

Vertical Industrial Policy in the EU: An empirical analysis of the effectiveness of state aid

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Agenda

- Industrial Policy and State Aid
- Previous evidence on the effectiveness of vertical State Aid
- The approach that we use
- Results and concluding remarks

A preliminary statement of results

- We assess the effects of vertical industrial policy (*picking winners*) on multifactor productivity growth for EU manufacturing
- Vertical industrial policy is proxied by state aids
- We find that state aid to manufacturing has a negative effect on multifactor productivity growth
- The empirical model is quite robust, although concerns remain about causality
- Vertical industrial policy is probably better understood as *supporting losers* rather than *picking winners*

Industrial Policy and State Aid

- State Aid: an agreed framework to implement industrial policies in the EU
- Why state aid/industrial policy?
 - Efficiency (tackling market failures)
 - Strategy (rent-shifting in international oligopolies)
 - Equity (declining industries, compensating losers from trade)
 - Efficiency/equity (regional,...)

Facts about EU State Aid

- Significant decline between 1995 and 2003: from 1% to 0.6% of GDP
 - Mostly in sectoral and regional aid
 - Traditional classification:
 - Horizontal aid (41%)
 - Regional aid (15%)
 - Sectoral aid
 - Rescue and restructuring aid
- } (44%)
- Manufacturing gets 60 to 65% of total aid

Previous empirical findings

- Sectoral Aid
 - Röller and Von Hirschhausen(1996): shipbuilding and synthetic fiber
 - Rent shifting from WG to EG
 - Danish Competition Authority (2002): shipbuilding
 - Rent seeking by workers
 - Bergstrom (1998): regional aid for manufacturing
 - Capital subsidies: positive short term effect on productivity. Negative in the long term due to rent seeking
 - Danish Competition Authority (2001): horizontal objectives, several industries
 - Overall negative correlation between subsidy intensity and firm productivity growth, but positive for manufacturing. Causality uncertain.
- Rescue and Restructuring Aid: London Economics (2004)
 - The amount and design of aid schemes does not affect the survival rate
 - Post-aid growth performance not statistically different, but productivity improves

Vertical versus Horizontal Aid in Manufacturing

	1995	2003
Total State Aid to Manufacturing (bn €)	44	29
of which Vertical (bn €)	14	1

- However
 - 96% of total aid with horizontal objectives goes to manufacturing
 - Schemes are classified as horizontal because of their primary objective, but usually apply to narrowly defined industries
- We will work with both sectoral aid data (narrow definition of vertical aid) and total aid data (broad definition of vertical aid)

The empirical framework (I)

- Use Multifactor Productivity (MFP) as a measure of performance
- MFP growth is explained by:
 - technology diffusion
 - convergence towards the leader
 - conditional on the regulatory environment and other control variables (R&D spending, public capital)
 - These variables could also affect the rate of convergence

The empirical framework (II)

$$\ln \text{MFP}_{i,t} = \theta_1 \ln \text{MFP}_{i,t-1} + \theta_2 \ln \text{MFP}_{F,t} + \theta_3 \ln \text{MFP}_{F,t-1} + \omega_{i,t} + \varepsilon_{i,t}$$

$$\text{In the steady state } \Delta \ln \text{MFP}_{i,t} = \Delta \ln \text{MFP}_{F,t} \Rightarrow (1-\theta_1) = \theta_2 + \theta_3$$

$$\Delta \ln \text{MFP}_{i,t} = \theta_2 \Delta \ln \text{MFP}_{F,t} - (1-\theta_1) [\ln \text{MFP}_{i,t-1} - \ln \text{MFP}_{F,t-1}] + \omega_{i,t} + \varepsilon_{i,t}$$

i: countries

F: frontier country

ω : controls

Data

(1992-2003 and 11 Member States)

- Manufacturing: aggregate data, footloose
- Measurement issues:
 - MFP (capital stock, labor input, share of labor, PPP, etc.)
 - RMFP (distance to frontier country)
 - R&D/VA
 - Public capital (gkpub)
 - Regulation indicators (ADMIN and EPL)
 - Output gap

Estimates (Base specification)

Variable	(1)	(2) with fixed effects	(3) with fixed effects	(4) with fixed effects
$\Delta MFP_{Frontier\ t}$	0.5171 ***	0.5348 ***	0.6260 ***	0.6259 ***
$RMFP_{i\ t-1}$	-0.0008	-0.0414	-0.1751 ***	-0.1748
output gap EU			-0.0079 **	-0.0079 **
$R\&D/VA_{i\ t-1}$			0.6873 **	0.6864
$R\&D/VA_{i\ t-1} \times RMFP$				-0.0040
gkpub			-0.3151	-0.3154
_cons	0.007	-0.0115	-0.0770 ***	-0.0769 **

Key Results (Base Specification):

- The diffusion effect is important 0.60
- So is the convergence parameter -0.15
- R&D effort has a positive influence on MFP growth
 - independent of the distance to the frontier
- No effect of public capital
- Results broadly consistent with earlier empirical analysis

Estimates (Adding State Aid)

Variable	(5)	(6)	(7)	(8)
$\Delta\text{MFP}_{\text{Frontier } t}$	0.6220***	0.5868***	0.6124***	0.5618***
$\text{RMFP}_{i \ t-1}$	-0.1753**	-0.1783**	-0.1847***	-0.2057***
$\text{R\&D/VA}_{i \ t-1}$	0.6658**	0.7389**	0.5855*	0.4586
gkpub	-0.3220	-0.2706	-0.3985	0.1215
outgapeu	-0.0075**	-0.0025	-0.0058*	-0.0025
$\text{AIDV/VA}_{i \ t-1}$	-1.5307	-0.3506	-1.3837	
EPL_{t-1}		0.0268**		0.0202*
ADMIN		-0.0202**	-0.0171	-0.0346**
EPL_{t-1} (med)			0.0099	
EPL_{t-1} (high)			0.0319	
$\text{AIDV/VA}_{i \ t-1}$ (med)				-0.0259**
$\text{AIDV/VA}_{i \ t-1}$ (high)				-0.0208
_cons	-0.0756***	-0.0941***	-0.0714**	-0.0787***

Key results

(Adding State Aid):

- Key parameters remain stable
- Aid has a negative effect on MFP
 - Not always statistically significant
 - Estimates are possibly inefficient
- The causality problem
- Employment protection legislation has a positive effect
- General regulation has a negative effect

Estimates (Adding State Aid with interaction effects)

Variable	(9)	(10)	(11)
$\Delta MFP_{Frontier\ t}$	0.5516 ***	0.5516 ***	0.5409 ***
$RMFP_{i\ t-1}$	-0.2213 ***	-0.2222 ***	-0.2044 ***
$R\&D/VA_{i\ t-1}$	0.6051 **	0.4315	0.5354 *
gkpub	0.1879	0.1874	0.1499
outgapeu	-0.0029	-0.0023	-0.0021
EPL_{t-1}	0.0181 *	0.0269 **	0.0178 *
ADMIN	-0.0324 **	-0.0437 ***	-0.0039
$AIDV/VA_{i\ t-1\ (med)}$	-0.0099	-0.0189	-0.0543
$AIDV/VA_{i\ t-1\ (high)}$	-0.0455 *	0.0284	0.0005
$AIDV/VA_{i\ t-1\ (med)} \times RMFP$	0.0727		
$AIDV/VA_{i\ t-1\ (high)} \times RMFP$	-0.0726		
$AIDV/VA_{i\ t-1\ (med)} \times EPL$		-0.0030	
$AIDV/VA_{i\ t-1\ (high)} \times EPL$		-0.0217	
$AIDV/VA_{i\ t-1\ (med)} \times ADMIN$			0.0146
$AIDV/VA_{i\ t-1\ (high)} \times ADMIN$			-0.0086
_cons	-0.0716 ***	-0.0615 ***	-0.0789 ***

Key results (Adding State Aid with interaction effects)

- Key parameters remain stable
- The negative effect of state aid is independent of the distance to the frontier
- Interaction effects with employment protection and regulation are not relevant
- Results are only slightly less strong with a broader definition of vertical aid

Concluding Remarks

- State aid to manufacturing has a negative effect on multifactor productivity growth
- The effect is not dependent on the technological distance to the frontier country
- The empirical model is quite robust, although concerns remain about causality
- Vertical industrial policy is probably better understood as “supporting losers”