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Ioannis Ganoulis and Reiner Martin *

State Aid Control in the European Union – Rationale, Stylised Facts and Determining Factors

The EC Treaty substantially reduces the freedom of EU Member States to provide direct economic assistance to enterprises. The main rationale for controlling the use of national state aid at the European level are the potentially negative repercussions of national subsidies on EU market integration. Expressed in per cent of GDP, overall state aid has indeed declined over the last 15 years and state aid to manufacturing, expressed as a percentage of value added, has also fallen. Furthermore, country-specific differences with regard to the use of state aid have been reduced. The econometric analysis conducted in this paper suggests that the increased need for fiscal discipline during most of the 1990s had a considerable impact on the reduction of manufacturing state aid. Were it not for this increased fiscal discipline, state aid to manufacturing might not have remained on a declining trend in the second half of the 1990s.

The EC Treaty substantially reduces the freedom of EU Member States to provide direct economic assistance to enterprises. These restrictions often attract a fair deal of public attention, especially if EU state aid control limits the ability of national governments to support prominent ailing companies such as recently a number of European airlines. The legal basis of EU state aid control is Art. 87(1) of the EC Treaty, which states that, "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."

There are a number of interesting points to note regarding this article. First, the Treaty clearly focuses on state aid that has potentially cross-border externalities in the EU via the trade link ("insofar as it affects trade between Member States") and that might distort competition. Second, despite the general prohibition principle for aid that might affect competition across borders, exceptions to this principle are possible ("Save as otherwise provided in this Treaty"). Third, it refers to all kinds of direct or

indirect government assistance, not just direct subsidies. Fourth, it distinguishes state aid from general policy measures that in principle affect all types of economic activity and all companies, e.g. the general taxation regime for companies ("favouring certain undertakings or the production of certain goods").

The general prohibition of aid to enterprises – exceptions notwithstanding – is in marked contrast to federal states such as the USA that do not normally have comparable controls over subsidies or other aid granted by their constituent parts. It is therefore important to ask why a supranational entity like the EU needs rules on state aid control. This question is explored below. We then consider a number of stylised facts on changes in the use of state aid in the EU during the period from 1986 to 1999. Finally, we look in more detail at some determinants and at the trend of state aid to manufacturing. We conclude that overall fiscal discipline has played an important role in limiting the use of state aid, particularly in the most recent period.

The Rationale for State Aid Control in the EU

The most commonly used argument in favour of government subsidies to private firms is the presence of market failures. There are a number of market failure arguments that justify the use of subsidies, most notably the existence of informational asymmetries and other market imperfections, as well as

* European Central Bank (ECB), Frankfurt am Main, Germany. The views expressed in this paper are those of the authors and do not necessarily reflect the position of the ECB. Helpful comments by A. van Riet, M. Bagella, M. Malgarini and G. Piga as well as secretarial assistance from S. Schleicher Baltrusch are gratefully acknowledged.

arguments on scale economies.¹ Market failures are likely to be more severe in some geographic areas such as peripheral regions and in certain sectors such as those more dependent on research and development. Thus, subsidies can be expected to vary across countries and sectors. Indeed, at times, subsidies may be considered a more efficient policy instrument than, for example, general taxation measures because they can be better targeted at the sources of market failures.

In recognition of the fact that subsidies may at times be granted for justifiable policy objectives, the EC Treaty explicitly mentions types of subsidies that are exempted from the general prohibition of state aid to enterprises.² Moreover, even within the legally acceptable types of subsidies, EU policy has tended to favour subsidies that could generically be linked to market failures, such as subsidies to research or to small and medium-sized enterprises. It has tended to look less favourably at subsidies targeting specific sectors or given on an ad hoc basis on the grounds that the objective of these types of aid has tended to be the protection of national industries rather than the correction of possible market failures.

The defence of government subsidies on the grounds of market failures can often be problematic in practice. Market failures can be notoriously difficult to identify. Their actual costs to social welfare are often unknown. Even the costs to the government and the benefits for the recipients of government subsidies are often difficult to determine. In a study prepared for the Joint Economic Committee of the US Congress; Break noted already in 1972 that "subsidy advocates have both a natural propensity and a remarkable ability to disguise the amounts of money involved in their programs" and Houthakker warned that, because of political inertia, such programmes tend to be preserved long after their initial justification has disappeared (if indeed there was one).³ In a world of imperfect information and of "government failures", the fact that subsidies can be better targeted to support specific activities may render them vulnerable to political pressure. Neven presented evidence in

support of the hypothesis that the distribution of national state aids in EU countries was affected by political economy considerations such as the type of government in power and the number of parties in the national parliament.⁴

Against this background, market failures can often appear to be a rather weak line of defence of government subsidies. Indeed there is a risk that generic references to market failures may just about justify any state aid programme. Arguably, however, the possible misuse of state aid at the national level is a matter for the citizens of the respective country, rather than for the EU institutions, to regulate. Were it just a question of waste of government funds, there would not be a rationale for EU state aid control. EU state aid control is more interested in the negative externalities of state aid on the economies of European trading partners.

State aid is often perceived as a "beggar-thy-neighbour" policy. Indeed, governmental subsidies are sometimes thought to be designed to protect rents and employment at home at the expense of economic activity abroad. In the tradition of strategic trade theory, for example, government backing for a private firm in an oligopolistic international market may be "strategically" used to dissuade foreign competitors from actively competing.⁵ It may also persuade private creditors to back firms that would not have otherwise survived.

Government support of this kind may not even involve direct subsidies. It may be just a promise of subsidies to cover potential losses. The impact of this kind of state aid will be particularly strong if predatory pricing is possible, i.e. if a short-run price undercutting from the supported company has long-term effects on market structure, for example, driving some competitors permanently out of the market. State aid in a competitive environment will tend, instead, to affect mainly the profits of the subsidised firms but less so the market conditions and the actions of foreign competitors.⁶

⁴ D. Neven: *The Political Economy of State Aids in the European Community: Some Econometric Evidence*, Discussion Paper No. 945, Centre for Economic Policy Research, London 1994.

⁵ For a critical overview see T. Besley and P. Seabright: *The Effects and Policy Implications of State Aids to Industry: An Economic Analysis*, in: *Economic Policy*, Vol. 28, 1999, pp. 15-53.

⁶ D.C. Mueller: *Public Subsidies for Private Firms in a Federalist Democracy*, in: G. Galeotti, P. Salmon and R. Wintrobe (eds.): *Competition and Structure: The Political Economy of Collective Decision-Making: Essays in Honor of Albert Breton*, Cambridge University Press 2000, Chapter 14, pp. 339-363.

¹ See e.g. R. Meiklejohn: *The Economics of State Aid*, in: *European Commission: State Aid and the Single Market*, *European Economy - Reports and Studies*, Vol. 3, 1999, pp. 25-31.

² These are described primarily in Art. 87(2 and 3) but also in Art. 36, 73 and 86(2) of the EC Treaty.

³ Quoted in B. Clements and G. Schwartz: *Government Subsidies*, in: *Journal of Economic Surveys*, Vol. 13, No. 2, 1999, pp. 119-147.

If other countries retaliate in view of such practices by granting subsidies to firms in their territory, state aid policy could turn into a zero or even a negative sum game of policy competition between countries. Subsidies in each country will attract little new investment. Instead they are likely to redistribute income in favour of more mobile activities. As the European Commission's First Report on Competition Policy put it, "part of the aid granted at present only achieves reciprocal neutralisation with unjustified profits for the benefiting enterprises as the only counterpart".⁷ As a consequence, overall resources may be misallocated towards some economic activities or even some types of firms (large relatively mobile multinationals rather than smaller locally based firms). Furthermore, national governments will have to raise taxes to finance their state aid programmes, and, thus, add a further source of market distortion.⁸

The possibility of "state aid competition" acquires particular importance in the context of the EU.

Historically, state aid has been used by EU Member States in the recent past explicitly and extensively in defence of their national industries. It used to be an important part of a set of microeconomic policies ranging from product market standards to labour market regulations and even administrative procedures that resulted in the segmentation of European markets. The view that governmental competition on state aid could have spillovers in policymaking in other domains, thus possibly undermining the single European market, is still to be found in official European Commission publications. This contrasts for example with the US literature, which often seems to consider state aids as a waste of taxpayers' money

⁷ See S. Martin and P. Valbonesi: State Aid in Context, in: G. Galli and J. Peckmans (eds.): Regulatory Reform and Competitiveness in Europe, Vol. 1 – Horizontal Issues, Cheltenham 2000, Edward Elgar, pp. 176-201.

⁸ D.R. Collie: State Aid in the European Union: The Prohibition of Subsidies in an Integrated Market, in: International Journal of Industrial Organization, Vol. 18, 2000, pp. 867-884.

Heike Schweitzer

Daseinsvorsorge, „service public“, Universaldienst

Art. 86 Abs. 2 EG-Vertrag und die Liberalisierung in den Sektoren Telekommunikation, Energie und Post

The liberalisation of telecommunications, energy and postal services has raised politically and legally controversial questions in the EC law debate. They refer to, inter alia, the conflict between the EC law liberalisation imperatives on the one hand, the national claim to sovereignty in the field of infrastructure policies on the other hand. Starting from a comparative study of the concepts of »Daseinsvorsorge« in Germany and "service public" in France and an analysis of the EC law, especially Art. 86 § 2 and Art. 16 ECT, the author presents the debate in a systematically coherent manner. A comparative analysis of the deregulation concepts and their realisation through secondary Community law in the different sectors then follows. Thoroughly discussing the practice of the EC courts and the EC Commission as well as the German, English and French literature, the analysis is placed within the framework of some of the fundamental questions of European law and economic order, with frequent references to the current discussion relating to the "constitutional" principles of European integration. Considering the slow progress of the creation of an internal market in the energy and postal sector, this study has important insights to offer with respect to the future development of these sectors.

2002, 481 pp., hardback with dust-jacket, 148,- DM, 76,- EURO, 127,- sFr, ISBN 3-7890-7650-3 (Law and Economics of International Telecommunications – Wirtschaftsrecht der internationalen Telekommunikation, Vol. 46)

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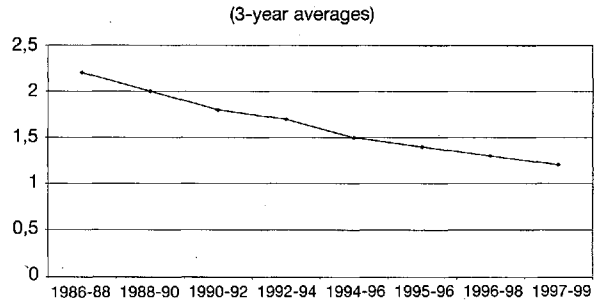
on the pursuit of questionable policy objectives but not as a threat to the internal market in the USA.⁹ Uncontrolled international competition on subsidies within the EU, however, could even to date lead EU governments to take measures to protect national industries, which may compromise the free movement of products, capital and labour in the EU. EU Member States continue to have more freedom of action and more policy instruments at their disposal than US federal states. Cases of large state aid to individual firms still attract a great deal of attention in the media, especially if they are rightly or wrongly perceived to facilitate the relocation of plants from one EU Member State to another. The side effects of such arguments on national economic policymaking and, hence, on the progress of market integration in the EU should not be underestimated and are at the heart of the general – although incomplete – prohibition of state aid in the EU.

State Aid in the EU – Stylised Facts

In order to conduct its monitoring and supervising role, the European Commission regularly compiles reports on state aid expenditures in the EU Member States. These “Surveys on State Aid” cover a wide range of state aid types and state aid objectives. With regard to state aid types, the surveys cover aid that is transferred in full to the recipient such as grants, equity participation, interest savings for enterprises resulting from instruments such as “soft loans” and deferred taxes and public guarantee schemes resulting in lower risk premia. The surveys differentiate between more than 20 aid objectives, grouped into the major categories agriculture and fisheries, manufacturing and services, horizontal objectives, particular sectors and regional aid (mostly to regions with low per capita income relative to the EU average).¹⁰

On the basis of these reports, we now provide a brief overview of the use of overall state aid as well as manufacturing state aid in the EU during the period

Figure 1
Overall State Aid in the EU in per cent of GDP during the Period 1986-99



Sources: European Commission: Surveys on State Aid (various issues), own calculations.

1986 to 1999. Developments at the EU level are complemented by country-specific information.

Figure 1 shows that the overall use of state aid in the EU (expressed in per cent of EU GDP) is on a gradual downward trend. Between the periods 1986 to 1988 and 1997 to 1999 the total average annual state aid expenditures in the EU Member States in per cent of EU GDP fell by one percentage point.

Table 1 provides an overview of country-specific differences with regard to the level of state aid and the development over time. The table indicates that around 50 per cent of the overall decline in the use of state aid in the EU is attributable to the considerable reductions in state aid expenditures in two large EU Member States, namely Italy and Germany, which in turn is largely due to reduced regional aid.¹¹ More generally, average annual state aid expenditures in per cent of GDP for the period from 1997 to 1999 are in almost all Member States substantially below the average for the period from 1986 to 1988. The only exceptions from the general downward trend are Denmark and Portugal where state aid relative to GDP has increased slightly, although from low starting-points. In Luxembourg, Greece, Italy and Belgium state aid as a per cent of GDP fell substantially over the 1986-99 period, albeit starting from higher levels.

The standard deviation across the EU declined from 1.1 during the period 1986 to 1988 to 0.3 during the 1996 to 1998 period. The maximum-minimum ratio increased significantly during the first half of the 1990s, mainly due to the very low values for the UK, but subsequently reverted to much lower values.

⁹ See T.F. Buss: The Effect of State Tax Incentives on Economic Growth and Firm Location Decisions: An Overview of the Literature, in: *Economic Development Quarterly*, Vol. 15, No. 1, 2001, pp. 90-105.

¹⁰ It is not always possible to attribute different state aid schemes unambiguously to one of these headings. Regional state aid for example is usually provided to enterprises and could therefore also be grouped under the heading “manufacturing and services”. The surveys do not cover public subsidies that do not affect trade and distort competition, subsidies that are granted according to the EC Treaty article on the provision of services of general interest and subsidies provided through Community funds such as the European Regional Development Fund (ERDF) and the European Social Fund (ESF).

¹¹ Taken together, the share of these two Member States in total EU GDP is around 40 per cent.

Table 1
Overall State Aid in the EU in per cent of GDP from 1986 to 1999
 (3-year annual averages)

	86-88	88-90	90-92	92-94	94-96	96-98	97-99	Change from 86-88 to 97-99
Austria	n.a.	n.a.	n.a.	n.a.	1.4	1.2	1.2	-0.2
Belgium	3.2	2.8	2.9	1.5	1.6	1.5	1.4	-1.8
Denmark	1	1.1	1	0.9	1.1	1.0	1.1	+0.1
Finland	n.a.	n.a.	n.a.	n.a.	2.4	1.9	1.7	-0.7
France	2	2.1	1.7	1.2	1.4	1.5	1.4	-0.6
Germany ¹	2.5	2.5	2.4	2.3	1.9	1.6	1.4	-1.1
Greece	4.5	3.1	1.9	1.3	1.6	1.4	1.2	-3.3
Ireland	2.7	1.9	1.2	1	1.2	1.2	1.4	-1.3
Italy	3.1	2.8	2.4	2.2	1.9	1.6	1.3	-1.8
Luxembourg	4	3.9	2.4	2.1	0.9	1.2	1.3	-2.7
Netherlands	1.3	1.1	0.9	0.6	0.8	0.9	0.9	-0.4
Portugal	1.5	2	1.5	0.8	1.5	1.7	1.6	+0.1
Spain	2.7	1.8	1.3	1.1	1.5	1.3	1.2	-1.5
Sweden	n.a.	n.a.	n.a.	n.a.	1.1	0.9	0.8	-0.3
United Kingdom	1.1	1.2	0.5	0.3	0.8	0.7	0.6	-0.5
EU average ²	2.2	2	1.8	1.7	1.5	1.3	1.2	-1.0
Max.-min. ratio	4.5	3.5	5.8	7.7	3.2	2.7	2.9	
Standard deviation	1.1	0.9	0.7	0.6	0.4	0.3	0.3	

Source: European Commission, Surveys on State Aid (various issues), own calculations.

¹ Until 1989 West Germany only.

² GDP-weighted.

Despite the falling trend of these dispersion measures, the country-specific variation with regard to the level of total state aid expenditures relative to GDP remains sizeable. Whereas Finland and Portugal used 1.7 and 1.6 per cent of their GDP respectively for state aid during the 1997 to 1999 period, the figure for the UK was only 0.6 per cent.

Public assistance to the manufacturing sector has arguably more widespread repercussions for trade and competition in the EU than state aid for sectors such as transport, coal and agriculture. The Commission's surveys on state aid therefore provide particularly detailed information on aid to the manufacturing sector. This includes support granted under eleven different horizontal, sector-specific and

regional objectives. The horizontal objectives taken into account for the heading "manufacturing sector" are R&D, environment, SMEs, trade, energy saving and other objectives (namely rescue and restructuring aid). The particular sectors are shipbuilding, steel and other sectors. Furthermore state aid distributed on the basis of regional considerations is taken into account. Taken together, these state aid categories accounted for 31 per cent of total state aid expenditures in the EU during the 1997 to 1999 period.

Figure 2 shows the development of state aid for the manufacturing sector in the EU expressed as a per cent of industrial value added.

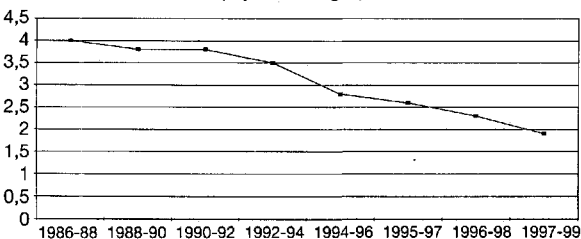
Expressed as a per cent of industrial value added, state aid for the manufacturing sector in the EU fell gradually between the period 1986 to 1988 and the period 1990 to 1992. The decline accelerated in the early/mid 1990s and the level of aid reached an annual average of 1.9 per cent during the 1997-99 period.

As in the case of total state aid, there are also sizeable country-specific differences with regard to the development of state aid for manufacturing over time (see Table 2). Expressed in per cent of value added, the average annual state aid during the period 1997 to 1999 was in all EU Member States substantially below the average for the 1986 to 1988 period. The only exceptions are Denmark and Sweden where

Figure 2

State Aid for Manufacturing in the EU in per cent of Manufacturing Value Added from 1986 to 1999

(3-year averages)



Sources: European Commission: Surveys on State Aid (various issues), own calculations.

Table 2
State Aid for Manufacturing in the EU Member States in per cent of
Manufacturing Value Added during the Periods 1986 to 1999

(3-year averages)

	86-88	88-90	90-92	92-94	94-96	96-98	97-99	Change from 86/88 to 97/99
Austria	n.a.	n.a.	n.a.	n.a.	1.3	1.4	1.3	0.0
Belgium	4.3	5	7.9	2.5	2.5	1.9	1.7	-2.6
Denmark	1.9	2.3	1.9	2.5	2.6	2.9	2.6	+0.7
Finland	n.a.	n.a.	n.a.	n.a.	1.6	1.6	1.6	0.0
France	3.8	3.7	2.7	2.4	1.7	2.0	2	-1.8
Germany ¹	2.7	2.6	3.5	4.4	3.8	2.6	2.4	-0.3
Greece	24.3	16.9	12.5	6.5	4.8	4.9	4.3	-20.0
Ireland	6.4	3.9	2.7	1.7	1.3	1.9	2	-4.4
Italy	6.2	7.8	8.9	6.4	5.5	4.4	2.7	-3.5
Luxembourg	2.3	3.4	3.5	2.6	2.2	2.3	2.1	-0.2
Netherlands	3.1	3.2	2.5	1.5	1.1	1.1	1	-2.1
Portugal	2.2	7.3	4.6	2.5	1.4	1.0	0.9	-1.3
Spain	6.8	3.7	2.1	1.8	2.3	2.1	1.7	-5.1
Sweden	n.a.	n.a.	n.a.	n.a.	0.8	0.8	1	+0.2
United Kingdom	2.6	1.9	1.4	0.9	0.6	0.7	0.6	-2.0
EU average ²	4	3.8	3.8	3.5	2.8	2.3	1.9	-2.1
Max.-min. ratio	12.8	8.9	8.9	7.2	9.2	7.0	7.2	
Standard deviation	6.2	4.1	3.4	1.9	1.4	1.2	0.9	

Sources: European Commission: Surveys on State Aid (various issues), own calculations.

¹ Until 1989 West Germany only.

² GDP-weighted.

the use of state aid for manufacturing has increased, although from low starting-levels. In the case of Denmark this is mainly due to more resources being allocated to a number of horizontal objectives such as employment and training. In the case of Sweden the increase was small and data is only available as of 1995, thus limiting the comparability of the results. The reductions in manufacturing state aid in Germany and Luxembourg are considerably smaller than in the EU as a whole. In the case of Germany this is mainly due to the substantial financial assistance for the industrial restructuring process in the new Länder. The biggest reductions have occurred in two countries that started with relatively high levels of aid to manufacturing, namely Greece (20 percentage points) and Spain (5.1 percentage points).

For some Member States the fall from the state aid levels for manufacturing recorded during the period 1986 to 1988 has not been continuous. In Italy, Belgium and Luxembourg state aid expenditures for industry peaked during the 1990 to 1992 period, possible due to the often considerable industrial adjustment measures in the run-up to the completion of the Single Market at the end of 1992. Manufacturing state aid in Germany peaked during the 1992-94 period, mainly due to industrial aid granted to East German enterprises.

As argued above, EU state aid policy has tended to look more favourably at subsidies that could be

generically linked to market failures and at state aid that is granted in order to improve the regional cohesion in the EU. It is therefore important to look not only at developments regarding aggregate overall and manufacturing state aid but also at the functional distribution of national support to enterprises.

Sectoral aid is considered to have potentially the strongest distortive effects on the allocation of resources. It interferes with the conditions of competition and affects the sectoral structure of the economy. These distortions can have repercussions on relative domestic and international sectoral prices. Furthermore, the use of state aid in favour of relatively low productivity industries may have a negative impact on the expansion of sectors with relatively high productivity. Generally speaking, sectoral state aid is strongly motivated by political and/or social considerations such as the preservation of particular industries. Given the – normally – relatively limited group of possible recipients, sectoral aid is also more likely to be initiated and influenced by lobby groups. Horizontal state aid is available for all sectors of the economy. A typical example for this category of aid is financial support for R&D investments. A priori, horizontal state aid schemes do not aim at changing the sectoral structure of the economy. However, public benefits for particular economic activities such as R&D tend to be asymmetrically distributed across the different sectors of the economy and are therefore

Table 3
Shares of Horizontal, Sectoral and Regional State Aid in the EU in per cent
of Total and Manufacturing State Aid from 1986 to 1999
 (3-year averages)

		86-88	88-90	90-92	92-94	94-96	95-97	96-98	97-99	Change 86 to 99 in p.p.
Total state aid ¹	Horizontal	17.5	19.1	17.9	14.2	14.8	16.1	17.0	17.7	+0.2
	Sectoral	65.8	63.8	58.9	60.1	59.8	59.6	60.8	62.1	-3.7
	Regional	16.7	17.2	23.3	25.7	25.4	24.3	22.2	20.2	+3.5
Manufac- turing state aid	Horizontal	40.0	40.0	35.0	31.0	31.0	32.0	35.0	37.0	-3.0
	Sectoral	26.0	21.0	15.0	11.0	11.0	9.0	8.0	7.0	-19.0
	Regional	34.0	39.0	50.0	58.0	58.0	59.0	57.0	56.0	+22.0

Sources: European Commission: Surveys on State Aid (various issues), own calculations.

¹ The difference between the total and the shares provided in this table represent national state aid to agriculture and fisheries.

also likely to result in the above-mentioned allocative distortions. Nevertheless, the resulting allocative distortions are likely to be less pronounced than in the case of sector-specific aid. The implications of region-specific aid are likely to fall in between the other two categories, depending inter alia on the relative economic importance of the supported regions, expressed for example in per cent of GDP, and the sectoral structure of the area concerned.

Table 3 summarises the shares of horizontal, sectoral and regional state aid as a per cent of total and of manufacturing state aid.¹² Throughout the period under review sector-specific state aid constituted by far the largest share of total state aid expenditures (around 60 per cent). This group comprises inter alia state aid to the transport and coal industries, which makes up a significant part of total state aid expenditures. According to the "Ninth Survey on State Aid" these two sectors received around 84 per cent of all sector-specific state aid during the 1997-99 period. This is equivalent to around 44 per cent of total national state aid. The share of state aid with horizontal objectives initially declined during the early 1990s but increased subsequently during the period 1997 to 1999, reaching 17.7 per cent of total EU state aid. The relative importance of state aid with regional objectives increased during the first half of the 1990s but fell subsequently to 20.2 per cent during the period 1997 to 1999. The functional composition of state aid to manufacturing has changed more substantially during the period under review. Whereas the share of sector-specific state aid for industry declined by around 20 percentage points during the

period 1986 to 1999, the relative importance of manufacturing aid with regional objectives increased considerably by around 22 percentage points. Only the share of horizontal state aids for manufacturing remained broadly unchanged.

Determinants of Manufacturing State Aid in the EU

The common downward trend in the use of manufacturing state aid across the EU countries could be considered an indication that the European Commission's efforts to control the use of state aid in the EU were increasingly successful. In fact, there is considerable qualitative information to suggest that EU state aid control became gradually tighter throughout the late 1980s and 1990s.¹³ Before reaching such a conclusion, however, we need to control for the effect of other possible factors determining the use of manufacturing state aid, most notably the demand for public assistance by private firms and the budgetary pressures faced by national governments. Both these factors have varied considerably over the period under consideration and may have been responsible for the observed reduction in the overall use of manufacturing state aid.

To control for these determinants, we use a simple econometric model.¹⁴ The dependent variable is the logarithm of state aid to manufacturing expressed as a ratio of industrial value added, both expressed in current prices. For brevity, this ratio is called "state aid intensity". The sample is that of Table 2, covering seven partially overlapping three-year periods between 1986 and 1999 for most EU Member States.

¹² National state aid for agriculture and fisheries has been deducted from the total figures. Furthermore, assistance for agriculture and fisheries financed by EU funds and financial instruments is not included in the national state aid figures reported in the surveys.

¹³ See e.g. M. Cini: From Soft Law to Hard Law?: Discretion and Rule-making in the Commission's State Aid Regime, in: RSC No. 2000/35, European Forum Series, EU Working Papers.

¹⁴ All estimation results were obtained using the econometric package LIMDEP.

Austria, Sweden and Finland are included from 1995 onwards and Luxembourg, due to a lack of public accounts data for 1988-89, from 1990 onwards. The use of three-year averages implies that some short-term developments are not captured by the data. However, annual data is only available from 1994 onwards.

The explanatory variables used in the model are:

private investment as a ratio to GDP (INVEST), both measured in current prices, in order to capture private sector "demand" for subsidies;

public deficit as a ratio to GDP (DEFICIT), both measured in current prices, to capture the degree of fiscal discipline applied by the government ("supply" side).

The respective three-year averages of these variables were constructed to match the state aid data. Additional potential explanatory variables such as GDP per capita, the change in industrial output and the ratio of public debt to GDP were also tested. These were not found to have a statistically significant impact on state aid intensity and the estimation results for these variables are not reported below.

The regressions include time dummies and country dummies, the latter to capture among other things the effects of country-specific differences in sectoral structures and regional disparities on the use of manufacturing state aid. The estimated coefficients of the time dummies indicate the trend of state aid in manufacturing after having controlled for the effects of the explanatory variables and of country dummies.¹⁵ Table 4 presents the estimation results.

In column (1), only country and time dummies are introduced but no other independent variables. To facilitate comparisons, the time dummy coefficients in all regressions are normalised, taking an annual average of manufacturing state aid intensity of 4% of industrial value added during the period 1986 to 1988 as the starting-point.¹⁶ Controlling for the country specific effects, column (1) shows that state aid intensity fell sharply in the first half of the nineties (up

¹⁵ In this context it should be noted that there is a difference in the interpretation of the trend of the aggregate of EU manufacturing state aid reported in Figure 2, and the estimation results for the country dummies reported in Table 4. The former is strongly influenced by the differences in economic size of the various EU Member States, with developments in the large Member States dominating the aggregate. The pattern captured by the time dummies, instead, is not influenced by differences in the country size. All countries have an equal weight.

¹⁶ We use 4% as the benchmark for 1986-88 to facilitate comparisons with the weighted EU average reported in Table 2. The *unweighted* average manufacturing state aid intensity in the 1986-88 period was closer to 3.5%.

Table 4
Econometric Results

	(1) Period and Country Dummies	(2) Random Effects Model	(3) Fixed Effects Model	(4) Fixed Effects and Instruments
INVEST		0.43 (4.6)	0.40 (3.5)	0.50 (3.3)
DEFICIT		0.29 (5.0)	0.25 (3.6)	0.30 (2.9)
R ² adjusted	0.78	0.35	0.78	0.71
Number of observations	91	91	91	91
Estimated autocorrelation of error	0.40	0.28	0.29	0.36
Period effects				
1988-90	3.98		3.64	3.48
1990-92	3.33		3.21	2.52
1992-94	2.34		2.68	1.84
1994-96	1.88		2.17	1.83
1996-98	1.84		2.32	2.13
1997-99	1.68		2.16	2.01

Note: t-statistics in parentheses.

to the period 1994 to 1996), then stabilised and then fell again in the last period. This pattern is broadly similar to that observed in Figure 2 for the weighted average of manufacturing state aid intensity in the EU as a whole.

In column (2), we introduce private investment and public deficit in a random effects model. This model does not include time or country dummies but it allows for a time and country specific random error. Private investment and public deficit are found to have had a statistically significant and quantitatively important effect on state aid intensity. The point estimates suggest that a 1 percentage point increase in private investment to GDP was accompanied on average by a 0.43 percentage point rise in manufacturing state aid over value added. An increase of 1 percentage point in the public deficit to GDP ratio was accompanied by a 0.29 percentage point rise in manufacturing state aid intensity.

The estimated coefficients of random effects models can be biased if the independent variables are correlated to the country and time effects. Regression (3) remedies this problem by combining the investment and deficit variables with the time and country dummies. The estimated coefficients of the two variables fall somewhat but remain statistically significant and quantitatively important. Concerning the time dummies, it is interesting to note that, once

we control for the effects of the public deficit and private investment, manufacturing state aid intensity appears to have fallen much less after the period 1990 to 1992. Indeed, net of the estimated effects of public deficit and investment, manufacturing state aid intensity was effectively the same during the 1997-99 period as during the 1994 to 1996 period. In other words, without the increased overall fiscal discipline of many Member States in the second half of the 1990s, state aid to manufacturing might not have fallen further from the levels reached in the mid-1990s.

The results reported so far are potentially subject to endogeneity bias. It may be argued that the causal link runs both ways: from private investment and from public deficit to manufacturing state aid and from manufacturing state aid to investment and public deficit.¹⁷ To deal with this potential endogeneity bias, we instrument both variables. For investment we use as instruments the consumption to GDP ratio, the change in the GDP and the investment to GDP ratio of the previous period. For public deficit, we use the total public sector receipts to GDP, the current public expenditures to GDP excluding subsidies and the interest rate payments to GDP. Except for GDP growth, all variables are expressed in current prices. Three-year averages are constructed to match the state aid data.

As column (4) shows, the estimated coefficients of the two instrumented explanatory variables rise and remain statistically significant. During most of the 1990s, the increased fiscal discipline across many EU Member States appears to have played an important role in the control of state aid in the EU. The (unweighted) average of the Member States' public deficits to GDP fell by approximately 3.7 percentage points between the 1994 to 1996 and 1997 to 1999 periods. During the same period average private investment to GDP rose by approximately 1.4 percentage points. The combination of these two effects, according to the estimation results in column (4), should have brought the average manufacturing state aid intensity down by 0.4 percentage points.¹⁸

¹⁷ Note however that the investment variable used here also includes investment in dwellings and investment in services (manufacturing investment is not available for the whole observation period and all countries), both of which are not in principle affected by manufacturing state aid. Also on the public deficit side a priori the endogeneity bias should not be severe. At least for the period of the Maastricht criteria and probably even before, public deficit was likely to have been the government target with state aids being one of the variables adjusting to accommodate the deficit target rather than the other way round.

The point estimates of the time dummies now suggest that, net of the effect of the public deficit and investment, manufacturing state aid intensity increased in the second half of the 1990s compared to the 1992-96 period. It should be mentioned, however, that with standard errors for the time dummy coefficients in the order of 0.2, the difference between the estimated coefficient for the period 1992-94 and that for the period 1997 to 1999 is not statistically different from zero. Thus, a more appropriate interpretation of these results would be that, *net of the effects of public deficit and investment*, manufacturing state aid intensity has remained unchanged since about the target date for the completion of the Single Market Programme in 1992.

Summing up, the tentative econometric results reported above suggest that both supply and demand factors for manufacturing state aid had a statistically significant impact on manufacturing state aid expenditures in the EU. In particular, the results suggest that the increased fiscal discipline in the EU had a disciplinary effect on the use of national state aids for manufacturing. Against this background it appears that the Maastricht criteria for EMU membership and the Stability and Growth Pact have been beneficial in curbing state aid expenditures in the EU.

Conclusions

The main purpose of EU state aid control is to limit the possible negative repercussions of national state aids on European market integration. Looking at aggregate EU state aid figures, the state aid control system appears to have worked well. Since the mid-1980s, the overall use of state aid expressed in per cent of EU GDP as well as the use of state aid to the manufacturing sector expressed in per cent of industrial value added are on a downward trend. Country-specific differences with regard to the level of state aid still exist but they have been substantially reduced. The results of the econometric analysis of the determinants of state aid to the manufacturing sector suggest that the increased need for fiscal discipline during most of the 1990s has had a considerable impact on the reduction of manufacturing state aid in the more recent period. Were it not for this increased fiscal discipline, state aid to manufacturing might not have remained on a declining trend in the second half of the 1990s.

¹⁸ It should be mentioned that all estimation results remain very similar when Greece is omitted from the sample. Although the very high Greek state aid expenditures in the late eighties could a priori have dominated the results for the entire sample the estimation results suggest that this is not the case.