Determinants of State Aid to Car Manufacturers in the European Union

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Motivation

The focus on State aids in the EU

The European competition policy is unique in its control on state aid.

The rationale for control of state aid is the safeguard of market integration by protecting against:

- the possibility that less efficient firms which receive state aid prosper at the expense of more efficient that do not
- more rich member state will systematically give their firms competitive advantage over firms from less rich member state

Lisbon declaration in 2000: "less and better aid"

Motivation

The focus on the car industry

The current crisis has spurred a number of interventions to support the car industry

The Temporary Framework for the years 2009-10 is allowing Member States to grant aid with fewer controls

However, the industry has always been heavily subsidized

We focus on this industry to disentangle the different factors which can explain State aid policy in the EU in the last 20 years

Motivation

Research questions

1. Which are the determinants of state aid in the car sector?
2. Has the EU official statement "less and better aid" been effectively pursued in the car sector?
3. Is the granting of state aid the outcome of a repeated game in which member states dynamically (strategically) exchange on the possibility to provide subsidy?

Motivation

Empirical strategy

We collect a unique database on state aids to firms in the car industry in the EU over the 1988-2008 interval

We analyse political and economic determinants of state aid

We disentangle between:

- aid to industry and services
- aid to the car industry: here we distinguish, case by case:
  - aid to increase capacity
  - aid to reduce operating costs
  - aid for rescue & restructuring

The dependent variable

Several empirical papers investigate the economic and political determinants of state aids (Neven 1994, Neven Roller 2000, Ganoulis Martin 2001, Zahariadis 2005 and 2010, Aydin 2007)

The dependent variable is generally defined as a ratio:

$$\frac{\text{total aid}}{\text{total value added}}$$

We consider aid granted the sector, and general aid, in logs, and include industry's value added and total value added among the regressors

In this way we do not impose the coefficient on value added to be equal to one

The explanatory variables

The literature finds that political factors are relevant as well as economic issues

As we focus on aid to a specific industry, we include also industry-specific controls

	Economic variables	Political variables
Country	Income per capita; Industrialization.	Election year; Polarization; Government political orientation; Time trend.
Industry	Change in new car registrations; National champions; Import penetration	Scrapping schemes; Aid in other countries

The econometric specification

We expect the country specific regressors to influence both total aid and aid to the car industry, while industry specific regressors are expected to affect aid to the car industry only

Since the same set of factors are affecting both explanatory variables, they can not be independently estimated

The SUR estimator (Zellner 1962) allows contemporaneous error terms in the two equations to be correlated.

The econometric specification

Therefore, we jointly estimate:

$$total\_aid = f(\text{econ\_var}_{ct}, \text{pol\_var}_{ct})$$
$$car\_aid = f(\text{econ\_var}_{ct}, \text{econ\_var}_{ict}, \text{pol\_var}_{ct}, \text{pol\_var}_{ict})$$

Additionally, we distinguish car_aid by its aim, and we estimate the system:

$$total\_aid = f(\text{econ\_var}_{ct}, \text{pol\_var}_{ct})$$
$$capacity\_aid = f(\text{econ\_var}_{ct}, \text{econ\_var}_{ict}, \text{pol\_var}_{ct}, \text{pol\_var}_{ict})$$
$$op\_c\_aid = f(\text{econ\_var}_{ct}, \text{econ\_var}_{ict}, \text{pol\_var}_{ct}, \text{pol\_var}_{ict})$$

Data Description

Dependent Variable: a taxonomy of state aid

Table 5.1 A taxonomy of state aid

Aid type	Potential benefit	Potential distortion
Horizontal		
Employment	Reduce labour market imperfections	Camouflage operating aid
Environment	Increase environmental quality	Camouflage operating aid
R&D	Promote innovation	Camouflage operating aid
Rescue & restructuring	Facilitate survival of fundamentally sound firms	Preserve Fundamentally unsound firms
Small & medium sized enterprise	Ameliorate financial and other market failures that differently affect small firms; promote job creation	Create or preserve fundamentally unsound firms
Regional		
	Promote development of peripheral regions	Aid wars; channel more aid to least developed regions of wealthiest member states than to least developed regions of less wealthy member states
Sectoral		
Declining or consolidating industries	Ease labour market transitions; facilitate restructuring; share adjustment costs	Delay inevitable reorganisation; favour firms from richer member states; less efficient firms survive, more efficient firms exit
Privatising Industries	Increase share of economy guided by market forces	Artificial advantage for former public firm

Data Description

Dependent Variable

We classify each case, according to the aid type declared in the official documents, into three categories:

- aid aimed at increasing capacity (mainly regional aid, privatising industries, some R&D and environmental)
- aid aimed at reducing operating costs (training, environment, R&D)
- aid for rescue and restructuring

Data Description

Dependent Variable

	EU12	EU15	EU25	EU27
1988	4770.76	-	-	-
1989	642.68	-	-	-
1990	70.01	-	-	-
1991	853.88	-	-	-
1992	3748.62	-	-	-
1993	388.55	-	-	-
1994	466.10	-	-	-
1995	377.40	377.40	-	-
1996	769.45	779.44	-	-
1997	57.24	57.24	-	-
1998	263.06	264.78	-	-
1999	310.32	310.32	-	-
2000	90.90	90.90	-	-
2001	342.88	342.88	-	-
2002	563.21	563.21	-	-
2003	123.80	154.37	-	-
2004	43.32	52.92	52.92	-
2005	123.43	132.40	132.40	-
2006	13.39	20.02	63.66	-
2007	23.48	23.48	171.21	171.96
2008	80.70	80.70	80.70	176.85

Source: Own elaboration from DG competition and OJEU (Million €, 2000)

Data Description

Dependent Variable

Country	Nr of cases	Cumulated amount of nominal aid (Million €, 2000)	Average nr of employees	Aid per employee (€ 2000)
Austria	2	37.01	31,642	1,169.60
Belgium	12	88.99	48,989	1,816.50
Czech Republic	1	169.47	107,183	1,581.10
France	3	61.08	234,926	260
Germany	4	494.25	864,436	571.8
Italy	8	371.59	170,518	2,179.20
Poland	6	86.73	111,607	777.1
Portugal	3	45.07	24,384	1,848.30
Romania	2	174.08	63,439	2,744.10
Slovakia	3	85.5	27,508	3,108.20
Spain	7	163.07	205,513	793.5
Sweden	2	17.51	205,513	85.2
United Kingdom	16	191.34	196,294	974.8
Total	**69**	**1,985.69**	**2,291,951**	**866.4**

Data description

Explanatory Variables - Economic variables

Data are sourced from Eurostat and/or EUKLEMS

- income per capita
- industrialization= share of manufacturing in total value added
- import penetration= $\frac{IMP_{ct}}{IMP_{ct}+PROD_{ct}-EXP_{ct}}$

Data on car registrations are sourced from Eurostat and ACEA (European Automobiles Manufacturers' Association)

- National champion= dummy equal to 1 if the aid is granted to an "historical" producer

Data description

Explanatory Variables - Political variables

- election year
- polarization =measure of polarization between government party and the four main parties of the legislature (source: Database of Political Institutions, WB)
- left-wing government= index of cabinet composition, ranging from 0 (hegemony of right-wing) to 5 (hegemony of left-wing) (source: Comparative Political Data Set, 2008)
- scrapping scheme= dummy equal to 1 if scrapping schemes are offered (source: Global Insight, 2010)

Results

1992-2007

	Aid to car industry	*Total aid*
industry's value added$_{c,t-1}$	0.313***	
	(0.0569)	
GDP$_{c,t-1}$		1.126***
		(0.0387)
income per capita$_{c,t-1}$	-0.413**	-0.297***
	(0.209)	(0.109)
industrialization$_{c,t}$	-1.864	1.864**
	(1.773)	(0.839)
election year$_{c,t}$	0.210	0.0761
	(0.187)	(0.0887)
polarization$_{c,t}$	-0.151	0.175***
	(0.107)	(0.0508)
left-wing government$_{c,t}$	-0.0538	-0.0193
	(0.0571)	(0.0264)
time trend	-0.0503**	-0.0201*
	(0.0251)	(0.0109)
change in new car registrations per capita$_{c,(t-(t-1))}$	-0.452	
	(0.439)	
aid to national champion$_{c,t}$	3.071***	
	(0.294)	
import penetration$_{c,t}$	0.727**	
	(0.285)	
scrapping scheme$_{c,t}$	0.643***	
	(0.248)	
aid to car industry in other countries$_{t-1}$	0.00428	
	(0.0700)	
total aid in other countries$_{t-1}$		-0.101
		(0.106)
Constant	-2.666*	-7.428***
	(1.537)	(1.713)
Observations	213	213
R-squared	0.525	0.865

Results

1992-2007

	Aid to increase capacity	*Aid to reduce operating costs*	*Total aid*
industry's value added$_{c,t-1}$	0.243***	0.0898***	
	(0.0583)	(0.0313)	
GDP$_{c,t-1}$			1.125***
			(0.0387)
income per capita$_{c,t-1}$	-0.287	0.108	-0.296***
	(0.207)	(0.109)	(0.109)
industrialization$_{c,t}$	-0.573	-1.364	1.862**
	(1.815)	(0.972)	(0.839)
election year$_{c,t}$	0.301	0.153	0.0762
	(0.192)	(0.103)	(0.0887)
polarization$_{c,t}$	-0.243**	-0.0647	0.175***
	(0.109)	(0.0587)	(0.0508)
left-wing government$_{c,t}$	-0.0232	-0.0135	-0.0193
	(0.0587)	(0.0314)	(0.0264)
time trend	-0.0405*	0.0113	-0.0201*
	(0.0239)	(0.0115)	(0.0109)
change in new car registrations per capita$_{c,(t-(t-1))}$	-0.313	0.0502	
	(0.443)	(0.237)	
aid to national champion$_{c,t}$	2.269***	1.254***	
	(0.302)	(0.163)	
import penetration$_{c,t}$	0.436	0.526***	
	(0.292)	(0.156)	
scrapping scheme$_{c,t}$	0.468*	0.0957	
	(0.253)	(0.135)	
aid to increase capacity in other countries$_{t-1}$	-0.0622		
	(0.0554)		
aid to reduce operating costs in other countries$_{t-1}$		-0.0407	
		(0.0384)	
total aid in other countries$_{t-1}$			-0.101
			(0.106)
Constant	-1.631	-0.191	-7.410***
	(1.442)	(0.717)	(1.713)
Observations	213	213	213
R-squared	0.397	0.324	0.865

Results

Before and after Lisbon

	1992-1999			*2000-2007*		
	Aid to increase capacity	***Aid to reduce operating costs***	***Total aid***	***Aid to increase capacity***	***Aid to reduce operating costs***	***Total aid***
industry's value added$_{c,t-1}$	0.284**	0.0196		0.202***	0.117***	
	(0.118)	(0.0511)		(0.0669)	(0.0422)	
GDP$_{c,t-1}$			1.061***			1.091***
			(0.0720)			(0.0479)
income per capita$_{c,t-1}$	-0.713	0.302	-1.038***	-0.272	0.0736	-0.0576
	(0.513)	(0.225)	(0.216)	(0.228)	(0.141)	(0.127)
industrialization$_{c,t}$	1.051	-2.190	2.161	-0.823	-1.445	1.923**
	(3.295)	(1.437)	(1.471)	(2.149)	(1.357)	(0.978)
election year$_{c,t}$	0.176	0.0341	0.125	0.442*	0.243	0.0454
	(0.296)	(0.129)	(0.125)	(0.233)	(0.148)	(0.110)
polarization$_{c,t}$	-0.100	-0.0735	0.197***	-0.302**	-0.0259	0.164***
	(0.196)	(0.0872)	(0.0757)	(0.128)	(0.0812)	(0.0634)
left-wing government$_{c,t}$	0.0624	-0.0548	-0.0405	-0.0355	-0.0134	0.00107
	(0.115)	(0.0501)	(0.0486)	(0.0706)	(0.0446)	(0.0322)
time trend	-0.0683	0.00174	-0.000119	-0.0669	0.0145	0.0207
	(0.0816)	(0.0375)	(0.0305)	(0.0557)	(0.0357)	(0.0263)
change in new car registrations per capita$_{c,(t-(t-1))}$	0.333	0.325		-0.504	-0.0400	
	(1.130)	(0.473)		(0.463)	(0.294)	
aid to national champion$_{c,t}$	3.174***	1.121***		1.636***	1.392***	
	(0.466)	(0.204)		(0.392)	(0.243)	
import penetration$_{c,t}$	0.273	0.242		0.449	0.623***	
	(0.590)	(0.256)		(0.312)	(0.197)	
scrapping scheme$_{c,t}$	0.393	-0.148		0.408	0.242	
	(0.389)	(0.173)		(0.347)	(0.217)	
aid to increase capacity in other countries$_{t-1}$	-0.266***			0.0223		
	(0.101)			(0.0653)		
aid to reduce operating costs in other countries$_{t-1}$		-0.00844			-0.0812	
		(0.0551)			(0.0575)	
total aid in other countries$_{t-1}$			-0.996***			-0.137
			(0.318)			(0.116)
Constant	-3.037	1.695	-0.0849	-1.044	-0.617	-6.393***
	(3.288)	(1.387)	(4.485)	(1.678)	(0.983)	(1.812)
Observations	89	89	89	124	124	124
R-squared	0.544	0.387	0.845	0.326	0.328	0.894

Conclusions

We investigate the determinants of state aid to the car industry in EU over the period 1992-2007
We find:

1. both political and economic variables are relevant
2. there is a structural break after the statement of the Lisbon strategy (2000)
3. there is a negative and significant trend over the period considered
4. the strategic game between Countries is significant before Lisbon