

Supplementary Appendix

to the paper

“Service regulation and growth: evidence from OECD countries”

by

Guglielmo Barone and Federico Cingano

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Table A1: Alternative determinants of international specialization and comparative advantages

	(1)	(2)	(3)	(4)	(5)	(6)
	Value added growth				Exports	
	Human Capital	Physical Capital	Both	Property Rights	Contract Enforcement (a)	Enforcement (b)
Service regulation [<i>SERVREG</i> _{<i>j,c</i>}]	-0.154* (0.066)	-0.174* (0.068)	-0.154* (0.067)	-0.176* (0.068)	-6.786* (3.011)	-3.688+ (2.032)
Financial dev. × external dep. [<i>FD</i> _{<i>c</i>} × <i>ED</i> _{<i>j</i>}]	0.007+ (0.004)	0.010* (0.004)	0.007+ (0.004)	0.010* (0.004)	0.405** (0.144)	0.298+ (0.158)
Human capital × skill intensity	0.101* (0.048)		0.101* (0.048)			
Physical capital × physical capital intensity		-0.468 (2.885)	0.082 (2.790)			
Property rights × intangible intensity				-0.001 (0.003)		
Quality of contract enforcement × contract intensity					0.144** (0.048)	
Quality of contract enforcement × institutional dependence						0.003* (0.001)
Initial industry share [<i>SHARE</i> _{<i>j,c</i>}]	0.141* (0.064)	0.169* (0.067)	0.141* (0.064)	0.171* (0.067)		
Constant	-0.789* (0.382)	0.023 (0.106)	-0.793* (0.366)	0.009 (0.022)	2.595 (1.736)	6.634** (2.207)
Observations	220	220	220	220	220	220
R-squared	0.69	0.67	0.69	0.67	0.79	0.37

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes:

In cols. 1-4 the dependent variable is the annual compounded growth rate of real value added at the country-industry level for the period 1996-2002 (*GROWTH*_{*j,c*}); in col. 5 the dependent variable is the natural logarithm of total exports in industry *j* from country *c* in 1996; in col. 6 the dependent variable is an index of export specialization given by $(EXPORTS_{j,c} / \sum_c EXPORTS_{j,c}) / (\sum_j EXPORTS_{j,c} / \sum_{j,c} EXPORTS_{j,c})$, where *j* and *c* represent industries and countries, respectively. *SERVREG*_{*j,c*} measures exposure to service regulation at the country-industry level as a weighted average ($\sum_s w_{j,s} * X_{c,s}$) of country-level anti-competitive regulation indexes from the OECD-PMR databases. Service regulation (*X*_{*c,s*}) is measured in 1996. Interaction weights *w*_{*j,s*} are (“direct”) technical coefficients of dependence between service sector *s* and manufacturing industry *j* computed on the 1997 USA Input-Output matrix. Financial development is measured as Private Credit by Deposit Money Banks over GDP in 1996 (*FD*_{*c*}) and is interacted with External dependence (*ED*_{*j*}) an industry-level measure of reliance on external finance obtained from USA firm-level data (see Table 1). In cols. 1 and 3, Human capital is an index of labor force quality on a (0-100) scale taken from Bosworth and Collins (2003). It is interacted with average years of schooling at the industry level in 1980 (as obtained from the US 1990 Integrated PUMS). In cols. 2 and 3, Physical capital is the physical capital-to-GDP ratio in 1980. The capital stock is calculated using the perpetual inventory method as implemented by Klenow and Rodriguez-Clare (2005). Source: Penn World Table 5.6. It is interacted with US capital-value added ratio at industry level in 1995 taken from the EUKLEMS database (<http://www.euklems.net/>). In col. 4, “Property rights” is an index of the protection of the private property across countries. It is interacted with an industry-level measure of intangible intensity in US industries. Both are taken from Claessens and Laeven (2003). In cols. 5 and 6, “Quality of contract enforcement” measures the extent to which agents have confidence in and abide by the rules of society (Kaufmann, Kraay and Mastruzzi, 2003). In col. 5, contract enforcement is interacted with Nunn (2007) measure of contract intensity (i.e., of the importance of relationship-specific investments). In col. 6 it is interacted with a measure of institutional dependence. Following Levchenko (2007), this is computed as the (opposite of) an Herfindahl index of intermediate input use from the U.S. Input-Output Use Table for 1997. *SHARE*_{*j,c*} indicates the industry share in total value added in manufacturing in 1996. All regressions include country- and industry-fixed effects and use (employment) weighted least squares as estimation method. Robust standard errors are reported in parentheses.

Table A2: Alternative measures of regulation impact

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Value added growth			Productivity growth			Export growth		
	ALTERN.	SERVREG	BOTH	ALTERN.	SERVREG	BOTH	ALTERN.	SERVREG	BOTH
Panel A : OECD Regulation Impact Indicator (<i>RII</i>)									
Reg. imp. ind. [<i>RII</i> _{<i>j,c</i>}]	-0.246* (0.120)		-0.158 (0.111)	-0.164 (0.144)		-0.043 (0.120)	0.199 (0.150)		0.352* (0.162)
Service reg. [<i>SERVREG</i> _{<i>j,c</i>}]		-0.176** (0.068)	-0.145* (0.064)		-0.202* (0.080)	-0.193* (0.075)		-0.215* (0.106)	-0.279** (0.102)
Implied effects	-0.009	-0.019	-	-0.006	-0.022	-	0.007	-0.023	-
Observations	220	220	220	220	220	220	205	205	205
R-squared	0.67	0.67	0.67	0.57	0.59	0.59	0.71	0.72	0.76
Panel B : “Mixed” indicator of Service Regulation									
Serv. reg. mixed [<i>MIXED</i> _{<i>j,c</i>}]	-0.076* (0.036)		-0.052 (0.037)	-0.086* (0.038)		-0.058+ (0.035)	-0.016 (0.039)		0.028 (0.043)
Service reg. [<i>SERVREG</i> _{<i>j,c</i>}]		-0.176** (0.068)	-0.123+ (0.070)		-0.202* (0.080)	-0.140* (0.071)		-0.215* (0.106)	-0.242* (0.116)
Implied effects	-0.011	-0.019	-	-0.012	-0.022	-	-0.002	-0.023	-
Observations	220	220	220	220	220	220	205	205	205
R-squared	0.67	0.67	0.68	0.59	0.59	0.60	0.71	0.72	0.72

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes:

In cols. 1-3 the dependent variable is the annual compounded growth rate of real value added at the country-industry level for the period 1996-2002 (*GROWTH*_{*j,c*}). In cols. 4-6 the dependent variable is the annual compounded growth rate of labor productivity (value added per employed worker) at the industry-country level for the period 1996-2002 (*LPGROWTH*_{*j,c*}). In cols. 7-9 the dependent variable is the annual compounded growth rate of exports at the industry-country level for the period 1996-2002 (*EXPGROWTH*_{*j,c*}). *SERVREG*_{*j,c*} measures exposure to service regulation at the country-industry level as a weighted average ($\sum_s w_{j,s} * X_{c,s}$) of country-level anti-competitive regulation indexes from the OECD-PMR databases. Service regulation ($X_{c,s}$) is measured in 1996. Interaction weights $w_{j,s}$ are (“direct”) technical coefficients of dependence between service sector s and manufacturing industry j computed on the 1997 USA Input-Output matrix. In Panel A the Regulation Impact Indicator (*RII*) is the OECD measure of the relevance of service regulation for manufacturing industries (taken from Conway and Nicoletti, 2006). In Panel B, the “Mixed” indicator of Service regulation is computed as a weighted average ($\sum_s w_{j,s}^c * X_{c,s}$). Country-specific weights $w_{j,s}^c$ are (“direct”) technical coefficients of dependence between service sector s and manufacturing industry j computed on the OECD Input-Output matrices. All regressions include (unreported) controls for financial development and for initial conditions: *SHARE*_{*j,c*} in cols. 1-3, *LLP*_{*j,c*} in cols. 4-6 and *EXSHARE*_{*j,c*} in cols. 7-9 (see Table 1 for the definition of these variables). All regressions also include country- and industry-fixed effects and use (employment) weighted least squares as estimation method. Robust standard errors are reported in parentheses.

Table A3: Global opportunities and average regulation

	(1) Without other controls	(2) With other controls
Service regulation [$SERVREG_{j,c}$]	-0.185** (0.068)	-0.234** (0.070)
Average service regulation × global opportunities	-0.101 (0.099)	-0.035 (0.123)
Fin. dev. × external dep. [$FD_c \times ED_j$]	0.009* (0.004)	0.011** (0.004)
Initial industry share [$SHARE_{j,c}$]	0.160* (0.067)	0.148* (0.068)
Constant	0.016 (0.020)	0.042+ (0.025)
Observations	220	220
R-squared	0.68	0.69

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes:

The dependent variable is the annual compounded growth rate of real value added at the industry-country level for the period 1996-2002 ($GROWTH_{j,c}$). $SERVREG_{j,c}$ measures exposure to service regulation at the country-industry level as a weighted average ($\sum_s w_{j,s} * X_{c,s}$) of country-level anti-competitive regulation indexes from the OECD-PMR databases. Service regulation ($X_{c,s}$) is measured in 1996. Interaction weights $w_{j,s}$ are (“direct”) technical coefficients of dependence between service sector s and manufacturing industry j computed on the 1997 USA Input-Output matrix. Average service regulation is the simple average of sectoral regulation given by $(X_{c,ENERGY} + X_{c,PROSERV} + X_{c,TLCPOST} + X_{c,TRANSP}) / 4$. It is interacted with an industry-level measure of global opportunities obtained according to the following two-steps procedure: (a) Regress $GROWTH_{j,c}$ on country dummies, industry dummies and industry dummies interacted with country-level simple average of sectoral regulation; USA are excluded from the regression. (b) Obtain global opportunities as the predicted values of $GROWTH_{j,c}$ for the USA. All regression include (unreported) controls for financial development, labor market regulation and red tape costs (see Tables 1, 2 and 7 for the definition of these variables). $SHARE_{j,c}$ is the industry share in total value added in manufacturing in 1996. All regressions include country- and industry-fixed effects and use (employment) weighted least squares as estimation method. Robust standard errors are reported in parentheses.

Table A4: Service regulation and country size

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Value added growth			Productivity growth			Export growth		
	All countries	Large countries	Small countries	All countries	Large countries	Small countries	All countries	Large countries	Small countries
Service reg. [<i>SERVREG_{j,c}</i>]	-0.272** (0.073)	-0.313** (0.086)	0.107 (0.174)	-0.282** (0.101)	-0.340** (0.124)	0.012 (0.127)	-0.241* (0.104)	-0.270+ (0.145)	-0.233 (0.180)
Constant	0.020 (0.025)	0.036 (0.038)	0.033 (0.030)	-0.070 (0.048)	-0.083 (0.065)	0.017 (0.054)	0.028 (0.030)	0.006 (0.047)	-0.006 (0.043)
Observations	220	113	107	220	114	106	205	98	107
R-squared	0.70	0.75	0.59	0.61	0.65	0.52	0.75	0.80	0.75

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes:

In cols. 1-3 the dependent variable is the annual compounded growth rate of real value added at the country-industry level for the period 1996-2002 ($GROWTH_{j,c}$). These columns replicate results of table 8, cols. 7-9 in the main text. In cols. 4-6 the dependent variable is the annual compounded growth rate of labor productivity (value added per employed worker) at the industry-country level for the period 1996-2002 ($LPGROWTH_{j,c}$). In cols. 7-9 the dependent variable is the annual compounded growth rate of exports at the industry-country level for the period 1996-2002 ($EXPGROWTH_{j,c}$). $SERVREG_{j,c}$ measures exposure to service regulation at the country-industry level as a weighted average ($\sum_s w_{j,s} * X_{c,s}$) of country-level anti-competitive regulation indexes from the OECD-PMR databases. Service regulation ($X_{c,s}$) is measured in 1996. Interaction weights $w_{j,s}$ are (“direct”) technical coefficients of dependence between service sector s and manufacturing industry j computed on the 1997 USA Input-Output matrix. All regressions include (unreported) controls for financial development [$FD_c \times ED_j$], Labour market regulation [$LMR_c \times LABINT_j$], Red tape costs [$COST_c \times GROP_j$], FDI restrictions [$FDIREG_{j,c}$], Public ownership [$POWN_{j,c}$] and the corresponding initial conditions [$SHARE_{j,c}$, $LLP_{j,c}$ and $EXSHARE_{j,c}$]. See Table 1 for the definition of these variables. The sample of large countries include Canada, France, Germany, Italy, Japan, the Netherlands, Spain and the UK while the sample of small ones include Austria, Belgium, Denmark, Finland, Greece, Norway, Portugal and Sweden. All regressions also include country- and industry-fixed effects and use (employment) weighted least squares as estimation method. Robust standard errors are reported in parentheses.

Table A5: Sector-specific effects over longer horizons: Energy

	(1) Initial year: 1980	(2) Initial year: 1984	(3) Initial year: 1988	(4) Initial year: 1992	(5) Initial year: 1996
Energy Regulation \times Energy dependence [$X_{c,ENERGY} \times w_{j,ENERGY}$]	-0.206 (0.207)	-0.210 (0.175)	-0.434* (0.182)	-0.469** (0.178)	-0.482** (0.147)
Observations	139	139	154	220	220
R-squared	0.74	0.74	0.75	0.66	0.69

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes:

The dependent variable is the annual compounded growth rate of real value added at the industry-country level for the period 1996-2002 ($GROWTH_{j,c}$). $X_{c,ENERGY} * w_{j,ENERGY}$ is an interaction term between country-level measures of regulation in energy in 1996 ($X_{c,ENERGY}$) and the corresponding industry-level indicators of dependence ($w_{j,ENERGY}$). The interaction weight $w_{j,ENERGY}$ is the (“direct”) technical coefficients of dependence between energy and manufacturing industry j computed on the 1997 USA Input-Output matrix. All regression include (unreported) controls for financial development, labor market regulation and red tape costs (see Tables 1, 2 and 7 for the definition of these variables), and the industry share in total value added in manufacturing in 1996. All regressions also include country- and industry-fixed effects and use (employment) weighted least squares as estimation method. Robust standard errors are reported in parentheses.

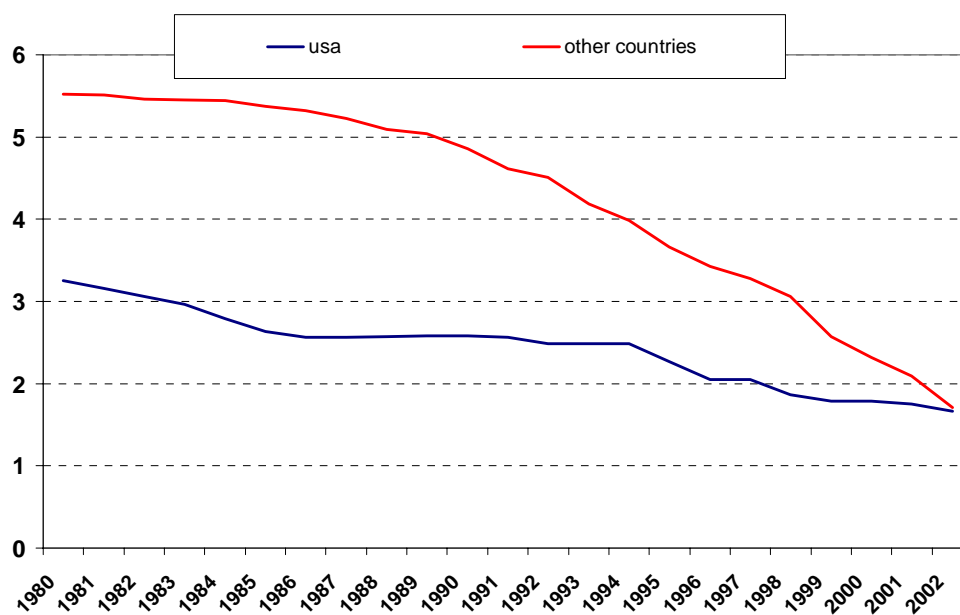
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Figure: Service regulation in USA and other OECD countries



Notes:

Service regulation is the simple average of the OECD measures of regulation ($X_{c,s}$) in energy, communications and transports. Other countries are: Austria, Belgium, Canada, Germany, Denmark, Finland, France, Great Britain, Greece, Italy, Japan, the Netherlands, Norway, Portugal, Spain and Sweden.