



Public policy reforms and their impact on productivity, investment and employment:

New evidence from OECD and non-OECD
countries

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The usual disclaimer applies



Interest in quantifying the impact of reforms on growth

- Low economic growth ever since the 2007/08 crisis
 - Help mitigate the negative impact of fiscal consolidation
 - Help restore fiscal sustainability (public debt crisis => more growth lower debt)
 - Mitigate the impact of slowing potential growth (population ageing)



Existing literature

Country-, industry- and firm-level studies

- **Weaker productivity** if stringent product and labour market regulations (Andrews and Cingalo, 2014; Nicoletti and Scarpetta, 2003; Cetto et al., 2013, 2014).
- **Unemployment and employment outcomes** correlated with a variety of regulations and labour market institutions (Blanchard and Wolfers, 2000; Bertola et al, 2002; Nickell et al, 2005).



Existing literature

- **Investment:**
 - The business environment is also an important factor for investment as the costs of starting and running a business will bear with business investment (World Bank, 2014).
 - *Tight regulation* is identified to have a particular effect on investment in network sectors (Alesina et al., 2005; Vartia, 2008; Cambini and Rondo, 2011).
 - Controversy whether labour market regulation would be associated with greater or smaller investment (Cingano et al., 2010, 2015; Cetto et al., 2016; Égert, 2016).
- **Economic growth:** the growth literature identifies the quality of institutions as an important driver of long-term economic growth (Acemoglu and Johnson, 2005; Aghion et al., 2016).



Micro vs. macro approaches

Micro vs. macro

- A large amount of micro- and industry-level work
- But there is still need for a framework with a targeted macro focus

Micro approaches:

- Better identification of policy effects

Macro approaches:

- Better at providing macroeconomic effects
- Better at incorporating more policy channels
- Better at covering a larger number of countries

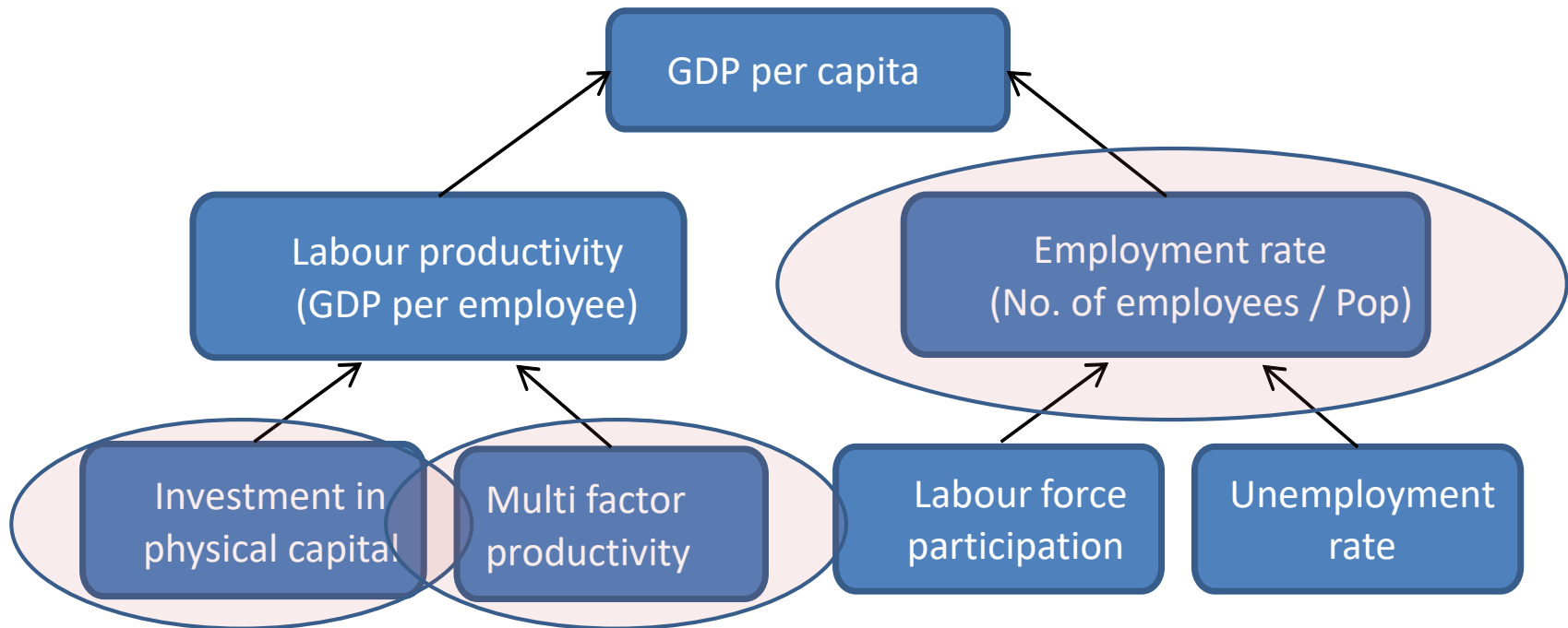


THE QUANTIFICATION FRAMEWORK



Quantifying the effects of reforms

Key drivers in a production function approach



Purpose:

- Links to policies assessed through well-established channels
- Supported by empirical evidence from aggregate, industry and firm-level data



Policy variables can be classified according to their systemic importance

Channel-specific policies (MFP, capital stock, employment rate)

- **Innovation policies** (*R&D spending, R&D tax credits and grants, industry-university links*)
- **Openness** to foreign trade and investment (*barriers, trade support measures*)
- **Human capital** and skills development (*education and employment policies*)

Framework conditions => Market competition, resource allocation

- **Product and labour market regulation** (*barriers to entry and labour mobility*)
- **Competition Law and Policy**
- **Tax policies**
- **Financial system regulation**
- **Efficiency of bankruptcy legislation**

Legal infrastructure and basic institutions

- **Rule of law**, contract enforcement and efficiency of judicial systems



Data sources

OECD indicators

- i.) the overall Product Market Regulation (PMR) indicator, for more than 60 countries.
- ii.) the Employment Protection Legislation (EPL) indicator has also become available for additional countries. A similar number of countries is covered by PMR and EPL but they do not cover exactly the same countries

Non-OECD indicators

- The World Bank's Doing Business indicators (the cost and time of starting a business, insolvency procedures and contract enforcement)
 - The World Bank's World Governance Indicators (rule of law)
 - The Fraser Institute's Economic Freedom of the World (EFW) ; a measure of business regulation and a measure of labour market regulation (each broken down into six sub-categories).
 - Cambridge Labour Regulation Indicator (CBR LRI), annually labour market-related legal regulations in 117 countries over more than 40 years (Adams et al., 2016).
- Sub-indicators are strongly correlated with each other both along the within (variation over time) and between (cross-country variation) dimensions. Hence, they could not be included in the regressions at the same time.



Trade-offs

OECD indicators

Good coverage of OECD countries over time but less info on non-OECD countries

IDENTIFICATION THROUGH VARIATION OVER TIME
(WITHIN DIMENSION)

Non-OECD indicators

Large cross-country coverage, though with limited time series observations

IDENTIFICATION THROUGH VARIATION FROM CROSS-SECTIONAL DIMENSION (BETWEEN DIMENSION)



OECD'S PRODUCT MARKET REGULATION INDICATOR

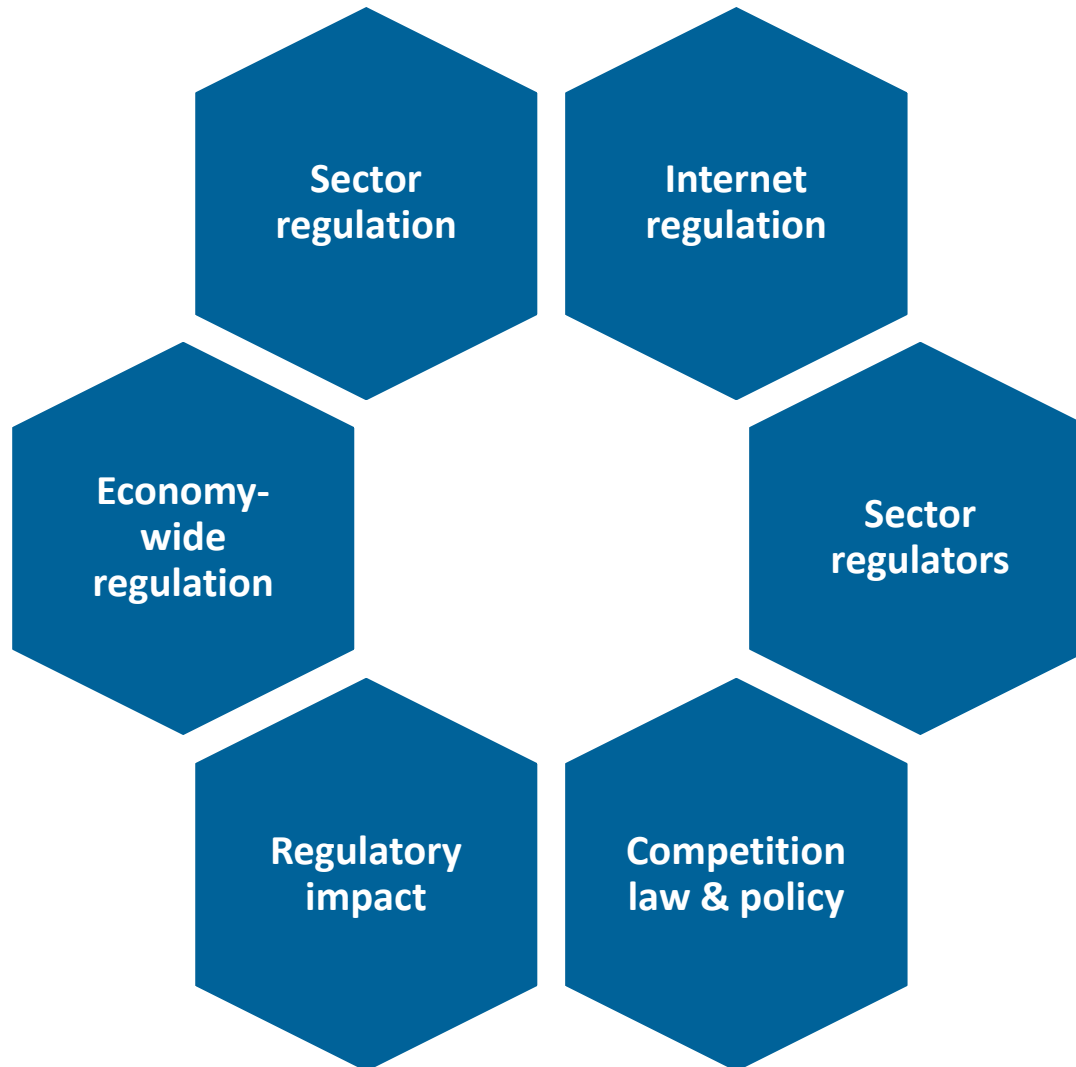


OECD's PMR indicators

- Product market regulation is essential for well-functioning of market-based economy.
 - Market integrity as well as health, safety and environmental goals
- Aspects of regulation create barriers to entry and competition while not necessarily being helpful to other objectives.
 - Limit the **number** of suppliers of a specific service or product
 - Limit the **ability** of suppliers to compete
 - Reduce **the incentives** of suppliers to compete
 - Limit **the choices** and information available to customers

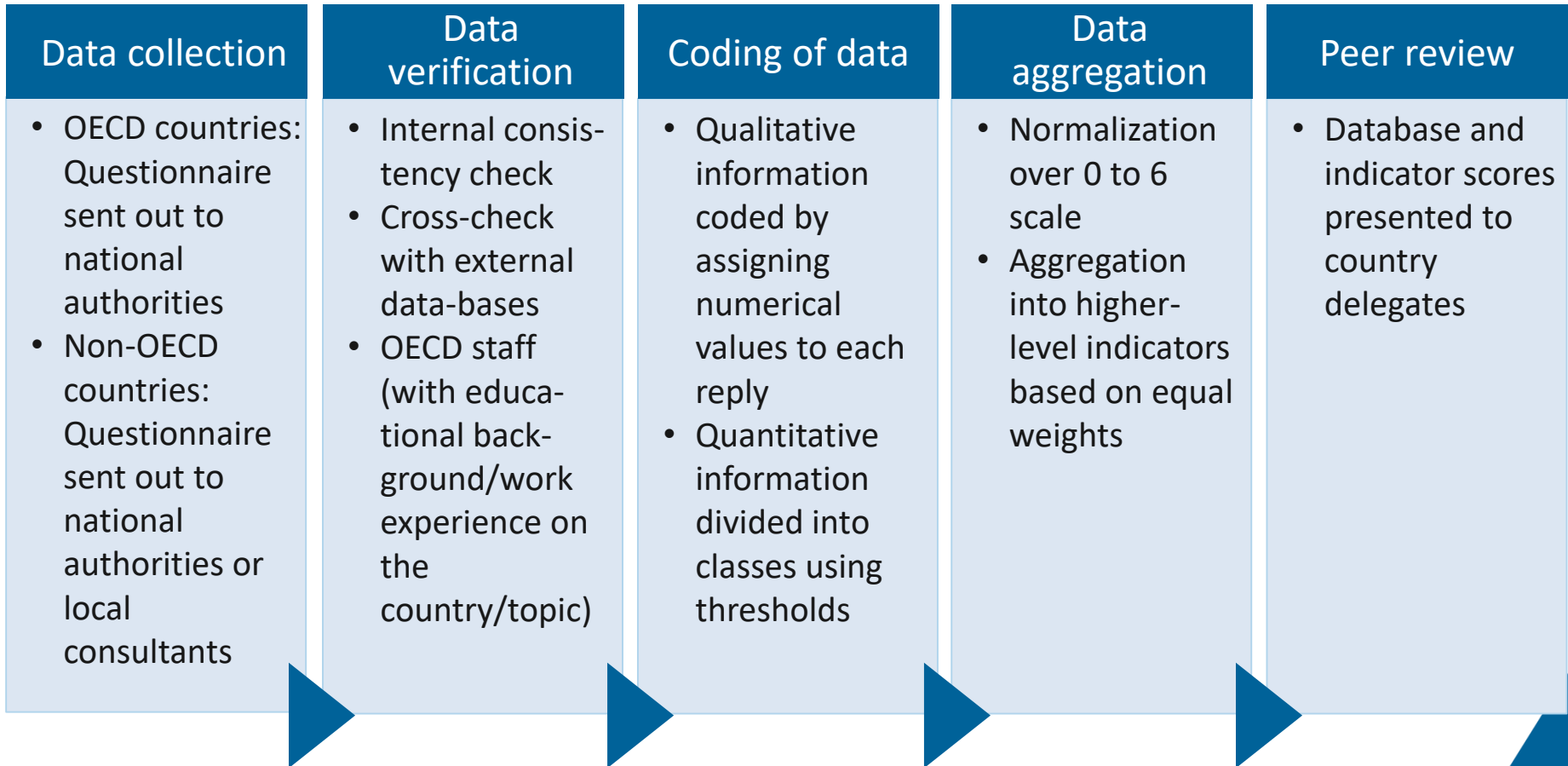


Methodologies and strategies used to construct the indicators.





How do we proceed from data collection to computing the final indicator value?





PMR database: Examples of questions

State control / Public ownership

Do national, state or provincial government control at least one firm in electricity?

Barriers to entrepreneurship / complexity of regulatory procedures

Are there single contact points for issuing or accepting on notifications and licenses?

Barriers to entrepreneurship / Administrative burden on start-ups

How many different public and private bodies would an entrepreneur need to contact to register a public limited company?

How many procedures does the entrepreneur have to complete in the pre-registration and registration stage of the start-up process?

How many services does the profession provide under an exclusive or shared exclusive right?

Barriers to entrepreneurship / Regulatory protection of incumbents

Do laws or regulations restrict, in at least one market in electricity, the number of competitors allowed to operate a business?

Are publicly-controlled firms subject to an exclusion or exemption, either complete or partial, from the application of the general competition law?



STYLISED FACTS

**PER CAPITA INCOME VS.
REGULATION & INSTITUTIONS**

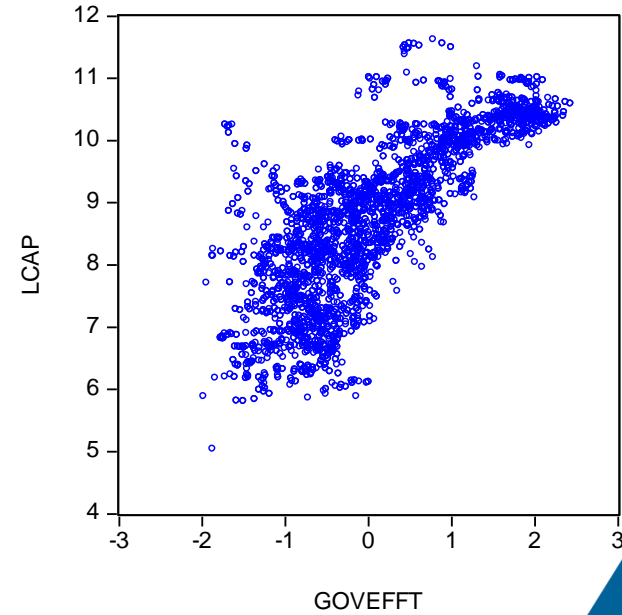
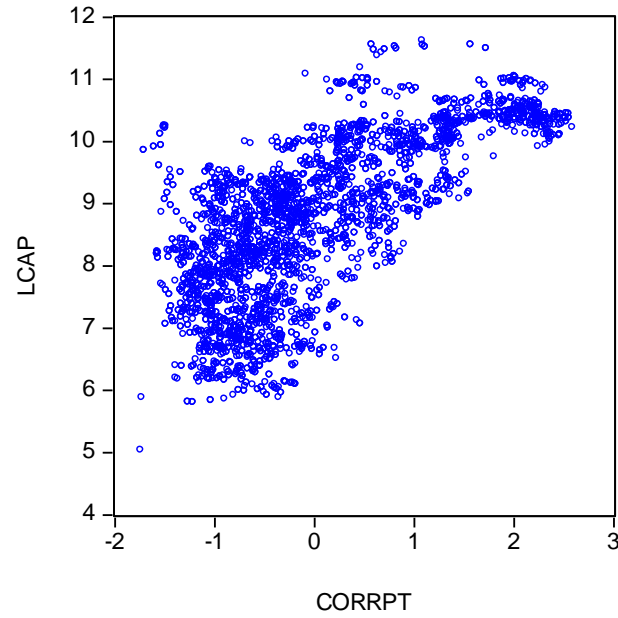
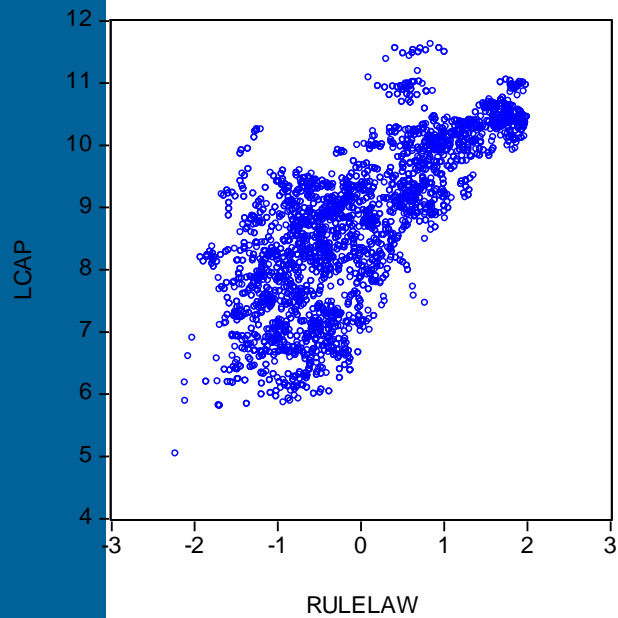


Stylised facts

Rule of law

Corruption

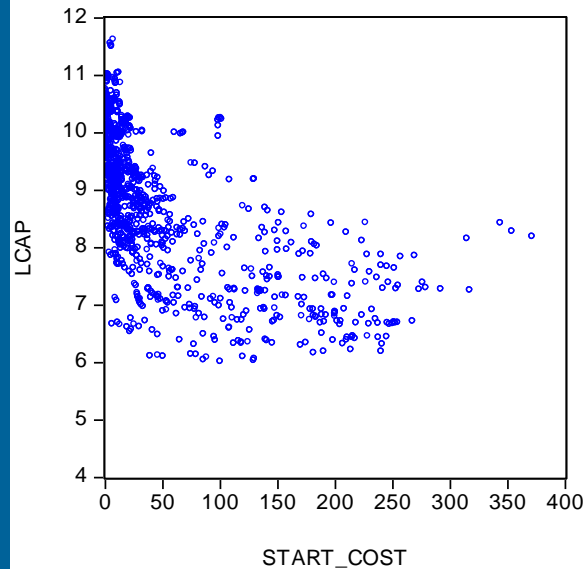
Gov't effectiveness



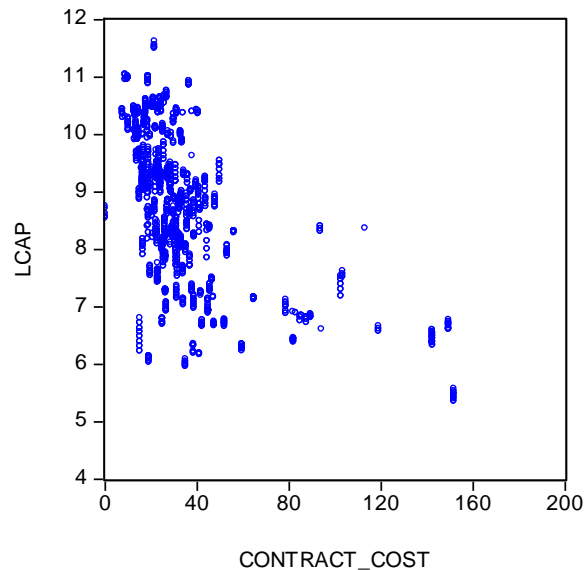


Stylised facts

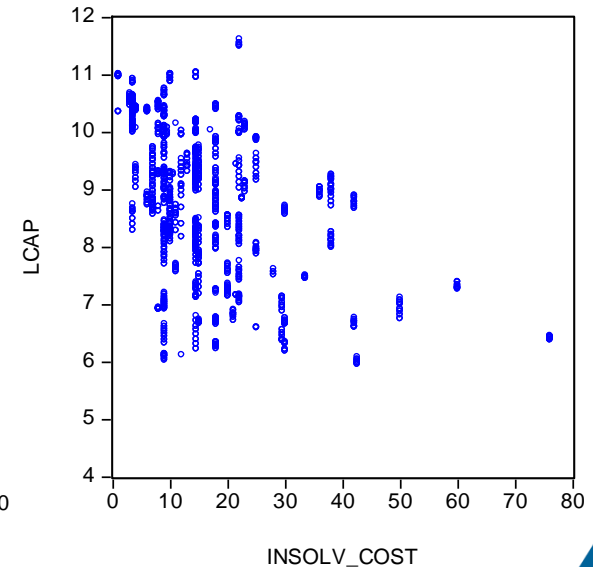
Cost of starting
a business



Cost of contract
enforcement



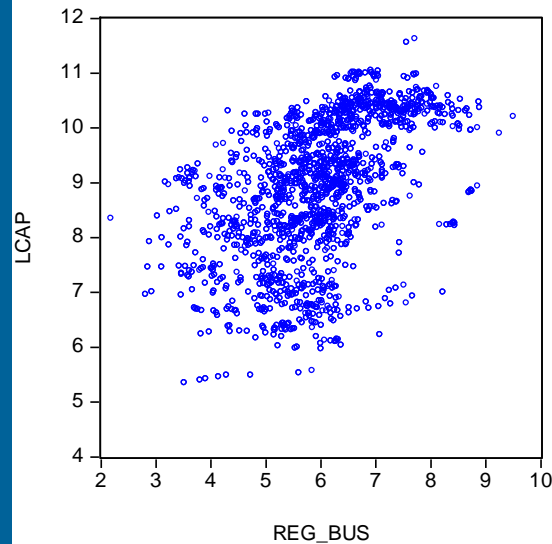
Cost of
insolvency pr.



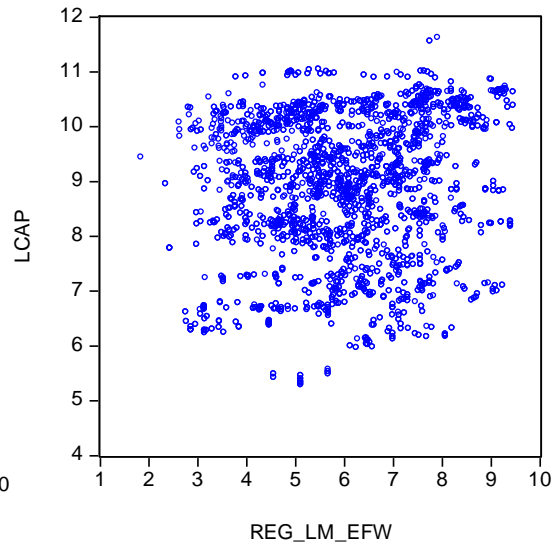


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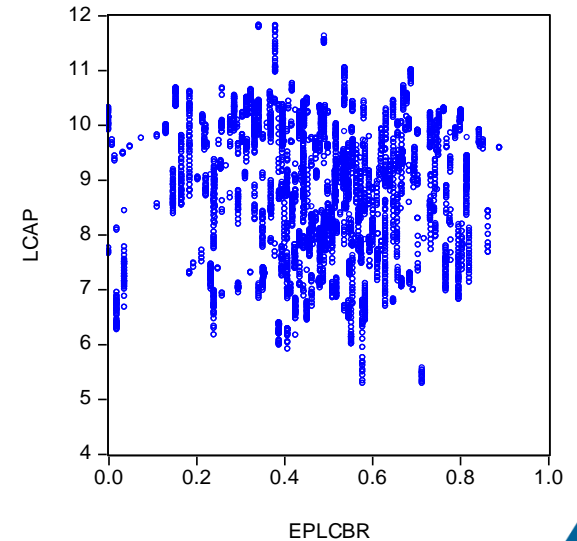
Business
regulation



LM
regulation
Fraser



LM
regulation
Cambridge





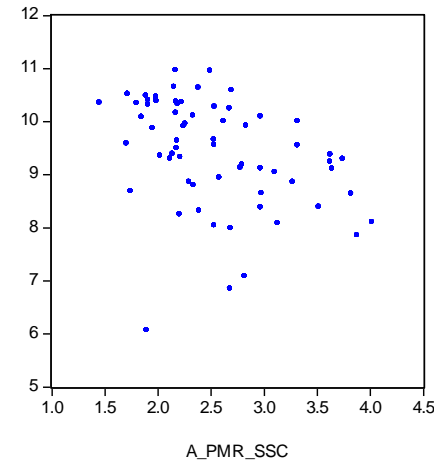
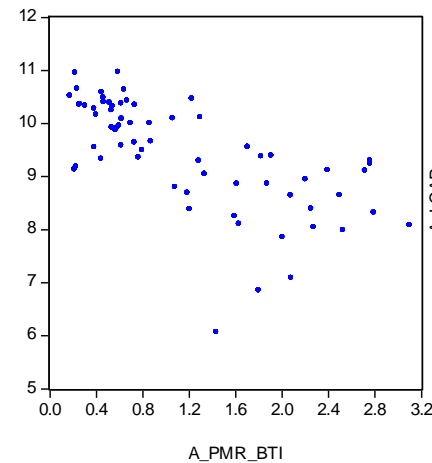
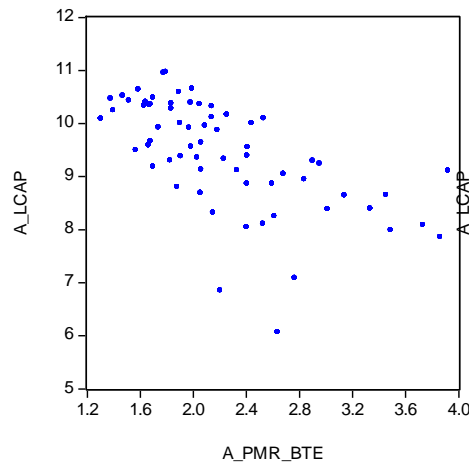
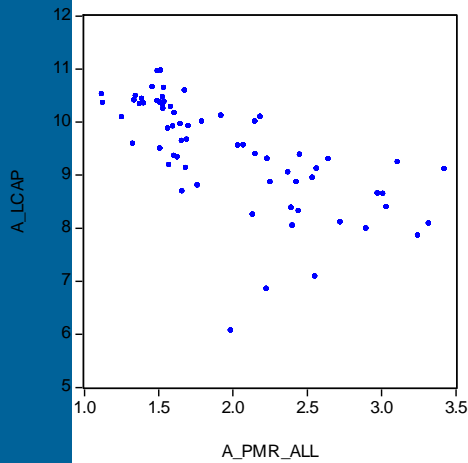
Stylised facts – cross section

PMR overall

**PMR
barriers to entry**

**PMR barriers to
trade&investment**

**PMR
State control**



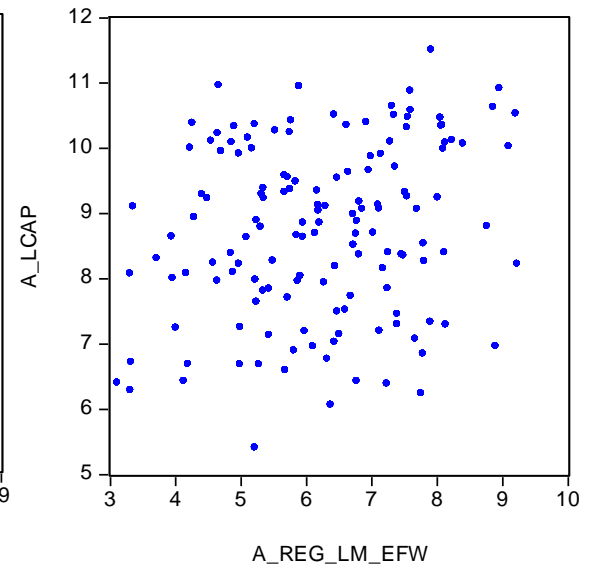
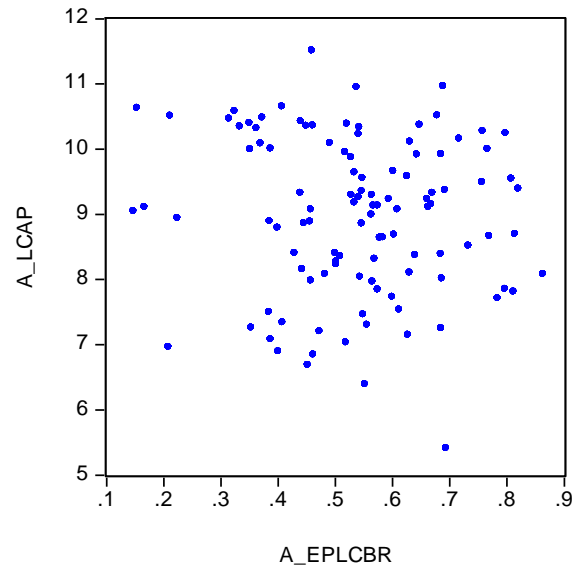
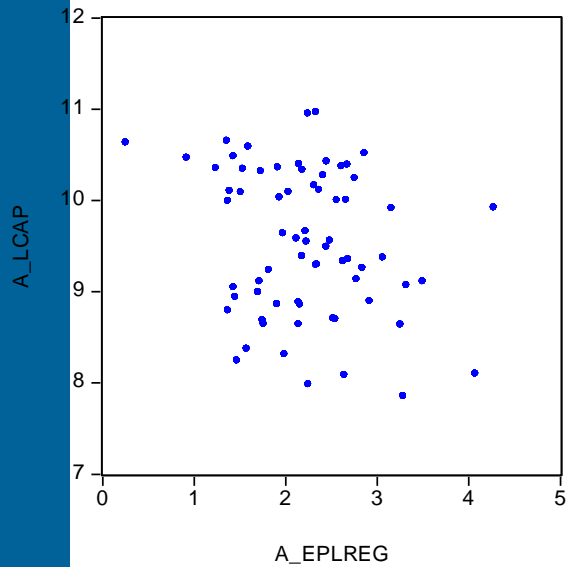


Stylised facts – cross section

EPL (OECD)

EPL (Cambridge)

**Labour market regulation
(EFW)**





SELECTED ESTIMATION RESULTS

1. Productivity (MFP)
2. Physical capital (K / Y)
3. Employment rate (L / N)



Baseline specifications

Multi-factor productivity

$$\begin{aligned} \text{MFP}_{j,t} \\ = f(\text{OPEN}_{j,t}, \text{INNOVATION}_{j,t}, \text{PMR}_{j,t}, \text{LMR}_{j,t}, \text{FMD}_{j,t}, \text{INSTITUTION}_{j,t}) \end{aligned}$$

Capital stock

$$(\text{K}/\text{Y})_{j,t} = f(\text{UCC}_{j,t}, \text{PMR}_{j,t}, \text{LMR}_{j,t}, \text{FMD}_{j,t}, \text{INSTITUTION}_{j,t})$$


Employment rate

$$L_{j,t} = f(\text{PMR}_{j,t}, \text{LMR}_{j,t})$$



Baseline specifications

Three types of regressions estimated:

- Time series cross-country panel regressions with country and time fixed effects
 - Time series cross-country panel regressions where country fixed effects are replaced by time-invariant variables
 - Pure cross-sectional regressions
- 



Quality of institutions

- **The quality of institutions matters** for productivity / employment / per capita income.
- Difficult to find effects for the capital stock.
- Improvements in institutional quality (government effectiveness and political stability) relate to better economic outcomes.
- Countries with better institutions have superior economic outcomes.

Product market regulation / business regulation

- Greater barriers to trade and investment are linked to weaker **productivity / per capita income**.
- More regulation captured by Doing business indicators and the Fraser Institute's business regulation indicator => **lower productivity**
- The PMR indicator exhibits a negative link to **capital stock and the employment rate**.



Labour market regulations

- **Difficult to establish a firm relation to productivity**, in particular in the cross-sectional dimension
- **Employment rate:**
 - Tighter labour market regulations is associated with a decrease in the employment rate (**EFW's labour market regulation indicator**).
 - In the cross-section dimension, stricter labour market regulation goes hand in hand with lower employment rates for the **EFW's indicator and the Cambridge EPL indicator**.
 - **The OECD's EPL indicator** does not seem to be have a statistically significant relationship to the employment rate .



Other variables

- *Financial development*
 - Greater findev boosts productivity and the capital stock
- *Human capital*
 - Positive correlation with outcome variables
- *Innovation intensity & trade openness*
 - Difficult to identify robust relationships




Country heterogeneity

Threshold regressions

- ***Productivity***

- Business regulation is more detrimental to productivity in less developed countries and if the rule of law is weak
- PMR has a stronger negative link with productivity if the rule of law is weak

- ***Employment***

- LM regulations are more binding in more developed countries and if the rule of law is strong
- 



Summary of estimation results

	MFP	capital deepening	employment rate	per capita income
Linear relationships				
within dimension				
institutions	YES	NO	YES	YES
business regulation	YES	NO	NO	NO
product market regulation	--	--	--	--
labour market regulation	--	YES	YES	--
financial system development	YES	NO	--	YES
between dimension				
institutions	YES	NO	YES	YES
business regulation	?	NO	NO	NO
product market regulation	BTI	BTE, SSC	BTE, SSC	BTI
labour market regulation	YES??	NO	YES??	NO
financial system development	YES	YES	--	YES
Non-linear relationships - between dimension				
non-linear variables		conditional on per capita income		
business regulation	YES	NO	YES	YES
product market regulation	BTE,BTI,SSC	NO	BTE, SSC	BTE,BTI,SSC
labour market regulation	NO	NO	YES	NO
		conditional on institutions		
business regulation	YES	NO	YES	YES
product market regulation	BTE,BTI,SSC	BTE, SSC	BTE, SSC	BTE,BTI,SSC
labour market regulation	NO	NO	YES	NO
		conditional on labour market regulations		
business regulation	NO	NO	NO	NO
product market regulation	BTE,BTI,SSC	NO	BTE,SSC	BTE,BTI,SSC
labour market regulation	NO	NO	NO	NO



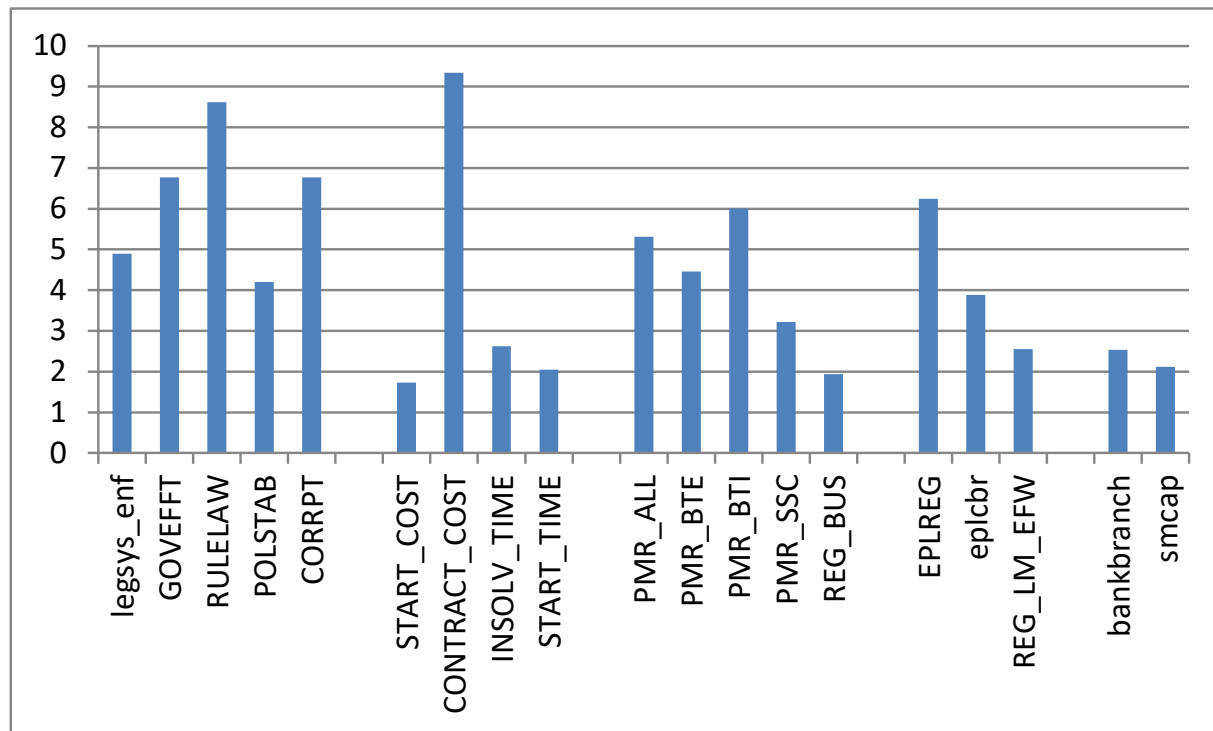
ILLUSTRATIONS OF REFORM EFFECTS



Nature of the data

- Cross-country variation vs. variation over time

Figure 3. The ratio of standard deviation of the pure cross-section to standard deviation over time





Reform effects – supply-side channels

Worldwide sample

	IMPACT THROUGH						TOTAL IMPACT			
	MFP		K/Y		L		per capita income: aggregated from MFP, K/Y and L		per capita income: derived from estimations	
	within	between	within	between	within	between	within	between	within	between
INSTITUTIONS										
government effectiveness	7.4%	50.0%			0.8%	5.2%	8.2%	55.2%	7.7%	51.8%
rule of law	5.0%	42.9%			0.5%	4.5%	5.5%	47.4%	5.2%	44.7%
political stability	5.7%	24.0%			1.0%	4.3%	6.7%	28.3%	6.6%	27.6%
corruption	5.9%	39.8%			0.9%	6.0%	6.8%	45.8%	5.9%	40.2%
BUSINESS REGULATION										
cost of starting a business	0.8%	1.3%	9.0%	15.6%			9.8%	16.9%		
cost of contract enforcement	1.4%	13.5%					1.4%	13.5%	1.1%	10.3%
time of insolvency procedures	5.6%	14.6%			1.1%	2.8%	6.6%	17.4%	7.1%	18.6%
PRODUCT MARKET REGULATION										
PMR - overall	--		--	8.9%	--	1.5%	--	10.4%	--	
PMR - barriers to entry	--		--	5.2%	--	2.0%	--	7.2%	--	
PMR - barriers to trade&investment	--	15.5%	--		--		--	15.5%	--	21.3%
PMR - scope of state control	--		--	6.4%	--	4.1%	--	10.5%	--	
LABOUR MARKET REGULATION										
EPL - OECD regular contracts						0.9%		0.9%		
EPL - Cambridge indicator					0.8%	3.1%	0.8%	3.1%		
labour market regulation (EFW)			2.1%	5.5%	0.8%	2.0%	2.9%	7.5%		
FINANCIAL DEVELOPMENT										
banking sector	4.9%	12.4%	4.2%	10.7%			9.1%	23.0%	6.1%	15.4%
financial markets	8.1%	17.2%					8.1%	17.2%		



Thank you very much



Data sources

	source	country coverage	time coverage
PRODUCT MARKET REGULATION			
Product Market Regulation - overall			
Product Market Regulation - barriers to entry	OECD Product Market Regulation	around 60	every five years, only one observation for about 15 countries
Product Market Regulation - barriers to trade & investment	Indicators database		
Product Market Regulation - scope of state control			
GENERAL BUSINESS SECTOR REGULATION			
Business regulation	Fraser Institute	more than 100 countries	annual, about 10 years
cost of contract enforcement			
time of contract enforcement			
cost of insolvency procedures	World Bank Doing Business	more than 100 countries	annual, about 10 years
time of insolvency procedures	Indicators		
cost of starting a business			
time of starting a business			
LABOUR MARKET REGULATION			
EPL regular contracts	OECD	around 60 countries, 10 countries different than for PMR	annual, 30 years, only one observation for about 15 countries
labour market regulation	Fraser Institute	more than 100 countries	annual, about 10 years
EPL regular contracts	Cambridge	117 countries	annual, 40 years
INSTITUTIONS			
legal system			
legal system - enforcement	Fraser Institute	around 100 countries	annual, about 10 years
legal system - judicial independence			
rule of law			
political stability	WB's World Governance	around 100 countries	
corruption	Indicators		
government effectiveness			
FINANCIAL DEVELOPMENT			
financial liberalisation - EFW	Fraser Institute	around 100 countries	annual, until 2005
domestic credit % GDP			
domestic private credit % GDP	World Bank's World Development	around 100 countries	annual, about 30 years
bank branches per capita	Indicators database		
stock market capitalisation % GDP			
stock market turnover % GDP			
TRADE OPENNESS			
openness	World Bank's World Development		