

An Empirical Analysis of the European Commission's Approved State Aid Decisions with a Focus on Competition Policy

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Abstract

This paper provides an analysis of the European Commission (EC) decisions on state aid control using data on 376 state aid cases approved by the EC between 1998 and 2009, and for which the DG Competition was the competent body for the application of state aid rules. More specifically, we investigate if there has been a change in the intensity of state aid cases (the share of state aid finance in the total cost of a project) following the implementation of the State Aid Action Plan (SAAP), of which main element is “less and better targeted state aid”. We further examine if the intensity of the state aid cases that have been subject of a key priority delineated in the SAAP has changed during the Action Plan. Our results suggest that aid intensity of a given state aid case has increased by about 10 % on average following the implementation of the SAAP. However, a significant portion of this increase in aid intensity can be attributed to the increases in the intensities of aid on which the EC puts a strong emphasis.

Key Words: European competition policy, state aid, regression analysis

JEL code: L49, L59, K21

1. Introduction

Governments tend to give financial support to companies in numerous ways owing to their incentives to shift a larger share of rents to be earned in the market to their sides. Generally, this form of financial aid has the impact of distorting competition in the internal market. The purpose of European state aid control is to enable European member states to grant state aid to address real market failures while avoiding the distortions of competition that this type of state intervention might give rise to.

Since distortion of competition is a major concern in state aid control, it has also been seen as a subfield in antitrust economics. Even though there has been vivacity in this “virgin” field of antitrust economics recently, which can be seen from the fact that one chapter has been devoted to European State Aid Control in the Handbook of Antitrust Economics, limited interest was shown in the economic analysis of state aid control by scholars. Even more

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[♦] The authors would like to thank Prof. Leigh Hancher for her helpful suggestions, and participants at CRESSE 2011 Conference on “Advances in the Analysis of Competition Policy and Regulation”.

desperate than the limited interest, most of the extant analysis about the practice of European state aid control is model- and econometric analysis-free and could not go beyond suggesting some principles based on vague and immeasurable definitions. As witnessed by Martin and Valbonesi (2006), formal treatments are scanty. According to Spector (2006) this is partly due to the lack of interest for this field in the United States, where there is no control for state aid.

The economic analysis of state aid control can best be performed in a counterfactual framework. Ideally, we would like to compare the prices, number of firms, competition level, profits and so on that prevailed with what would have occurred absent the state aid. However, in practice, measuring the counterfactual is an extremely difficult task. First of all, in order to perform this kind of rigorous counterfactual analysis we need very detailed and specific information for cases of aid. Secondly and more importantly, it is hard to establish that there are no systematic differences between aid-receiving and non-aid-receiving industries/firms in the absence of a natural or quasi-natural experiment. Consecutively, it is almost impossible to obtain an unbiased measure of the state aid's impact.

The lack of interest in the other side of the Atlantic Ocean and the absence of (quasi-)natural experiments led European theoretical economists to dominate this relatively unpopular strand of the economic literature. The early theoretical literature on the potential impact of state aid has centred more on competition between member countries to grant state aid instead of considering the competitive effects of state aid within an integrated market. Beginning with Collie (2000), these theoretical papers (Collie, 2002; Collie, 2005) ask the question of whether the prohibition of state aid increases overall welfare. Contrary to these early papers, which are built upon models that are akin to models in the strategic trade, tax competition and rent-seeking literature, Martin and Valbonesi (2006, 2008) focus on the idea that the incentive to provide state aid is endogenously determined by the process of market integration. That is, they consider the idea that the process of market integration itself creates pressure for granting state aid, since market integration may result in exit by firms absent state aid.

Elsewhere, different from the models of Collie, and Martin and Valbonesi that try to come up with pure economic explanations to the incentives of governments to give state aid, Møllgaard (2005) focuses on how state aid distorts competition by conferring competitive advantages to firms receiving them. Furthermore, a more thorough analysis of the distortions of competition induced by state aid is performed by Garcia and Neven (2005). Finally, a formal treatment of

rescue and restructuring subsidies, which are types of state aid relevant to the economics of competition, is proposed by Glowicka (2008).

On the other hand, the scarcity of data and the absence of the conditions that enable empirical researchers to identify the impact of state aid led applied economists to focus on different aspects of state aid control policy. In an attempt to measure the effectiveness of aid in Europe, some empirical studies (Chindooroy et al., 2007; Glowicka, 2008) study the survival of companies that have been granted rescue or restructuring aid in the EU, whereas some other (Friederiszick et al., 2003) consider the effectiveness of state aid in boosting efficiency at the sector level. Finally, parallel to the literature focusing on the analysis of competition authorities' decisions, a recent paper by Buts et al. (2010) examine the determinants of the European Commission's state aid decisions and whether they are in line with the goals of the State Aid Action Plan (SAAP).

In this paper, parallel to the work of Buts et al. (2010), we provide an alternative analysis of the European Commission (EC) decisions on state aid control. More specifically, we investigate if there has been a change in the aid intensity - the state-aid financed part of a project- following SAAP, of which main element is "less and better targeted state aid". We further examine if the intensity of the state aid cases that have been subject of a key priority delineated in the SAAP is changed following the implementation of the Action Plan. In doing so, we restrict ourselves to state aid cases that were approved by the EC over the period 1998-2009 and for which the DG Competition was the competent body for the application of state aid rules to ensure that cases are related to competition policy.

Our results suggest that there is strong evidence that aid intensity of approved cases has increased (by about 10 % on average) following the implementation of the State Aid Action Plan. Nevertheless, our results also indicate that a significant portion of this increase in aid intensity can be ascribed to the increases in the intensities of aid on which the EC puts a strong emphasis.

The remainder of this paper is organized as follows: The following section presents the legal and institutional framework about state aid control in Europe. In Section 3, we describe the data used in this study, present the estimation strategy and introduce various specifications. In

Section 4, we report the estimation results. Finally, we discuss the findings and conclude in Section 5.

2. The Legal and Institutional Framework for State Aid Control in the European Union

State aid control is crucial to assure a level playing field for European firms and to prevent European governments from involving in lavish subsidy races for which the taxpayers would have to bear the expenses. Article 107 (ex Article 87 of TEC) of the Treaty on the functioning of the European Union (TFEU) regulates the main principles concerning state aid. More specifically, Article 107(1) puts that state aid is, in essence, incompatible with the common market¹. However, this incompatibility principle does not mean an absolute prohibition of state aid as such. Articles 107(2) TFEU and 107(3) TFEU of the Treaty stipulate several cases where state aid can be deemed permissible. Particularly, for the majority of approved state aid cases, the most pertinent clauses are 107(3)(a)² and 107(3)(c)³ of the Treaty. The European Commission is given the authority to control these cases under Article 108⁴ of the Treaty. State aid rules are only applicable to measures fulfilling the criteria outlined in Article 107(1) TFEU, which are:

- **Transfer of state resources:** State aid rules concern only measures engaging in a transfer of state resources (e.g., aid by national or local authorities). Nevertheless, it does not necessarily have to be the case that aid is granted by the State itself. It might also be given by a private or public intermediary delegated by the State.
- **Economic advantage:** The aid should provide an economic advantage to the recipient that would not have had under regular conditions.
- **Selectivity:** State aid must be selective and therefore it impacts the balance between recipient firms and their rivals.

¹ “Save as otherwise provided in this Treaty, any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, insofar as it affects trade between Member States, be incompatible with the common market.”

² “aid to promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment;”

³ “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;”

⁴ “The Commission shall, in cooperation with Member States, keep under constant review all systems of aid existing in those States. It shall propose to the latter any appropriate measures required by the progressive development or by the functioning of the common market.”

- **Impact on competition and trade:** Aid must have the potential to affect competition and trade between Member States.

Several competent bodies are responsible for the application of state aid rules for various sectors. For instance, for the aid granted in the sectors related to the production and marketing of agricultural and fisheries products, the state aid units of the DG Agriculture and Rural Development and the DG Maritime Affairs and Fisheries are responsible. For state aid to transport sectors, the state aid unit of DG Energy and Transport is the competent body. Likewise, DG Energy and Transport is also competent for the application of state aid rules to the coal sector. Finally, aside from the DG Agriculture and Rural Development, DG Maritime Affairs and Fisheries and DG Energy and Transport, DG Competition is competent for aid measures in all remaining sectors.

The regulation of state aid rests on a system of *ex ante* authorization. According to this system, member countries have to notify the Commission of any plan to grant state aid and this aid is not put into effect before it has been approved by the Commission, which has the authority under Article 108 of the Treaty. Save the proposed aid falls under the scope of the General Block Exemption Regulation⁵ (GBER) or the *de minimis* Regulation⁶, states cannot grant any aid unless they have notified and have been allowed by the Commission. Any state aid, which is conferred absent the Commission consent, is accordingly put down as “unlawful aid”.

Recently, in order to overcome the challenges brought about by the enlargement in 2004 and the increasing complexity, and to utilise state aid rules to induce member states to contribute to the Lisbon Strategy, the EC implemented its State Aid Action Plan⁷ (SAAP) during the period 2005–2009. The aim of the SAAP was to present a reform package emphasizing (i) less and better targeted state aid, (ii) a more refined economic approach, (iii) more effective and transparent procedures, and, (iv) improved cooperation between the EC and member states. In addition, the SAAP delineated eight key priorities: (a) targeting innovation and R&D to strengthen the knowledge society, (b) creating a better business climate and stimulating entrepreneurship, (c) investing in human capital, (d) high quality services of

⁵ Commission Regulation (EC) No 800/2008 of 6 August 2008, Official Journal of European Union, L 214:3–47.

⁶ Commission Regulation (EC) No 1998/2006 of 15 December 2006, Official Journal of the European Union, L 379: 5–10.

⁷ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2005:0107:FIN:EN:PDF>

general economic interest, (e) better prioritization through simplification and consolidation, (f) a focused regional aid policy, (g) encouraging an environmentally sustainable future, and (h) setting up modern transport, energy and information and communication technology infrastructures.

Having described the legal and institutional framework, we explain the data used in our study and present the estimation strategy in the next section. For a more detailed description of the legal framework, one can refer to Vademecum⁸ on state aid rules.

3. Empirical Analysis of the Aid Intensities: Data and Empirical Strategy

Data Sources

The relevant data for this study has been extracted from the competition cases database of the EC. Besides, for further details for each case, we have looked at the Official Journal of the European Communities. The sample of state aid cases considered in this study includes regional aid together with the following horizontal aid schemes: training, innovation, employment, energy saving, research and development, SMEs (small- and medium size enterprises), environmental protection, services of general economic interest, and other aid. These state aid cases were approved by the EC over the period 1998-2009. Note that for these cases DG Competition was the competent body for the application of state aid rules. Therefore, state aid cases for which DG Agriculture and Rural Development, DG Maritime Affairs and Fisheries and DG Energy and Transport were the competent bodies have been excluded from our analysis. This form of sample construction originates from our focus on competition policy. Moreover, one might ask whether the cases of state aid that are finalized with a negative decision (with or without recovery) should also be taken into account, as those cases might be systematically different from the EC approved aid, which leads to a sample selection problem. However, since a very low ratio of aid notifications results in a negative decision (only about 3 % in 2009 according to the Scoreboard on state aid⁹), and since we are interested in aid that is put into effect, we do not consider those cases of state aid that are settled with a negative decision.

⁸ http://ec.europa.eu/competition/state_aid/studies_reports/vademecum_on_rules_09_2008_en.pdf

⁹ http://ec.europa.eu/competition/state_aid/studies_reports/measures.html

Empirical Strategy and Variables

In the current study, the following specifications are employed to evaluate if the intensity of state aid cases and the intensity of the state aid cases that have been subject of a key priority delineated in the SAAP are changed following the Action Plan:

$$\begin{aligned} intensity_j = & \beta_0 + saap_j\beta_1 + ad_hoc_j\beta_2 + scheme_j\beta_3 + individual_j\beta_4 \\ & + direct_grant_j\beta_5 + manufacturing_j\beta_6 + eu_15_j\beta_7 + ln_duration_j\beta_8 \\ & + \varepsilon_j \end{aligned} \tag{1}$$

$$\begin{aligned} intensity_j = & \gamma_0 + saap_jXobjective_j\gamma_1 + ad_hoc_j\gamma_2 + scheme_j\gamma_3 + individual_j\gamma_4 \\ & + direct_grant_j\gamma_5 + manufacturing_j\gamma_6 + eu_15_j\gamma_7 + ln_duration_j\gamma_8 \\ & + \varepsilon_j \end{aligned} \tag{2}$$

where j denotes state aid case, ε and u are normally distributed unobserved error terms, and β and γ are regression coefficients to be estimated. The dependent variable is the aid intensity (*intensity*). This variable indicates what proportion of the cost of a project is financed by state aid. The aid intensity is also one of the most important ingredients of the so-called proportionality principle, which ensures that the duration, intensity and scope of the aid must be proportional to the importance of the desired outcome.

saap is a dummy variable indicating if aid was granted during the implementation of SAAP. In the second specification, we include interactions of this variable with various objectives to check if the intensity of state aid cases that have been subject of a key priority delineated in the SAAP has been higher during the Action Plan. In total, we cover 11 objectives based on the EC's own classification system used for the State aid register: regional, training, innovation, employment, energy saving, research and development, SMEs (small- and medium size enterprises), risk capital, environmental protection, services of general economic interest, and other aid. However, we regroup these objectives based on the key priorities laid down in the SAAP, and we interact these regrouped objectives with *saap* dummy. In total, we have five groups for objectives. (i) *entrepreneurship* consists of aid given to small- and medium size enterprises (SMEs) and aid in the form of risk capital. We think that this form of

aid can be considered under the key priority of the SAAP that puts emphasis on “creating a better business climate and stimulating entrepreneurship”. (ii) *energy & environment* includes energy saving aid and environmental protection aid, which are related to another key priority: “encouraging an environmentally sustainable future”. (iii) As a proxy for the priority of “targeting innovation and R&D to strengthen the knowledge society”, we regroup research and development and innovation aid under the variable *rd & innovation*. (iv) *human capital* contains employment aid and training aid, which are considered to be concerned with the key priority of “investing in human capital”. (v) *regional* stands for regional aid, which is an element of “a focused regional aid policy”.¹⁰

Elsewhere *ad hoc*, *scheme* and *individual* are categorical variables showing the case type for state aid. *scheme* is a category that involves cases where general aid schemes are authorized. An *individual* application of an aid scheme is aid that is conferred based on an already approved scheme for which individual notification was required. Finally, aid that is not conferred based on a permitted scheme is called *ad hoc*.

Furthermore, we employ the variable *direct grant* to control for the instrument via which aid is given. This dummy variable is equal to one if aid is conferred via a direct grant, and zero otherwise. There are many other instruments (soft loans, guarantees, tax allowances etc) utilised when granting aid; however, since this type of instrument is the most popular one by far (about 70 % of cases in our sample), we only incorporate this variable. To control for the fact that the attitude towards granting aid in various intensities might be different in those countries which joined the EU in the last enlargement wave, we include a dummy variable, *eu 15*, which is equal to 1 if aid was granted in one of those EU-15 countries. As to the industry information, *manufacturing* is an industry dummy indicating if aid recipient operates in manufacturing industry.¹¹

Finally, we have information about the duration of state aid cases (*ln_duration*). We have collected the beginning and end dates for each state aid case. None of these dates are censored. The length of the state aid cases are expressed in days. We have taken the natural logarithm of these values. We are well aware of the fact that this variable might be

¹⁰ We could also consider services of general economic interest aid. However, there are very few observations for this form of aid, and consequently, identification might be extremely weak.

¹¹ Including dummy variables for all countries and dummy variables for all industries where aid is given brings about identification problems, since we would be asking too much from the data at hand.

endogenous with respect to the aid intensity; however, it is not a variable of interest in our current setup, and we are just including this variable as a control variable.

The list of variables are summarised and displayed in Table 1.

Table 1: Variables and Definitions

Dependent Variable	
intensity	part of project that is funded by state aid (in percentages)
State Aid Action Plan Dummy	
saap	1 = aid is granted during the implementation of SAAP
Primary Objective Dummies	
entrepreneurship	1 = aid given to small- and medium size enterprises (SMEs) or aid in the form of risk capital
energy & environment	1 = energy saving aid or environmental protection aid
rd & innovation	1 = research and development or innovation aid
human capital	1 = employment aid and training aid
regional	1 = regional aid
Case Type Dummies	
scheme	1 = authorized general aid schemes
individual	1 = aid that is conferred based on an already approved scheme for which individual notification was required
ad hoc	1 = aid that is not conferred based on a permitted scheme
Instrument Dummy	
direct grant	1 = aid is conferred via a direct grant
Country Dummy	
eu15	1 = aid is given in one of those EU15 countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom)
Industry Dummy	
manufacturing	1 = aid is given to the industry of manufacturing
Duration of State Aid Cases	
ln_duration	log of duration of state aid in days

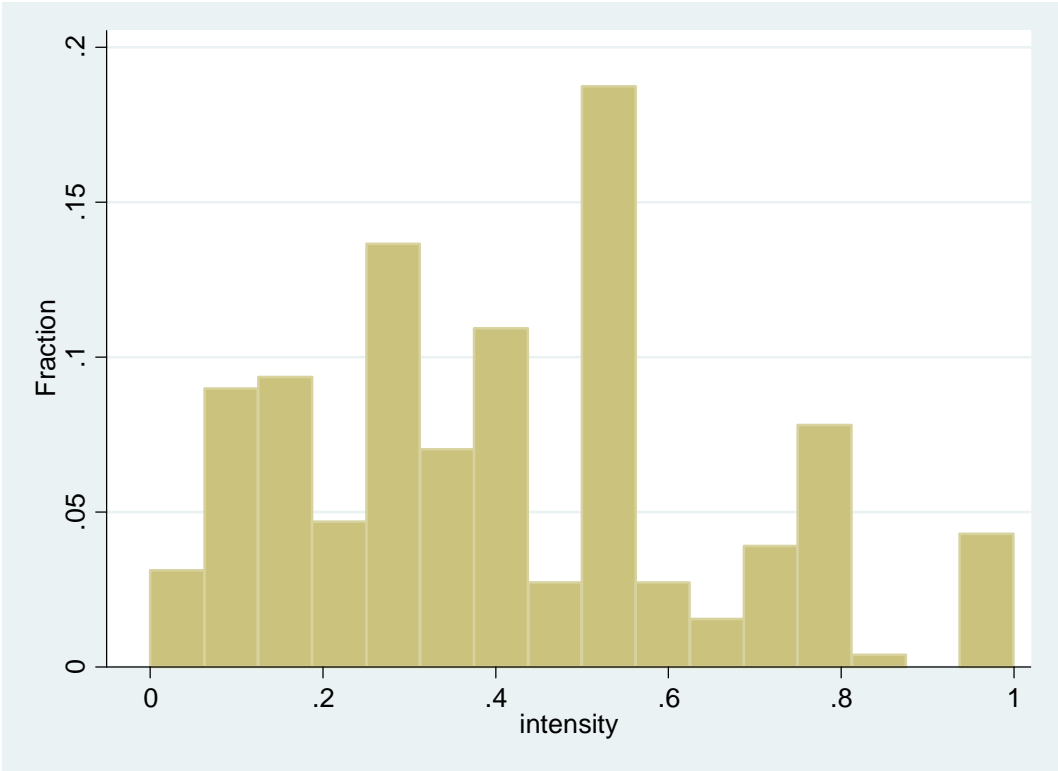
Sample Statistics

Table 2 displays summary statistics for all state aid cases in the sample during pre- and post-State Aid Action Plan period. In total, we have 376 observations. However, due to missing observations this number drops to 251 in the final econometric analysis. According to Table 2, it seems that a great majority of cases (around 60 %) were granted under authorized general aid schemes. Furthermore, most of the countries in which aid is granted (about 83 %) are EU-15 countries. As to objectives, regional aid dominates our sample: 42 % of the cases involve regional aid. The summations of the means of objective dummies do not necessarily add up to

100 %, since some cases have multiple objectives to achieve. Indeed, that is why we do not consider all objective dummies in the same specification simultaneously.

Even though not shown in Table 2, the median length of state aid cases is around 4.29 years. Besides, the mean aid intensity is around % 41. Finally, the distribution of *intensity* is depicted in Figure 1.

Figure 1: Histogram of the Intensity



Having presented the descriptive statistics on European state aid cases, we now turn to the econometric analysis of the intensity of state aid cases.

4. Estimation Results

This section displays results of the regressions with robust estimates of the variances. The results of the two different specifications that are introduced in the previous section are reported in Table 3 and Table 4. The first specification includes *saap* to check if the aid intensity of approved cases changes following the implementation of the Action Plan. The second specification includes interaction terms: We interact the regrouped

Table 2: Sample Statistics

	Before State Aid Action Plan					During State Aid Action Plan					All				
	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
intensity	71	0.332	0.184	0	1	185	0.436	0.254	0	1	256	0.407	0.241	0	1
entrepreneurship	90	0.100	0.302	0	1	286	0.066	0.249	0	1	376	0.074	0.379	0	1
energy & environment	90	0.067	0.251	0	1	286	0.301	0.459	0	1	376	0.245	0.430	0	1
rd & innovation	90	0.311	0.466	0	1	286	0.217	0.413	0	1	376	0.239	0.427	0	1
human capital	90	0.078	0.269	0	1	286	0.136	0.344	0	1	376	0.122	0.328	0	1
regional	90	0.489	0.503	0	1	286	0.395	0.490	0	1	376	0.418	0.494	0	1
ad hoc	90	0.222	0.418	0	1	286	0.154	0.361	0	1	376	0.170	0.376	0	1
scheme	90	0.544	0.501	0	1	286	0.626	0.485	0	1	376	0.606	0.489	0	1
individual	90	0.233	0.425	0	1	286	0.220	0.415	0	1	376	0.223	0.417	0	1
direct grant	90	0.711	0.456	0	1	286	0.675	0.469	0	1	376	0.684	0.466	0	1
eu15	90	0.989	0.105	0	1	286	0.776	0.418	0	1	376	0.827	0.263	0	1
manufacturing	90	0.667	0.474	0	1	286	0.538	0.499	0	1	376	0.569	0.496	0	1
ln_duration	89	8.089	1.562	5.204	10.610	277	7.805	1.567	2.773	10.747	251	7.874	1.568	2.773	10.747

objective dummies with *saap* to check if the intensity of state aid cases that have been subject of a key priority delineated in the SAAP has changed during the Action Plan. For both specifications, we also estimate a Tobit regression, since the intensity variable is constrained in the sense that it lies between zero and one. However, as the coefficients, standard errors and significance levels hardly change, we do not report those.

Table 3: The Regression Analysis of the Intensity of State Aid Cases for the First Specification

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
constant	0.3322 *** (0.0218)	0.2230 *** (0.0269)	0.1732 *** (0.0410)	0.2131 *** (0.0543)	0.1461 ** (0.0660)	0.0926 (0.0993)
saap	0.1037 *** (0.0287)	0.0952 *** (0.0277)	0.0908 *** (0.0277)	0.0855 *** (0.0288)	0.0992 *** (0.0295)	0.1050 *** (0.0295)
ad hoc		0.0526 (0.0391)	0.0530 (0.0392)	0.0460 (0.0376)	0.0519 (0.0366)	0.0499 (0.0374)
scheme		0.1960 *** (0.0294)	0.2046 *** (0.0303)	0.1898 *** (0.0345)	0.1879 *** (0.0344)	0.1793 *** (0.0349)
direct grant			0.0622 * (0.0361)	0.0580 (0.0363)	0.0612 * (0.0365)	0.0528 (0.0372)
manufacturing				-0.0388 (0.0331)	-0.0439 (0.0331)	-0.0496 (0.0337)
eu15					0.0688 * (0.0390)	0.0727 * (0.0401)
ln_duration						0.0082 (0.0085)
Observations	256	256	256	256	256	251
R-Squared	0.04	0.17	0.18	0.19	0.20	0.20
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000

(a) *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level,

(b) t-statistics are based on robust standard errors in parentheses.

To begin with, the coefficient on *saap* is positive and highly statistically significant (at 1 % level) in all variants of the first specification: the aid intensity of a given state aid case has increased by about 10 % on average following the implementation of the SAAP. As to case type of state aid, we report that *scheme* enters highly statistically significantly (and 1 % significance level) to all regressions with a positive sign, implying that authorized general aid schemes have higher aid intensities on average (around 18 %) compared to an individual application of an aid scheme. On the other hand, the coefficient on *ad hoc* is positive and insignificant in all models. Elsewhere, the coefficient on the variable *direct grant* that proxies

the instrument type via which aid is given is positive and hardly statistically significant (at 10 % level in the third and fifth models).

Furthermore, we could not find any significant difference in aid intensities for those cases where aid is given to manufacturing industries: the coefficient on *manufacturing* is negative and statistically insignificant in the fourth, fifth and sixth model. The results also suggest that whether the origin country of aid is an EU-15 country slightly matters for the intensity of state aid cases: the coefficient on *eu 15* is positive and statistically significant at 10 % level in the fifth and sixth model. Finally, we find that there is a very weak and positive but statistically insignificant correlation between duration (*ln_duration*) and aid intensity.

Table 4: The Regression Analysis of the Intensity of State Aid Cases for the Second Specification

	Model 1	Model 2	Model 3	Model 4	Model 5
constant	0.2056 ** (0.1005)	0.1679 * (0.1015)	0.2694 *** (0.0957)	0.2475 ** (0.1003)	0.3130 *** (0.1032)
ad hoc	0.0405 (0.0382)	0.0456 (0.0377)	0.0373 (0.0366)	0.0362 (0.0373)	0.0221 (0.0378)
scheme	0.1806 *** (0.0352)	0.1698 *** (0.0348)	0.1695 *** (0.0330)	0.1671 *** (0.0353)	0.1630 *** (0.0348)
direct grant	0.0595 (0.0381)	0.0630 * (0.0375)	0.0451 (0.0369)	0.0612 (0.0376)	0.0649 * (0.0372)
manufacturing	-0.0585 * (0.0340)	-0.0464 (0.0354)	-0.0841 *** (0.0322)	-0.0478 (0.0342)	-0.0571 (0.0338)
eu15	0.0417 (0.0392)	0.0463 (0.0367)	0.0003 (0.0380)	0.0133 (0.0412)	-0.0168 (0.0418)
ln_duration	0.0069 (0.0088)	0.0085 (0.0087)	0.0021 (0.0084)	0.0063 (0.0087)	0.0054 (0.0084)
saapXentrepreneurship	-0.0088 (0.1021)				
saapXenergy		0.0740 * (0.0386)			
saapXrd			0.2116 *** (0.0343)		
saapXhuman				-0.1239 ** (0.0479)	
saapXregional					-0.1156 *** (0.0335)
Observations	251	251	251	251	251
R-Squared	0.16	0.18	0.28	0.19	0.20
Prob>F	0.000	0.000	0.000	0.000	0.000

(a) *: Significant at 10 % level, **: significant at 5 % level, ***: significant at 1 % level,

(b) t-statistics are based on robust standard errors in parentheses.

As can be seen from Table 3 and Table 4, in comparison to the first specification, there is hardly any change in the coefficients and significance levels of the control variables in the second specification (except *manufacturing* in the third model). As to the variables of interest, the coefficient on the interaction term *saapXentrepreneurship* in the first model is statistically insignificantly negative, implying that the impact of the interaction term is imprecise. Elsewhere the coefficients on the interaction terms *saapXhuman* and *saapXregional* are negative and statistically significant (at 5 % and 1 % levels, respectively): employment and training aid, and regional aid during the implementation of the SAAP has had 12 % lower intensity compared to state aid given for other purposes prior to the Action Plan. On the contrary, the intensities of energy saving and environmental protection aid, and research and development and innovation aid have increased 7 % and 21 %, respectively, relative to state aid given for other purposes previous to the SAAP, as the coefficients on the interaction terms *saapXenergy* and *saapXrd* enter to the third and fourth models in a statistically significantly positive way.

5. Conclusion

According to Heidhues and Nitsche (2006) it is obvious that EU state aid control has evolved over time. What once was originally intended to address concerns about export subsidies and strategic trade has now become Article 107 TFEU, which is the legal basis for state aid control in Europe. During the recent decade, the evolution has continued: the EC implemented its State Aid Action Plan (SAAP) during the period 2005–2009 in order to overcome the challenges brought about by the enlargement in 2004 and the increasing complexity, and to utilise state aid rules to induce member states to contribute to the Lisbon Strategy. The main elements incorporated in the SAAP were (i) less and better targeted state aid, (ii) a more refined economic approach, (iii) more effective and transparent procedures, and, (iv) improved cooperation between the EC and member states.

The most concrete and operationalisable research question regarding those main elements of the SAAP is whether and to what extent there has been less state aid. So as to answer this question, we have collected data on 376 state aid cases approved by the EC between 1998 and 2009, and for which the DG Competition was the competent body for the application of state aid rules. Having collected the data, we have employed aid intensity -the share of state aid

finance in the total cost of a project- as the dependent variable in our analysis to have a more accurate measure that contains information about the relative size of state aid. Then we have performed a regression analysis to see if there has been a change in the intensity of state aid cases following the implementation of the SAAP. In doing so, we have also used other characteristics of state aid cases as control variables. Furthermore, in order to abstain from identification problems, we have regrouped those characteristics as explained in the subsection of “Empirical Strategy and Variables”. According to our findings, contrary to the goal of “less aid”, there is strong evidence that aid intensity of approved cases has increased (by about 10 % on average) following the implementation of the State Aid Action Plan.

As a second research question, we have also examined if the intensity of the state aid cases that have been subject of a key priority delineated in the SAAP has changed during the Action Plan. To check this, we have included interactions of the SAAP dummy with regrouped objectives based on the key priorities laid down in the SAAP in the regression analysis. Our results suggest that during the implementation of the Action Plan there has been statistically significant increase in the intensities of energy saving and environmental protection aid, and research and development and innovation aid, which are strongly connected to two key priorities delineated in the SAAP: “encouraging an environmentally sustainable future” and “targeting innovation and R&D to strengthen the knowledge society”. On the other hand, employment and training aid, and regional aid during the implementation of the SAAP have had statistically significantly lower intensities compared to state aid given for other purposes prior to the Action Plan.

Overall, it can be concluded that the recent increase in aid intensities is not in line with the State Aid Action Plan, which envisages less aid. However, a significant portion of this increase in aid intensity can be ascribed to the increases in the intensities of aid on which the EC puts a strong emphasis.

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