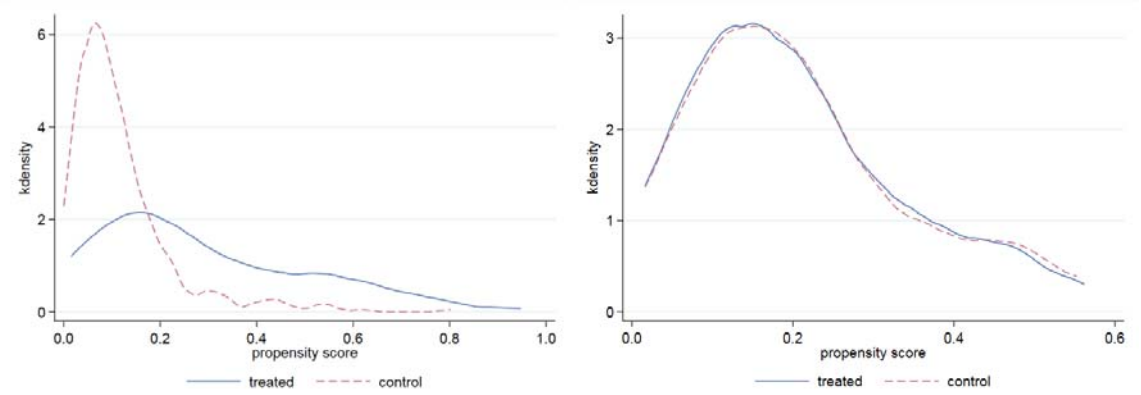
Variable	Unmatched / Matched	Mean Treated	Mean Control	%bias	%reduct |bias|	t-test t	t-test p>|t|	V(T)/ V(C)
n3_tr_gdphab_0910	U	.97949	.9967	-63.5		-4.42	0.000	0.76
	M	.98338	.98346	-0.3	99.5	-0.02	0.985	1.74
n3_gdp_pps_hab_0910	U	27035	30736	-33.5		-2.09	0.037	0.32*
	M	27237	29022	-16.1	51.8	-1.11	0.271	1.13
n3_tr_emp_0910	U	.9855	.99918	-75.9		-7.31	0.000	3.84*
	M	.99224	.9914	4.7	93.8	0.31	0.755	1.63
n3_empl_0910	U	.64672	.76963	-61.8		-4.24	0.000	0.69
	M	.67261	.73135	-29.5	52.2	-1.81	0.073	1.28
n3_tr_gdplab_0910	U	.99717	.99823	-4.4		-0.33	0.744	1.05
	M	.99367	.99773	-17.1	-284.6	-1.11	0.269	2.68*
n3_gdplab_0910	U	59.878	58.811	10.3		0.77	0.443	1.13
	M	59.36	59.711	-3.4	67.1	-0.19	0.852	2.14*

* if variance ratio outside [0.60; 1.66] for U and [0.57; 1.76] for M

Source: Own analysis based on Eurostat and regional aid maps (2007-2013/2014-2020).

Figure 91 then reports the estimated propensity scores for treatment and control before and after treatment, distinguishing between the treated (blue line) and control areas (red line). Following the matching procedure all (treated and non-treated) regions appear to have the same attractiveness for regional investments.

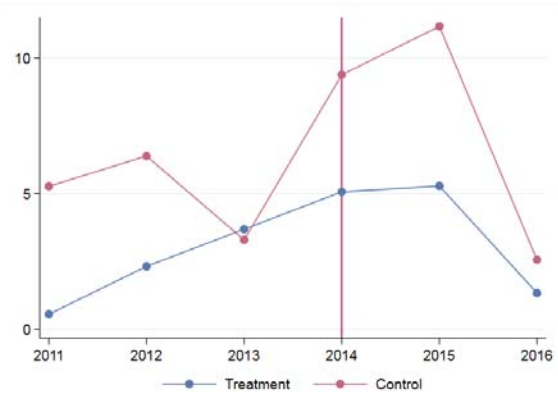
Figure 91 : Kernel density of propensity scores for treatment before (left figure) and after (right figure) the matching



Source: Own analysis based on Eurostat and regional aid maps (2007-2013/2014-2020).

Finally, Figure 92 and Figure 93 verify the existence of a common trend for investment to GDP and GVA respectively. Figure 92 shows the evolution of mean investment to GDP for the years 2011-2016. The figure suggests that trends were similar in 2011 and 2012 but control regions observed a sharp reduction of investment to GDP in 2013, while treatment regions did not. This drop seems to be driven by investment rather than changes in GDP. We will get back to this point when discussing our results.

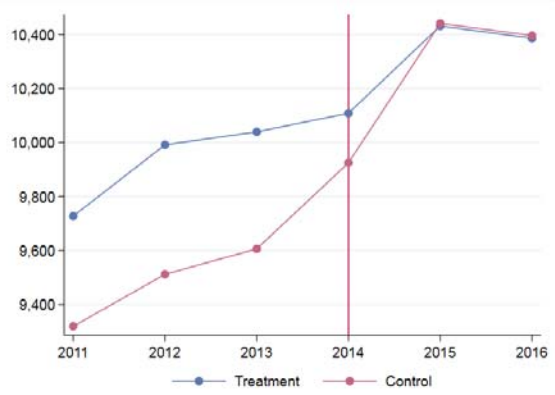
Figure 92: Evolution of investment to GDP in percentages per NUTS 3 region for the years 2011-2016



Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).

Trends for GVA are quite similar in the treatment and control groups prior to the RAF 2014 reform as shown in Figure 93. Therefore, we are confident that our matching produced a reasonable counterfactual case to perform a clean difference-differences analysis.

Figure 93: Evolution of GVA in million euros per NUTS 3 region for the years 2011-2016



Source: Own analysis based on Eurostat and regional aid maps (2007-2013/2014-2020).

A10.5.3 Results

Table 37 reports our main results on the effect of restrictions on aid to LE's in 'c' areas regarding eligibility of projects on levels of investment. We report separately results for large firms and compare these to results on small and medium firms.

The first two columns show our main results based on a sample including all years in the analysis. Investment in non-assisted control areas increased by 8.8 percentage points, whereas we find a negative and significant effect in areas facing a worsening of the eligibility conditions on large enterprises, by approximately 6 percentage points as compared to the control group. Yet, this decrease is not enough to offset the general trend in investment observed in the counterfactual scenario measured by the control group. Thus the overall effect in treated area, *i.e.* the sum of the two coefficients, is positive and approximatively equal to 2.2 percentage points Interestingly, this effect is almost identical to the effect that we measured for the same areas by means of the previous econometric strategy and reported in Table 29. This is very reassuring. Indeed, we can now more convincingly claim that 'c' areas that did not face changes in the maximum aid intensities observed an increase in investment by large firms, but this would have been even larger had the RAG 2014 not imposed additional restrictions on them in 'c' areas.

As reported in the second column, the effect on investment by small and medium firms is also increasing in control areas, but it is not significantly different in treatment regions. This implies that small and medium enterprises in 'c' areas are not affected by the worsening of the eligibility conditions on large enterprises, as one would expect. Thus, this additional result reinforces our claim to be able to correctly identify the effect of other restrictions on aid to LE's in 'c' areas Also in the case of medium and small firms, the results reported in Table 37 mimic those obtained by means of the previous analysis: the sum of the coefficients is approximatively 1.5 percentage point, which is very close to the estimates for the control group reported in Table 29.

As we discussed above, while treated and control areas seem to have parallel trends for 2011 and 2012, in 2013 we observed a sharp drop in investment in control areas, which goes up again in 2014. Therefore, as a robustness checks, we drop the years 2013 and 2014 from the sample. This clearly comes at a cost of substantially limiting the number of observations in our estimation implying a loss of predictive power. The two last columns of Table 37 present our results. While the effects of the restrictions on investment made by large enterprises is no longer significant, it remains similar in size. Although being much larger than in the previous estimates, the confidence interval is very much skewed to the right indicating that the effect is largely negative.

Table 37: Regressions on investment to GDP (in %) at the NUTS 3 level, distinguishing between large and medium and small enterprises – propensity score matching

	All years		Excl. 2013-2014	
	Size L	Size S&M	Size L	Size S&M
post	8.80***	2.12***	14.9*	4.22**
	[3.56,14.0]	[0.80,3.45]	[-1.06,30.9]	[1.00,7.44]
post × *Treat*	-6.00**	-0.61	-5.83	0.36
	[-11.9,-0.055]	[-2.73,1.50]	[-16.0,4.36]	[-2.00,2.72]
Fixed effects	yes	yes	yes	yes
Clustered SE	yes	yes	yes	yes
NUTS2 trends	yes	yes	yes	yes
Observations	468	468	312	312

95% confidence intervals in brackets

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).

Finally, Table 38 reports our additional findings on the effect of restrictions on aid to LE's in 'c' areas regarding eligibility of projects on regional development, as measured by GVA. Our result suggests that the restrictions result in a reduction in regional development of 2% as compared to the control areas.

Table 38: Regressions on GVA (in log) at the NUTS 3 level – propensity score matching

	ln(GVA)
post	0.022***
	[0.0090,0.035]
post × *Treat*	-0.020**
	[-0.039,-0.00044]
Fixed effects	yes
Clustered SE	yes
NUTS2 trends	yes
Observations	468

95% confidence intervals in brackets

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Own analysis based on Amadeus, Eurostat and regional aid maps (2007-2013/2014-2020).

A10.5.4 Conclusion and further issues

This additional analysis helps us to give the overall picture of the effect of the introduction of the RAG 2014. After 2014, investment has significantly increased in non-eligible areas, has to a lesser extent increased in 'c' areas where the maximum aid intensities have not worsened, while it has not increased in 'c' areas facing a worsening of the aid ceilings as well as in 'a' areas. These results are exclusively driven by large firms, and are causally due to the changes imposed by the RAG 2014.

We adopted two different identification strategies to causally interpret our results. We defined three groups of areas: (i) areas that were non-eligible before and after 2014, (ii)

'a' and 'c' areas where the maximum aid intensities have not worsened after 2014, and (iii) 'a' and 'c' areas where this was the case. Since in all 'c' areas the conditions for large enterprises have worsened, comparing areas from (i) to 'c' areas from (ii) help causally identify the effect of the restrictions to LEs. An internal comparison between 'c' areas as well between 'a' areas, instead, allows us to identify the effect of the reduction in the maximum aid ceilings.

Our identification is careful to control for observables. Not only do we control for several regional characteristics as well as fixed-effects and trends, but we also compare regions that are similar among each other. In the first identification strategy this is achieved by comparing 'c' areas among each other and 'a' areas among each other. In the second identification we instead use a matching procedure to reduce potential selection bias.

All chosen methodologies and identification strategies have each positive points and drawbacks. However, the convergence of results across specifications and the adherence of the results to *a priori* set expectations give us confidence of the causal nature of our findings.

Some caveats remain. First, especially the second identification strategy is based on a small number of regions, partially due to the difficulty of finding good matches based on a reasonable number of observable characteristics. We applied several specifications for our matching procedure that invariably lead to qualitatively similar results to those reported. Nevertheless, the precise point estimates have to be taken with caution.

Second, the evaluation exercise is mostly based on three years of data after the introduction of the RAG 2014. Data for the last year in our sample (2016) is probably also of lower quality than for the years before. To increase the confidence in our results, the same exercise should be done with one or two additional years of data. This would also be a possibly better time frame to more precisely assess the effect of a major change in regulation. However, one has also be careful not to extend the analysis to a too large time period, because it might become more difficult to assess the causal nature of the nexus between policy changes and investment as other confounders could then play a more important role.

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