

Labour Reallocation and Productivity

Eric Bartelsman

Vrije Universiteit Amsterdam and Tinbergen Institute

Labour Mobility in the Lisbon Agenda,

Helsinki, Sept. 4, 2006

This work is partially funded by the European Commission, Research Directorate General as part of the 6th Framework Programme, Priority 8, "Policy Support and Anticipating Scientific and Technological Needs".



Overview

- *Introduction*
- **Understanding Productivity**
- **Links between reallocation and productivity**



Introduction

- **Productivity: output per unit of input**
 - E.g. GDP per hour worked
 - Real quality adjusted production per unit of aggregate input (KLEMS)
- **Increases in productivity are bound only by our own creativity**
 -subject to optimal accumulation of physical and human capital and hard resource constraints
- **Productivity improvements may ‘buy:’ goods, leisure environment, retirement etc...**



Long run productivity growth

Commodity	Time to earn 1885 (hours)	Time to earn 2000 (hours)	Productivity multiple
1-speed Bicycle	260	7.2	36.1
Office chair	24	2.0	12.0
Hair brush	16	2.0	8.0
Silver Spoon	26	34.0	0.8

Source: Brad DeLong, 1991-2000



Growth Accounting – USA

	Growth rate 2004-2000	Sectoral growth contribution 2004-2000		Sectoral contribution to acceleration 2004-2000 vs 2000-1995	
	Sectoral Production	TFP	ICT-capital	TFP	ICT-capital
Non-farm Private Business	2.3	2.3	0.5	1.2	-0.6
Non High-Tech	2.0	1.7	0.4	1.4	-0.4
Manufacturing	0.6	0.4	0.0	0.3	-0.1
Construction	0.9	0.0	0.0	0.1	0.0
Distr and Trade	3.1	0.7	0.1	0.0	-0.1
FIRE	2.8	0.6	0.2	0.8	-0.2
Pers. Services	2.1	0.0	0.0	0.2	0.0
High-tech	3.2	0.6	0.0	-0.2	-0.2

Source: Corrado, Lengermann, Bartelsman, Beaulieu; 2006

Open questions

- **Why is ICT uptake relatively low in the EU?**
 - **Does ICT contribution depend on characteristics of firms or markets?**
- **Why is US TFP growth now broad based?**
 - **Is TFP growth high in all firms?**



Is labour reallocation part of the answer?

- **What are the links between labour reallocation and productivity?**
 - Is there a direct reallocation effect?
 - Can reallocation affect the diffusion of technology?
 - Can reallocation affect innovation?
- **Previously explored links:**
 - **Labour market flexibility affects investment in workers**
 - unemployment risk reduces worker's own investment
 - firing costs encourage worker re-training
 - lower incentive to train temporary or part-time worker
 - e.g. OECD Jobs Study 1994,



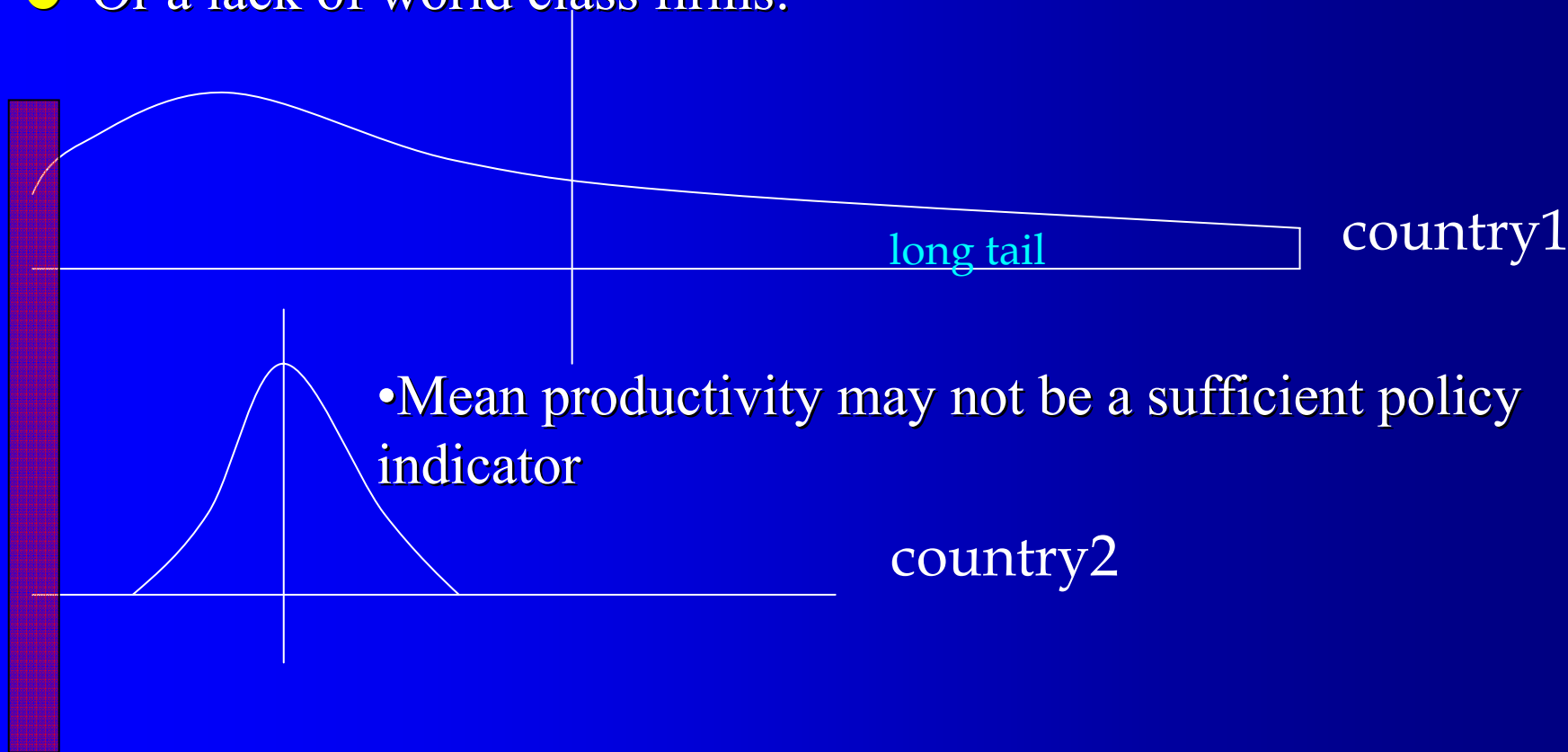
Overview

- **Introduction**
- *Understanding Productivity*
- **Links between reallocation and productivity**

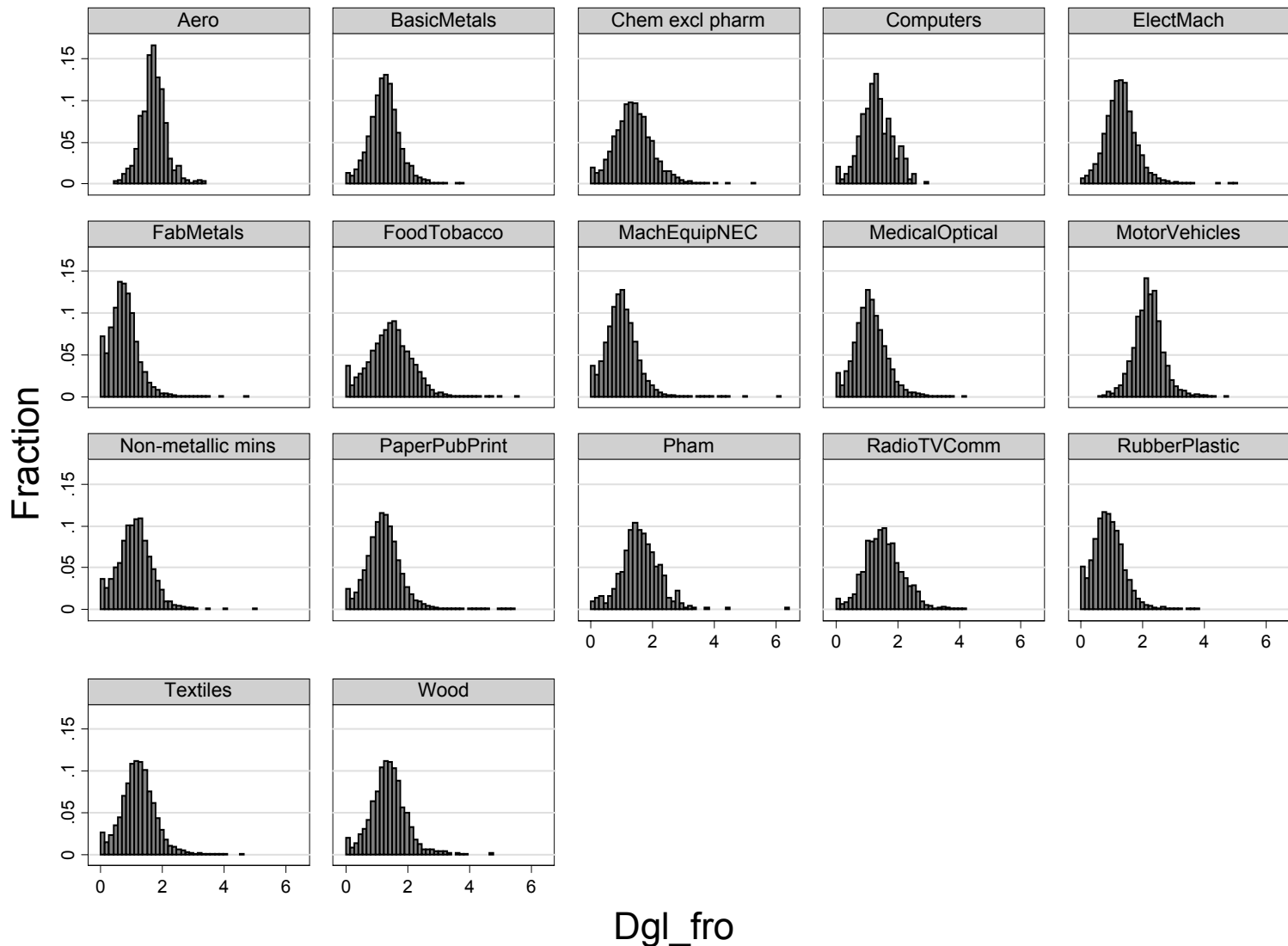


Firms produce not countries or industries

- Variation in firm-level productivity within industry or country
- A country could have a ‘long tail’ problem:
- Or a lack of world class firms:



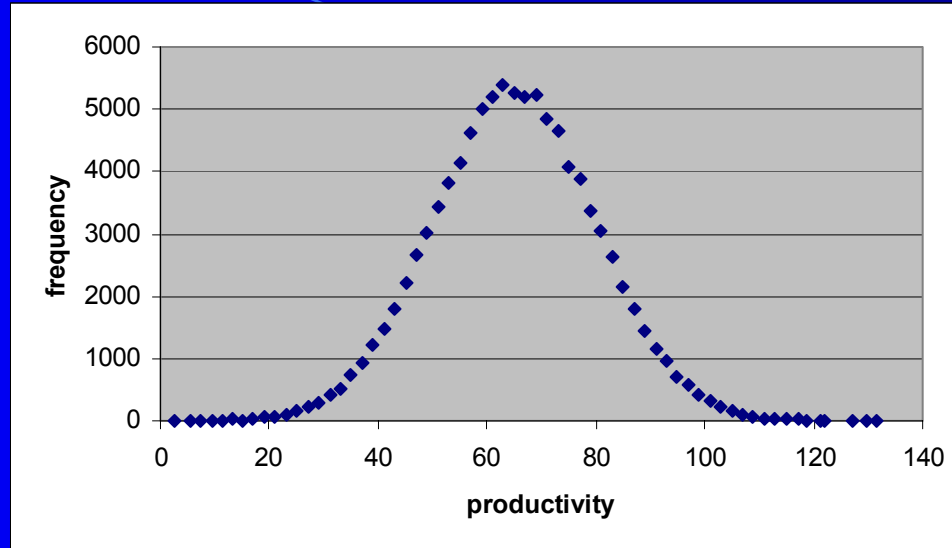
Firms in the UK and the global frontier



Graphs by stan0label



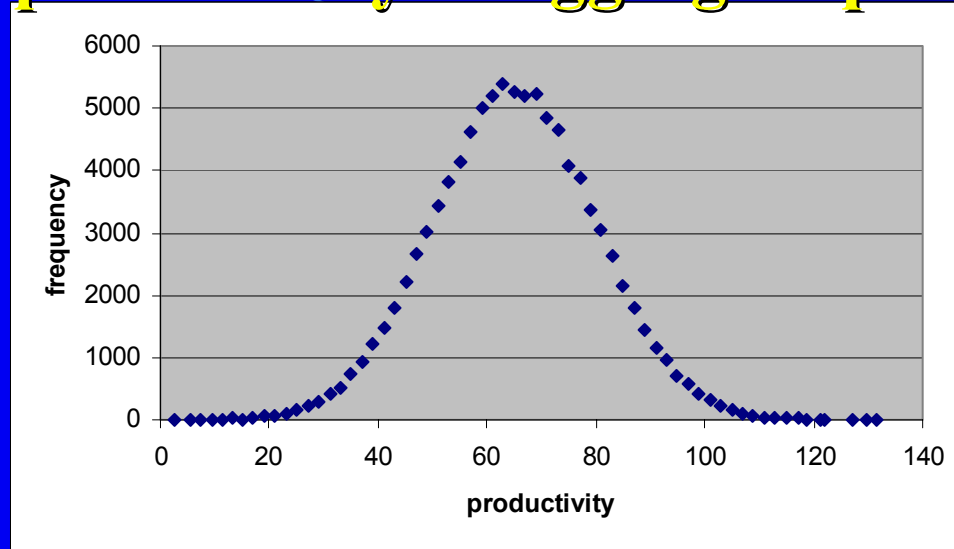
Average productivity vs aggregate productivity



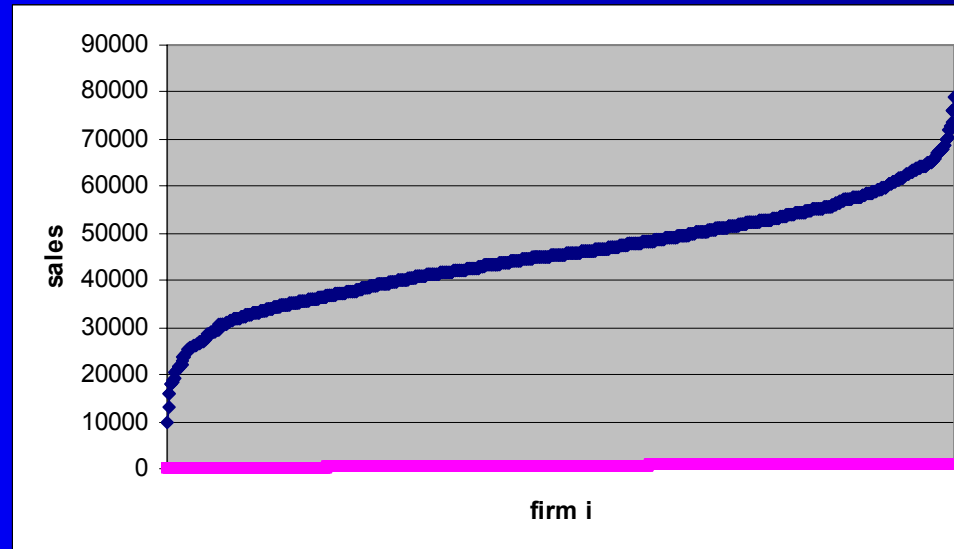
Aggregate productivity depends not only on the distribution of productivity across firms within an industry...



Average productivity vs aggregate productivity



...but also on the size distribution



Drivers of productivity growth 'below the frontier'

- Diffusion of existing technology
 - Human capital
 - Market pressure
 - Framework conditions
- Reallocation from low to high productivity firms
 - Frictions prevent instantaneous optimal allocation
 - policy may affect frictions in:
 - product markets, labor markets, firm entry/exit



Drivers of the productivity frontier

➤ Innovation

- R&D
- Experimentation (Bartelsman and Scarpetta, 2004)
 - Often non-technical, ie business concepts and processes; new services
 - Success determined in the market, not just in the lab.
 - Successful outcome can be ‘replicated’ or scaled



Overview

- **Introduction**
- **Understanding Productivity**
- *Links between reallocation and productivity*



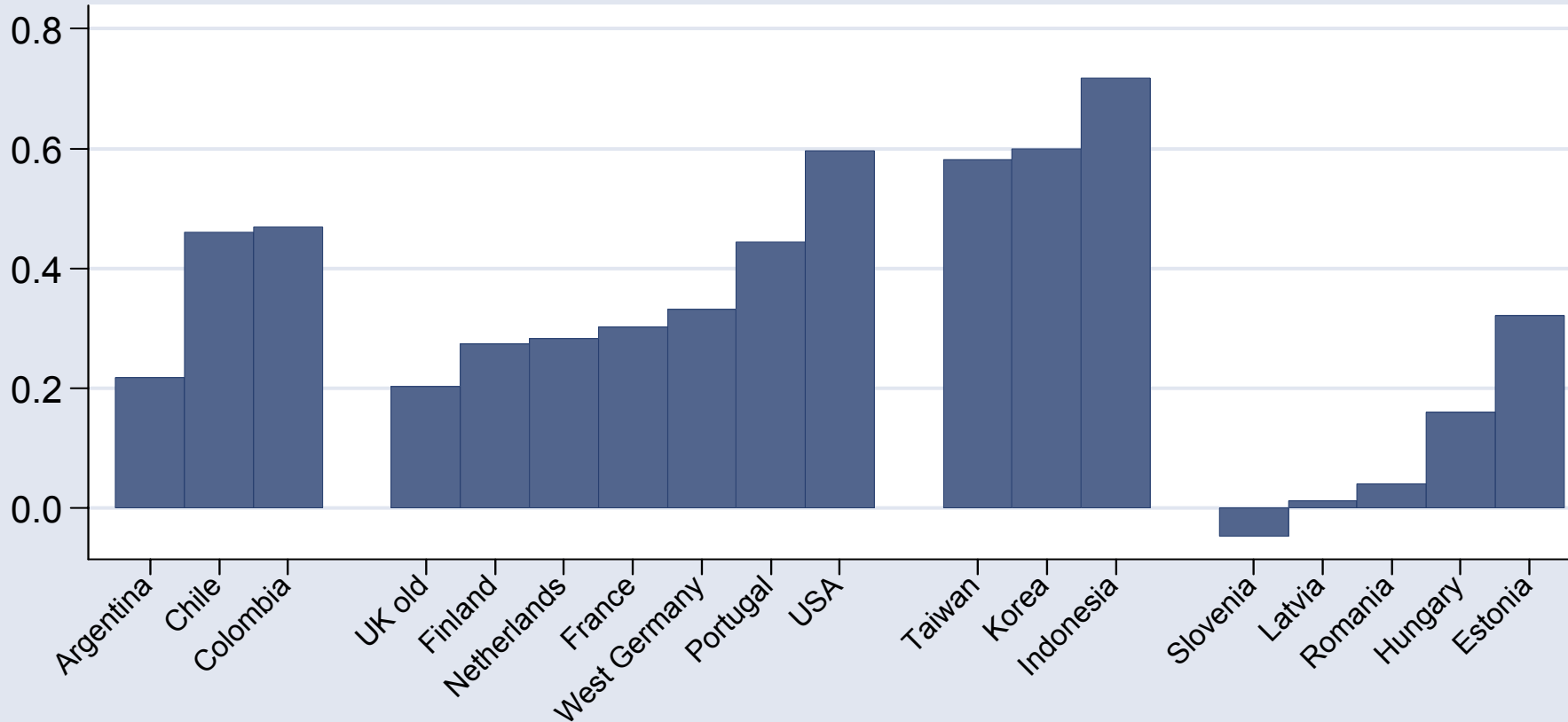
Frictions and allocation

- Some deviation from the neo-classical paradigm is needed to support a direct effect of reallocation on productivity
 - Search frictions; overhead labor; oligopolistic markets
 - (Levinsohn and Petrin vs. Restuccia and Rogerson; Lagos; Bartelsman et al; Hsieh and Klenow; Bannerjee and Duflo)
- Firing costs and other labor adjustment costs worsen allocation and thereby lower aggregate productivity
 - direct effect on employment decision of incumbent
 - selection effect: good firms may not enter market and poor firms may not leave



The Gap Between Weighted and Un-Weighted Labor Productivity, 1990s

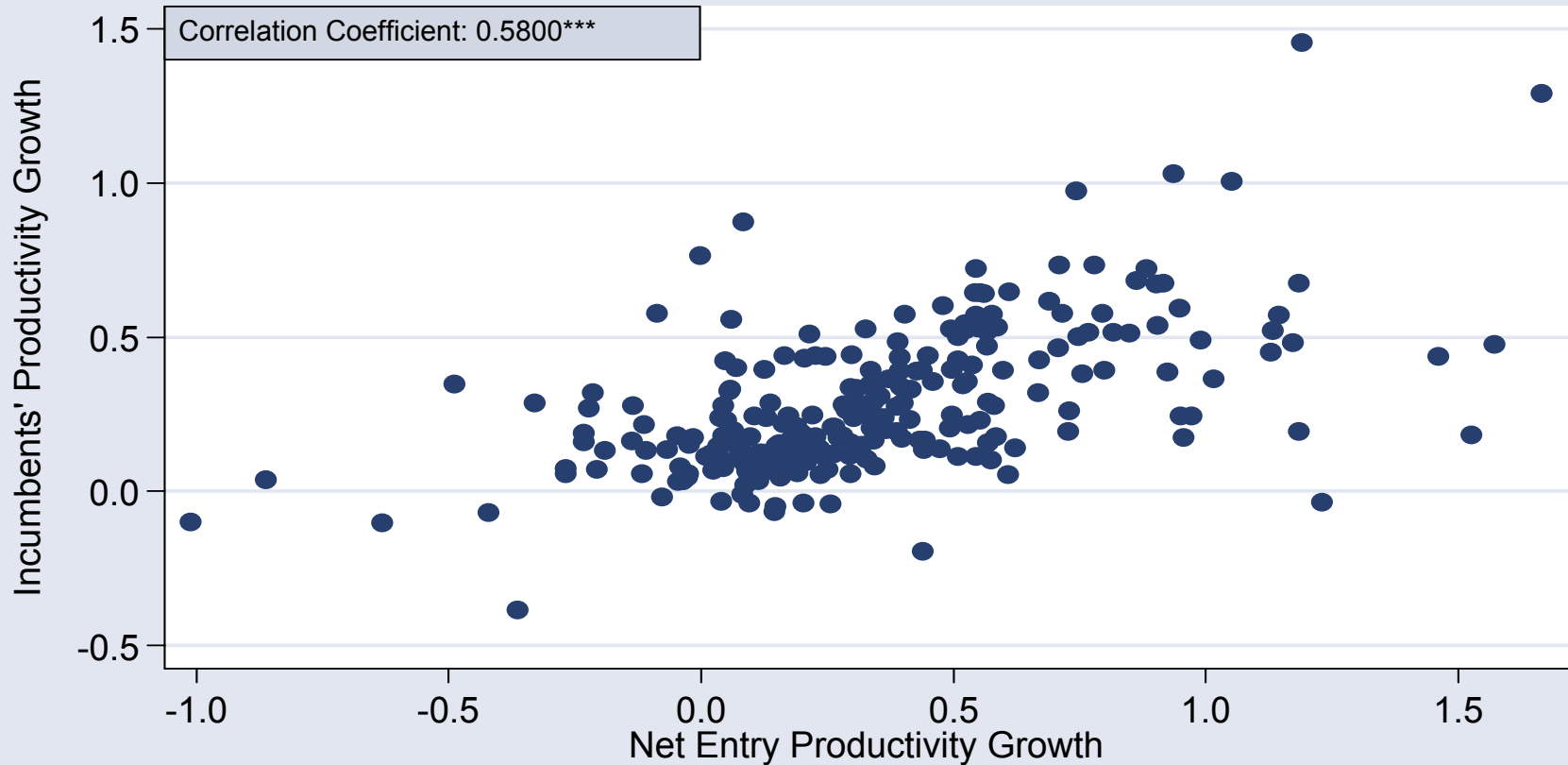
Five-Year Differencing, Real Gross Output, Manufacturing



Data for Hungary, Indonesia and Romania use Three-Year Differencing.
Excluding Brazil and Venezuela.

Reallocation and diffusion

Labor Productivity - Pooled Manufacturing
Five-Year Differencing, Real Gross Output
Country and Industry Time Averages



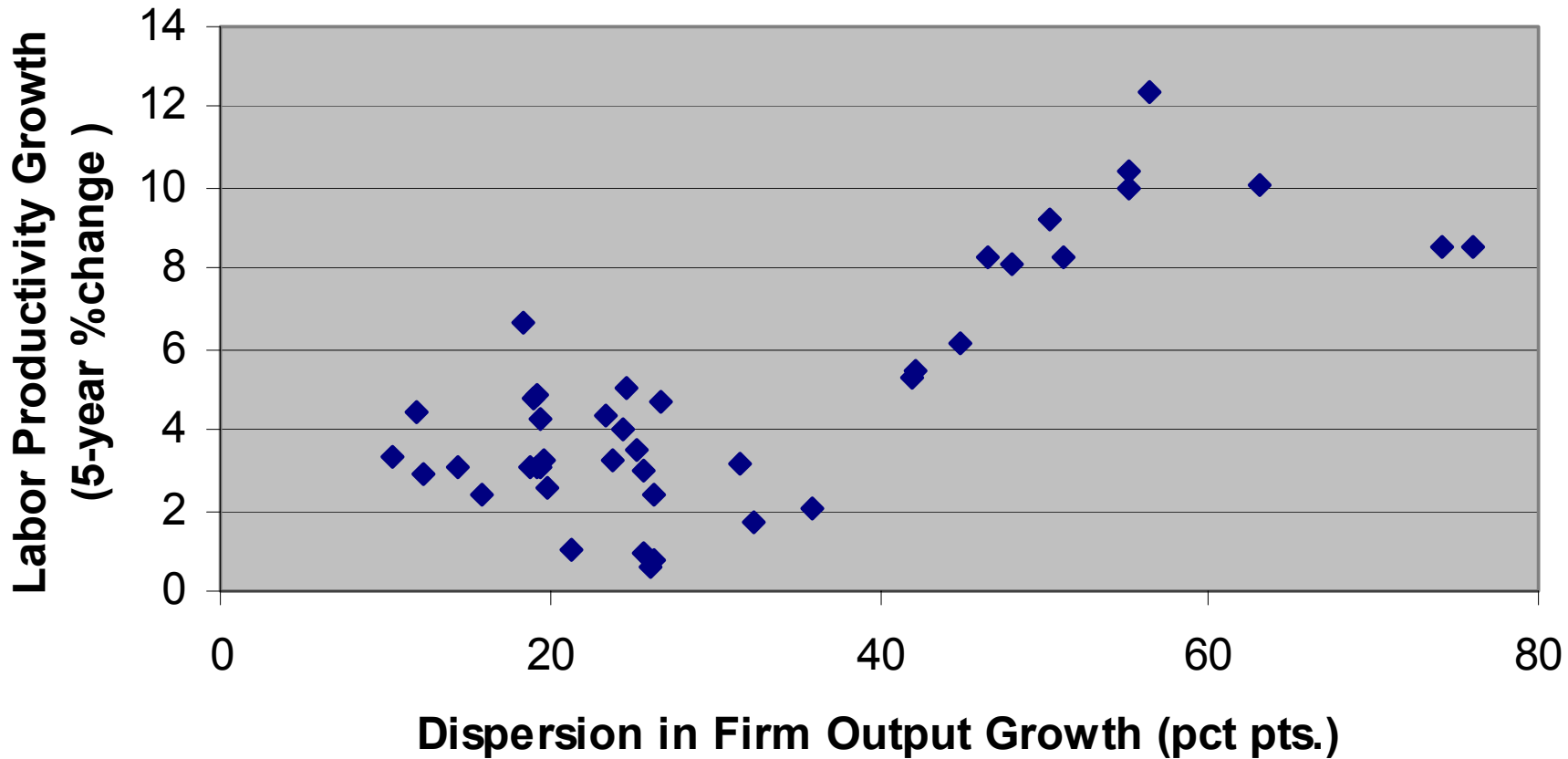
Note: Excluding Brazil and Venezuela. Outliers Excluded.

Pushing out the productivity frontier

- Increase private return to R&D
 - IPR
 - Subsidy
- Increase private return to Experimentation
 - Leverage successful new goods/services/business concept through:
 - Increase in scale
 - Replication in other markets
 - Rapidly redirect resources away from less successful experiments



Flexibility and productivity growth

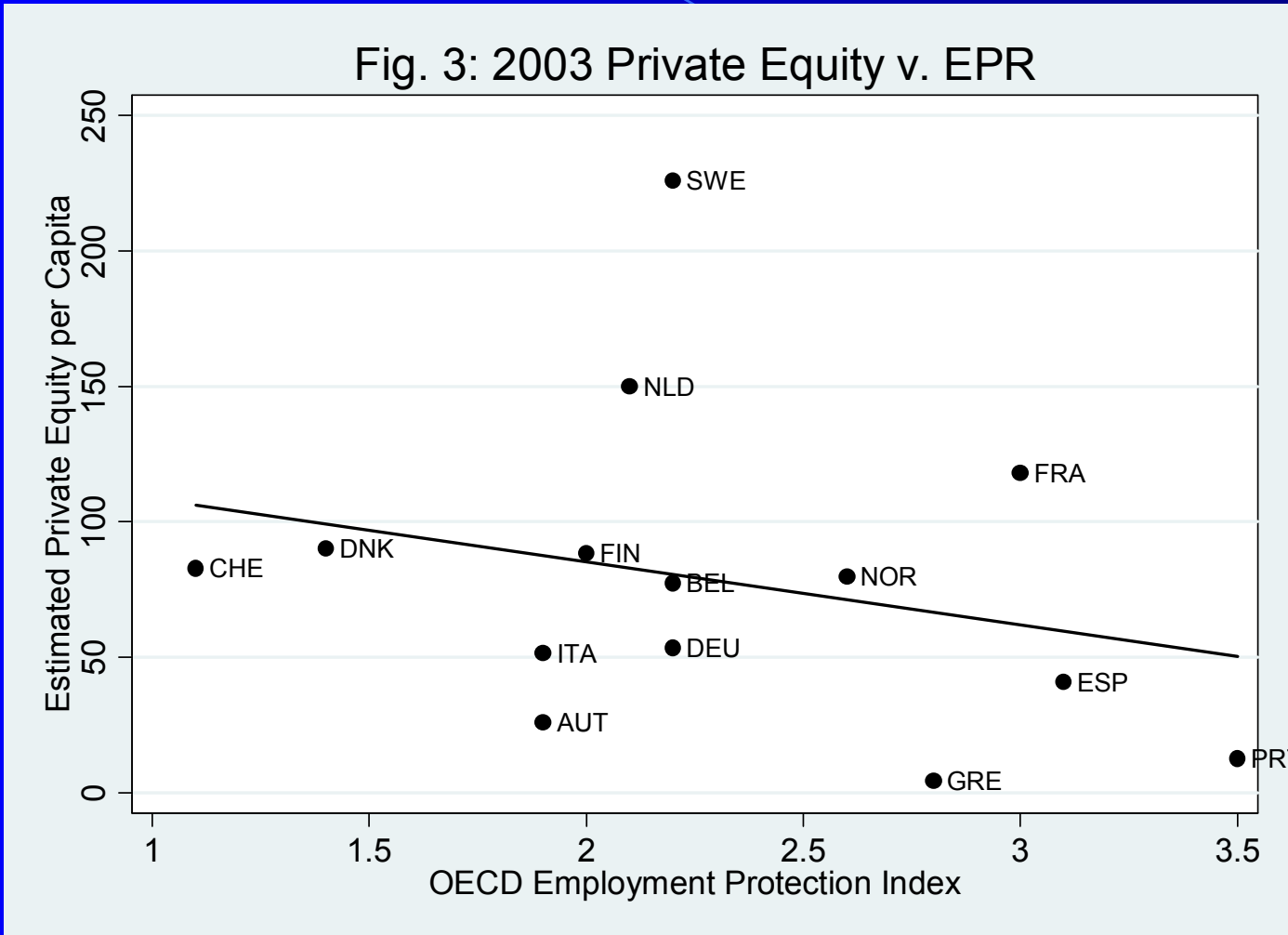


Venture Capital and reallocation

- “The VC industry thrives in high-growth industries with disruptive technological change, where rapid employment changes are frequently necessary” (Bozkaya and Kerr, 2006)
 - Many start-up firms either fail or face turbulent growth periods that require workforce changes
 - VC is a homerun game ...The median returns on an investment is ~ -40%; 4% of the firms created 66% of the IPO value in the 1997-2001 boom
 - Two important roles of a VC are to shut down failing ventures and/or replace early employees who no longer have the skills and experiences appropriate for the firm’s current needs



Private Equity and Employment Protection



source: Bozkaya and Kerr, 2006



Links between labour reallocation and productivity

- **There is a direct reallocation effect**
 - **In simulation models labor adjustment frictions lower productivity through worsened selection and allocation**
- **Reallocation can affect diffusion of existing technology**
 - **Incumbent firms productivity growth is related to indicators of market churn**
- **Reallocation can affect innovation**
 - **Attempts to push out the technology frontier are boosted by ‘potential scale’**
 - **VC harmed by EPR (but boosted by UI)**
 - **Experimentation higher with more flexibility**



THE US IS BETTER AT ACHIEVING EXCELLENT PRODUCTIVITY AND REALLOCATING RESOURCES TO MOST PRODUCTIVE COMPANIES

2000

Companies' quartile¹⁾

US vs. EU²⁾ productivity
Percent

Share in employment³⁾
Percent

Employment growth⁴⁾
Percent

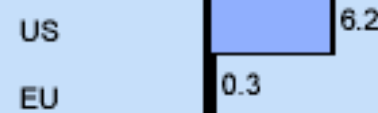
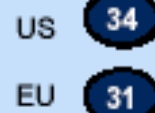
US lower | US higher

Most productive quartile

2nd quartile

3rd quartile

Least productive quartile



Top US companies grow faster than top EU companies

The US eliminates its least productive companies; the EU does not

1) Aggregated data for manufacturing sector, STAN 15t37

2) Weighted average of EU countries for which data were available; Finland, France, United Kingdom, the Netherlands and Sweden

3) Average share 1995-2000

4) Average annual growth in resources, 1995-2000

Source: ESI-VU

Conclusions

- **Drivers of productivity are different for firms at the ‘technology frontier’ and firms ‘below’ the frontier**
 - **At the frontier: leveraging intangible assets matters so potential scale is important**
 - **Costly reallocation is very harmful**
 - **Below the frontier: shifting resources to better firms and adoption of technology are key drivers**
 - **Costly reallocation directly harms first channel, but has ambiguous effect on e.g. worker training**

