PUBLIC POLICY AND RESOURCE ALLOCATION: EVIDENCE FROM FIRMS IN OECD COUNTRIES

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SUPPLEMENTARY APPENDIX: DATA AND ADDITIONAL RESULTS

Data and descriptive statistics. Table A1 reports some descriptive statistics on the main firm-level variables in ORBIS. Assembled by Bureau Van Dijk, the commercial database ORBIS contains balance sheet data on firms in many advanced and developing countries. See Pinto Ribeiro et al., (2010) for a detailed description of the ORBIS database and of the cleaning and checking undertaken by the OECD in order to increase data quality and comparability (see also Ragoussis and Gonnard 2012). Table A2 contains estimates of Allocative Efficiency for common industry groupings and Table A3 contains details and sources for the key explanatory variables used in the analysis. Table A4 displays the descriptive statistics for the key variables used in the regression analysis.

Additional results. Tables A5-A9 and Figure A1 report some additional empirical results not shown in the main text.

COUNTRY AND INDUSTRY COVERAGE

Country sample: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Japan, Korea, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, the United Kingdom and the United States.

Industry sample: Nace 15: Food products and beverages, Nace 16: Tobacco products, Nace 17: Textiles, Nace 18: Wearing apparel, Nace 19: Leather leather products and footwear, Nace 20: Wood and products of wood and cork, Nace 21: Pulp, paper and paper products, Nace 22: Printing and publishing, Nace 23: Coke refined petroleum products and nuclear fuel, Nace 24: Chemicals and chemical products, Nace 25: Rubber and plastics products, Nace 26: Other non-metallic mineral products, Nace 27: Basic metals, Nace 28: Fabricated metal products except machinery and equipment, Nace 29: Machinery and equipment n.e.c., Nace 30: Office accounting and computing machinery, Nace 31: Electrical machinery and apparatus, Nace 32: Radio television and communication equipment, Nace 33: Medical precision and optical instruments, Nace 34: Motor vehicles trailers and semi-trailers, Nace 35: Other transport equipment, Nace 36: Manufacturing n.e.c., Nace 37: Recycling, Nace 40: Electricity, gas, steam and hot water supply, Nace 41: Collection purification and distribution of water, Nace 45: Construction, Nace 50: Sale maintenance and repair of motor vehicles and motorcycles - retail sale of automotive fuel, Nace 51: Wholesale trade and commission excl. motor vehicles, Nace 52: Retail trade excl. motor vehicles repair of household goods, Nace 55: Hotels and restaurants, Nace 60: Land transport - transport via pipelines, Nace 61: Water transport, Nace 62: Air transport, Nace 63: Supporting and auxiliary transport activities, Nace 64: Post and telecommunications, Nace 70: Real estate activities, Nace 71: Renting of machinery and equipment, Nace 72: Computer and related activities, Nace 73: Research and development, Nace 74: Other business activities

Table A1: Descriptive statistics on firm level data by country, 2005

Country	Number of Industries		Firms	Turnover (2005 €`000s)		Employment		(Log) Labour Productivity	
	Total	Regulated Services	Number	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Austria	39	8	9590	14350.4	95830.2	63.68	494.95	4.82	0.81
Belgium	40	8	26421	16347.4	142422.9	48.04	442.38	5.42	0.94
Switzerland	42	8	4071	114645.6	718876.3	461.75	3391.83	5.47	0.76
Czech Rep.	40	8	44928	4083.7	44953.8	44.36	428.81	3.80	1.29
Germany	40	8	88247	87842.5	1603664.0	348.91	6403.97	5.00	0.87
Denmark	40	8	6396	19643.9	99672.3	74.60	427.66	5.11	0.91
Spain	40	8	377488	3113.4	53427.4	19.45	272.16	4.47	0.89
Finland	39	8	37663	5209.7	143526.5	22.87	214.89	4.60	0.84
France	40	8	290566	5648.2	158301.6	25.94	373.07	4.75	0.72
United Kingdom	40	8	40714	56357.0	493636.6	265.62	2347.80	5.04	1.19
Greece	40	8	18765	6351.2	48412.8	37.13	350.86	4.78	1.10
Hungary	39	7	3320	19761.0	134381.2	152.29	1199.03	4.27	1.06
Italy	40	8	87747	15213.6	134617.4	54.59	656.44	5.30	0.98
Japan	42	8	142880	31170.9	398374.6	72.92	570.04	5.34	0.83
Korea	39	7	24525	3473.8	4867.4	17.53	11.51	4.90	0.91
Netherlands	40	8	5446	146513.6	1277706.0	497.15	5369.86	5.50	1.35
Norway	36	8	1793	3522.7	20755.7	24.98	337.59	4.83	0.99
Poland	40	8	18231	13968.8	70506.9	139.74	973.20	4.36	1.06
Portugal	38	8	1607	25491.8	104845.2	155.90	665.27	4.77	1.08
Slovak Rep.	40	8	11311	5160.5	46409.6	56.22	353.48	3.62	1.70
Sweden	40	8	99732	3902.7	66692.7	16.71	188.33	4.80	0.76
United States	*excluded*	8	303562	14858.2	427152.7	80.84	2335.50	4.34	0.87

Source: Authors calculations based on the ORBIS firm level database. The sample excludes firms with one employee as well as firms in the top and bottom 1% of the labour productivity distribution.

Table A2: Allocative Efficiency across Common Industry Groupings

Selected OECD Countries; 2005

Country	Manufacturing	Services	Total business sector
European Union	*0.272*	*0.036*	*0.14*
Austria	0.196	0.222	0.229
Belgium	0.205	-0.218	-0.012
Czech Rep.	0.236	0.133	0.209
Germany	0.443	0.399	0.460
Denmark	0.270	0.121	0.184
Spain	0.465	-0.052	0.117
Finland	0.668	0.251	0.419
France	0.461	0.161	0.296
United Kingdom	0.300	0.065	0.156
Greece	-0.056	-0.235	-0.240
Hungary	0.104	-0.198	-0.086
Italy	0.141	-0.190	-0.039
Netherlands	0.043	-0.274	-0.137
Poland	-0.478	-0.560	-0.537
Portugal	0.077	-0.069	0.020
Slovak Rep.	0.062	-0.114	0.075
Sweden	0.672	0.253	0.379
Switzerland	0.052	-0.143	-0.031
Japan	0.366	-0.047	0.312
Korea	-0.030	-0.036	-0.061
Norway	0.370	0.103	0.185
United States	0.473	0.358	0.394

Notes: The Table shows estimates of allocative efficiency for three common industry groupings: the manufacturing sector, services sector and total business sectors (i.e. NACE 15-74). The estimate for the European Union is obtained by aggregating the respective allocative efficiency indicators by each countries share in total business sector employment in the EU.

Table A3: Structure of the differences-in-differences estimator and data sources

Variable	Country-level variable	Industry-level exposure variable
BTE_c X $turnover_j$	Administrative Burdens on Start-Ups sub-component of the Barriers to Entrepreneurship indicator in the OECD Product Market Regulation (PMR) index. Data from 2003.	Firm turnover rate (defined as the entry rate + exit rate) at the industry level in the United States. Sourced from Bartelsman *et al.,* (2008).
$BTE2_c$ X $turnover_j$	Average of the Administrative Burdens on Start-Ups and Barriers to Competition sub-components of the Barriers to Entrepreneurship indicator in the OECD Product Market Regulation (PMR) index. Data from 2003.	Firm turnover rate at the industry level in the United States (see above).
$Bankrupty_c$ X $turnover_j$	The stringency of bankruptcy rules is measured by an indicator of the cost to close a business, sourced from the World Bank. Data from 2004.	Firm turnover rate at the industry level in the United States (see above).
$EPLR_c$ X $layoff_j$	EPLR is the OECD Employment Protection Legislation (EPL) sub-index of restrictions on individual dismissal of workers with regular contracts. Data from 2003.	Layoff rates (defined as the percentage ratio of annual layoffs to total employment) at the industry level in the United States. Sourced from Bassanini *et al.,* (2009).
$EPLO_c$ X $turn_j$	The overall OECD EPL index, which takes into account EPLR, restrictions on collective dismissals and the regulation of temporary contracts. Data from 2003.	Firm turnover rate at the industry level in the United States (see above).
$FinDevl_c$ X $ExtFinDep_j$	Financial development is measured as the log of the ratio of private credit by deposit money banks and other financial institutions to GDP and is sourced from the World Bank. Data from 2003.	The variable measuring industries' dependence on external finance is computed from information contained in the Thomson Financial Worldscope database for US listed firms with less than 1000 employees. These estimates are sourced from de Serres *et al.,* (2006) and following Rajan and Zingales (1998), a firm's dependence on external finance is defined as its capital expenditure minus internal funds (cash flow from operations) divided by capital expenditure.
$BankReg_c$ X $ExtFinDep_j$	Index of banking regulation sourced from De Serres *et al.,* (2006). The index is increasing in the degree of regulation and takes into account regulatory barriers on domestic and foreign bank entry, restrictions on banking activities (*i.e.* controls on the types of activity that bank can engage into) and the extent of government ownership (*i.e.* the impact of state control on the level playing field). Data from 2003.	External finance dependency at the industry level in the United States (see above).
$Policy_c$ X $patenting_j$	Country-level policies as outlined above.	Patenting intensity is measured as the log of ratio of the number of patent applications to the number of firms in each sector in 2003, based on matched data from OECD ORBIS-PATSTAT.

SECTOR-SPECIFIC POLICIES		
Service sector regulations	N/A	Sourced from the OECD PMR indicators (2003) and measure the extent of barriers to entry and of conduct regulation (such as restrictions on the legal form of businesses, bans to advertising etc.) in key services sectors. Specifically, we focus on Energy (nace 40), Wholesale and retail trade (50-52), Land and air transport (60 and 62), Post and telecommunication (64) and Professional services (74).
FDI restrictions	N/A	The OECD FDI Regulatory Restrictiveness Index (see Nicoletti et al., 2003; Golub and Koyama, 2006), measures statutory restrictions on FDI in four main areas: foreign equity limitations; screening or approval mechanisms; restrictions on the employment of foreigners as key personnel and operational restrictions (e.g. restrictions on branching and on capital repatriation or on land ownership). The FDI index has been shown to be a good predictor of countries' inward FDI performance, and is available at the country level and for several mainly non-manufacturing sectors.

Table A4: Summary statistics of key variables used in the regression analysis

Variable	Obs	Mean	Median	Standard deviation	p10	p90
PANEL A: INDUSTRY-COUNTRY LEVEL						
Allocative efficiency	834	0.10	0.12	0.42	-0.37	0.51
Unweighted productivity	834	4.86	4.89	0.72	3.93	5.68
PANEL B: COUNTRY LEVEL						
Barriers to entrepreneurship (BTE) -- administrative burdens on start-ups	22	1.94	1.69	0.93	0.63	3.06
BTE2 -- average of administrative burdens on start-ups and barriers to competition	22	1.89	1.74	0.56	1.23	2.56
Bankruptcy (cost to close a business)	22	9.54	9.00	6.16	4.00	18.00
Employment Protection Legilsation (EPL) on Regular Contracts	22	2.29	2.31	0.70	1.63	3.05
EPL -- Overall Index	22	2.02	2.02	0.67	1.34	2.98
Financial Development (log of ratio of private credit to GDP)	20	-0.22	-0.01	0.54	-1.23	0.39
Banking Regulation	21	2.43	2.31	0.69	1.66	3.31
PANEL C: INDUSTRY LEVEL						
Service sector regulation	174	2.17	2.30	1.27	0.37	3.70
Service sector regulation (including public ownership)	174	2.40	2.47	1.07	0.93	3.87
FDI restrictions	152	0.08	0.00	0.21	0.00	0.25
Firm turnover rate (USA)	42	19.42	20.79	4.50	14.58	24.00
Job layoff rates (USA)	42	3.81	3.57	1.09	2.72	5.40
External Finance Dependency (USA)	40	1.00	0.44	1.37	0.00	3.35

Notes: see Tables A1 and A3 for details on variable definitions and sources.

ADDITIONAL RESULTS

Table A5: Public policies and allocative efficiency across OECD countries and industries: standardised coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables:	PMR and Bankruptcy			EPL		Banking & finance		All-in	
BTE X turnover	-0.153**							-0.139*	-0.140**
	(0.063)							(0.071)	(0.071)
BTE2 X turnover		-0.205**							
		(0.081)							
Bankruptcy X turnover			-0.087*					-0.002	-0.001
			(0.045)					(0.045)	(0.045)
EPLR X layoff				-0.212***				-0.207***	-0.210***
				(0.062)				(0.061)	(0.060)
EPLO X turnover					-0.290***				
					(0.084)				
FinDev X ExtFinDep						0.015		0.014	
						(0.020)		(0.019)	
BankReg X ExtFinDep							-0.030		-0.035
							(0.052)		(0.048)
AdjR2	0.556	0.557	0.553	0.567	0.565	0.553	0.553	0.572	0.572
Observations	834	834	834	834	834	828	828	828	828

Notes: This table reports standardized beta coefficients for the specifications in Table. 1, Panel A. The dependent variable is allocative efficiency as defined in (1), computed in 2005. See Table A3 for definitions and sources of the explanatory interaction variables. All specifications include country and industry fixed effects. Observations are weighted by the number of firms used to compute the productivity decomposition in (1). Robust standard errors in parentheses; *** denotes statistical significance at the 1% level, ** significance at the 5% level, * significance at the 10% level.

Table A6: First Stage Regressions

	(1)	(2)
	PANEL A: BTE X TURNOVER	
VARIABLES	Legal origin	Legal origin and latitude
Legal Origin (France) X Turnover	1.802***	2.089***
	(0.080)	(0.139)
Legal Origin (Germany) X Turnover	1.214***	1.523***
	(0.135)	(0.149)
Legal Origin (Scandanavia) X Turnover	0.329***	0.078
	(0.092)	(0.140)
Latitude X Turnover		0.038**
		(0.016)
R-squared	0.990	0.991
F Test	87.58	81.80
Observations	834	834
	PANEL B: EPL X LAYOFF	
VARIABLES	Common law	Civil code
Common law X Layoff	-1.285***	
	(0.075)	
Civil code X Layoff		0.914***
		(0.167)
R-squared	0.976	0.973
F Test	315.9	187.0
Observations	834	834

Notes: Panel A shows the first stage regressions for columns 1-2 in Table 5; the dependent variable is barriers to entry interacted with firm turnover rates. Panel B shows the first stage regressions for columns 3-4 in Table 5; the dependent variable is employment protection legislation on regular contracts interacted with job layoff rates. See Table A3 for definition and sources of the explanatory variables. All specifications include country and industry fixed effects. Observations are weighted by the number of firms used to compute the productivity decomposition in (1). Robust standard errors in parentheses; *** denotes statistical significance at the 1% level, ** significance at the 5% level, * significance at the 10% level

Table A7: Robustness to alternative country-level variables

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
AltVar:	**None**	**Institut. Quality**	**Corruption**	**Management**	**Openness**	**Infrastr.**	**Education**	**Country size**
EXPL. VARS:								
				Barriers to entry				
BTE X turn	-0.0075**	-0.0079**	-0.009**	-0.0072*	-0.009***	-0.0114***	-0.0055*	-0.0082***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)
AltVar X turn		0.0012	-0.00011	0.00053	0.02051**	-0.00485	0.01519	-0.00159
		(0.004)	(0.000)	(0.004)	(0.010)	(0.004)	(0.014)	(0.003)
Observations	834	834	834	834	834	834	834	834
AdjR2	0.556	0.556	0.556	0.556	0.558	0.557	0.556	0.556
				Bankruptcy (Barriers to exit)				
Bankruptcy X turn	-0.0007*	-0.0012	-0.0005	-0.0001	-0.0007**	-0.0012*	-0.0002	-0.0007*
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)
AltVar X turn		0.0068	0.00014	0.00537	0.01240	-0.00397	0.02374	0.00068
		(0.009)	(0.000)	(0.005)	(0.010)	(0.005)	(0.017)	(0.003)
Observations	834	834	834	834	834	834	834	834
AdjR2	0.553	0.553	0.553	0.553	0.553	0.553	0.554	0.553
				EPL				
EPLR X Layoff	-0.0522***	-0.0538***	-0.0462***	-0.0519**	-0.0557***	-0.0540*	-0.0483***	-0.0545**
	(0.015)	(0.016)	(0.015)	(0.016)	(0.016)	(0.015)	(0.016)	(0.017)
AltVar X Layoff		-0.0240	0.00156***	0.01731	0.04466	0.00682	0.06528	-0.00476
		(0.016)	(0.001)	(0.012)	(0.039)	(0.010)	(0.050)	(0.012)
Observations	834	834	834	834	834	834	834	834
AdjR2	0.567	0.568	0.573	0.569	0.568	0.567	0.568	0.567

Notes: Column (1) is the base specification. The remaining columns control for the following variables: (2) Institutional quality, proxied by the log of the number of days to resolve a legal dispute (source: World Bank Doing Business Database); (3) Freedom from Corruption (source: Heritage Foundation Economic Freedom of the World Index); (4) Reliance on Professional Management (source: World Economic Forum Global Competitiveness Index (WEF GCI)); (5) Openness to trade, proxied by the ratio of Exports plus Imports to GDP; (6) Overall Infrastructure Quality (source: WEF GCI); (7) The quality of national education systems (source: Hanushek and Woessmann (2011)); (8) Country size, proxied by the log of GDP. See Table A3 for definition and sources of the explanatory variables. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table A8: Public policies and the productivity of large firms (250 employees or more)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	PMR and Bankruptcy			EPL		Banking & finance		All-in	
BTE X turnover	-0.010***							-0.013**	-0.013**
	(0.003)							(0.006)	(0.006)
BTE2 X turnover		-0.016***							
		(0.006)							
Bankruptcy X turnover			-0.001**					0.001	0.001
			(0.005)					(0.001)	(0.001)
EPLR X layoff				-0.070***				-0.071***	-0.070***
				(0.020)				(0.019)	(0.019)
EPLO X turnover					-0.014***				
					(0.005)				
FinDev X ExtFinDep						0.037		0.035	
						(0.029)		(0.025)	
BankReg X ExtFinDep							-0.036*		-0.034*
							(0.022)		(0.019)
AdjR2	0.859	0.858	0.857	0.859	0.859	0.858	0.859	0.864	0.864
Observations	713	713	713	713	713	709	709	709	709

Notes: The dependent variable is average productivity of firms with 250 or more employees in 2005, as outlined in Section 6.4. See Table A3 for definition and sources of the explanatory interaction variables. All specifications include country and industry fixed effects. Observations are weighted by the number of firms used to compute the productivity decomposition in (1). Robust standard errors in parentheses; *** denotes statistical significance at the 1% level, ** significance at the 5% level, * significance at the 10% level.

Table A9: Public policies and the productivity of large firms in the service sector (250 employees or more)

VARIABLES	(1) Base	(4) Base & FDI - 1	(5) Base & FDI - 2
Service sector regulation	-0.086** (0.043)	-0.092** (0.043)	
FDI restrictions		-0.363 (0.302)	-0.389 (0.311)
Service sector regulation (including public ownership)			-0.093* (0.049)
AdjR2	0.879	0.880	0.878
Observations	161	141	141

Notes: The dependent variable is average productivity of firms with 250 or more employees in 2005, as outlined in Section 6.4. See Table A3 for definition and sources of the explanatory interaction variables. All specifications include country and industry fixed effects. Observations are weighted by the number of firms used to compute the productivity decomposition in (1). Robust standard errors in parentheses; *** denotes statistical significance at the 1% level, ** significance at the 5% level, * significance at the 10% level.

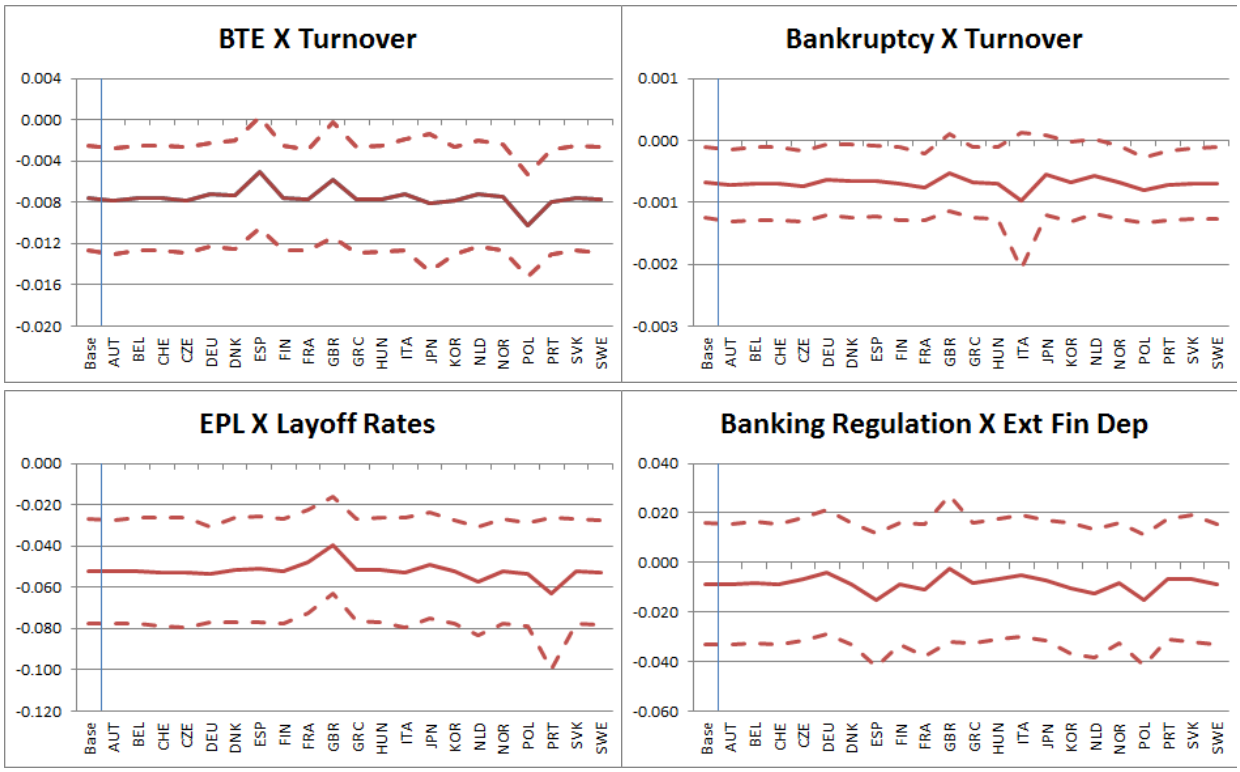

Figure A1. Impact on the estimated coefficient of dropping one country at a time; coefficient estimate (thick line) and 90% confidence interval (dashed line)

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