

# Developing and Analyzing Firm-Level Indicators on Productivity and Reallocation



## In brief

- Productivity growth is the main driver of long-run increases in per capita income and welfare. There may be multiple paths to aggregate productivity: firm-level improvements, resource allocation across firms that differ in productivity and entry and exit conditions of firms.
- This study aims to provide a method to measure these components in a harmonized manner across countries, in order to identify the effects on productivity growth of cross-country differences in policy.
- Firms are enormously heterogeneous in terms of product type, quality, price, choice of inputs, and productivity and profitability. Policy distortions widen the width of the distribution of firms, as well as the extent to which resources move to the best firms.
- A ‘level playing field’ - allowing firms to make decisions based on technical capabilities and demand instead of profitability - is affected by policy. Our measure of this improved during the 1990s in transition economies. This may have reduced the gap between per capita income in these countries and the richest OECD countries by about 10% points.
- Labour market turnover is affected by labour market regulations. This result is often not found in cross-country settings due to differences in industry compositions. However, when controlling for industry composition, we confirm that higher hiring and firing costs reduce job turnover and thus the speed of reallocation needed.
- The type of firms that a country produces depend on the policy and institutional environment. In transition economies, distortions to profitability may often lead otherwise productive firms to exit the market.

## Policy Motivation

*“Understanding the sources of productivity growth and the effect on policy on growth may provide for improvements in growth-oriented policy”*

Productivity growth is the main driver of long-run increases in per capita income and welfare. Understanding the sources of productivity growth and the effect on policy on growth may provide for improvements in growth-oriented policy. Recent research has suggested that multiple paths to aggregate productivity must be distinguished: improvements at the firm-level, improvements in resource allocation across firms that differ in productivity, and entry and exit of firms. Our project aims at providing a method to measure these different components in a harmonized manner across countries, and in finding methods to analyze these data in order to identify the effects on productivity growth of cross-country differences in policy.

## Policy Impact

Our work may provide a framework for evaluating the effect of changes in policy and economic institutions within a country, by comparing the impact of these changes on dynamics of productivity and resource use at firms in the country under study (treatment), as compared to firm-level dynamics in other countries (control). One of the main shortcomings in assessing the effect of policy using only information from one country, is that one cannot observe firms that have decided not to produce in the given institutional and policy setting.

## Audience

We hope that our work will encourage national statisticians to compile harmonized indicators for many countries, using the methodology and program code we have supplied. We would be very happy if policy makers would commit to evaluating the macro-economic impact of policy changes by comparing the effects on firm dynamics within their country with firm dynamics seen elsewhere. We expect researchers will take our ideas and our data to improve the modeling of firm dynamics and improve upon the methods to measure such dynamics at the firm level.

## Implications

*“We find that our measure of [the] ‘level playing field’, namely the correlation between productivity and firm size, has improved during the 1990s in the transition economies”*

The main findings from our cross-country datasets and analytical research may be summarized as follows:

### **Firms are enormously heterogeneous**

Entrepreneurs and managers in market economies generate a wide variety of choices in many dimensions: product type, quality, price, choice of inputs and production processes, and outcomes in terms of productivity and profitability. Policy makers may only want ‘the best producer’, but in any country we see a wide distribution. Even in well functioning economies, there is a wide distribution given the economic frictions associated with moving resources to the highest valued use. But it also appears that policy distortions widen the width of the distribution as well as the

extent to which resources move to the best firms.

*“Higher hiring and firing costs reduce job turnover, and thereby the speed of reallocation needed to adapt to shocks and changing economic trends”*

### **A ‘level playing field’ allows firms to make decisions based on their technical capabilities and demand for their products instead of on profitability that is affected by policy**

We find that our measure of this ‘level playing field’, namely the correlation between productivity and firm size, has improved during the 1990s in the transition economies. We estimate that this may have reduced the gap between per capita income in these countries and the richest OECD members by about 10 percentage points.

### **The amount of labor market turnover, hiring and firing, in a country is affected by labor market regulations**

This seemingly obvious result often is not found in cross-country settings because of difference across countries in industry composition, but especially in firm age and size. When controlling for these characteristics in our harmonized cross-country dataset, we confirm the theory that higher hiring and firing costs reduce job turnover, and thereby the speed of reallocation needed to adapt to shocks and changing economic trends.

### **The type of firms that produce in a particular country depend on the policy and institutional environment**

While policy makers may now be accustomed to the fact that the tax base responds to the tax rate, it may be less obvious that the firms you do not see in your economy may not be there for policy-related reasons. We find that in the transition economies, distortions to profitability may often lead otherwise productive firms to exit the market. In another study, comparing across EU countries, we find that fewer workers are allocated to industries which would benefit most by adopting ICT in those countries where employment protection is more stringent. We back up this empirical finding with a causal mechanism, by modelling the choice of firms to open vacancies in low-tech versus high-tech industries and estimating the model parameters using information built up from our harmonized cross-country firm-level indicators. Similar studies could be used to re-visit the old question of the ‘missing middle’, or lack of medium-sized firms, or other anomalies found in comparing the cross-country datasets.

## **Brief Summary of Research**

*“These indicators can be used to inform a researcher on the parameters underlying models of firm dynamics”*

Our project has involved collecting, organizing, and analyzing a harmonized cross-country dataset of indicators describing the birth and death of firms, and the development of output and input growth among firms over time. These indicators can be used to inform a researcher on the parameters underlying models of firm dynamics. These models may be used to simulate the effects of various policy changes related, for example to fairness in tax collection, bankruptcy laws, or infrastructure decisions. In one of the research papers prepared for IGC, we assess the importance of cross-country differences in the business environment as perceived by firms, and describe how this can be used to identify the effects of these differences on the developments of output and productivity of firms. Figure 1 shows

how these perceptions may vary systematically across firms by size.

## Implementation

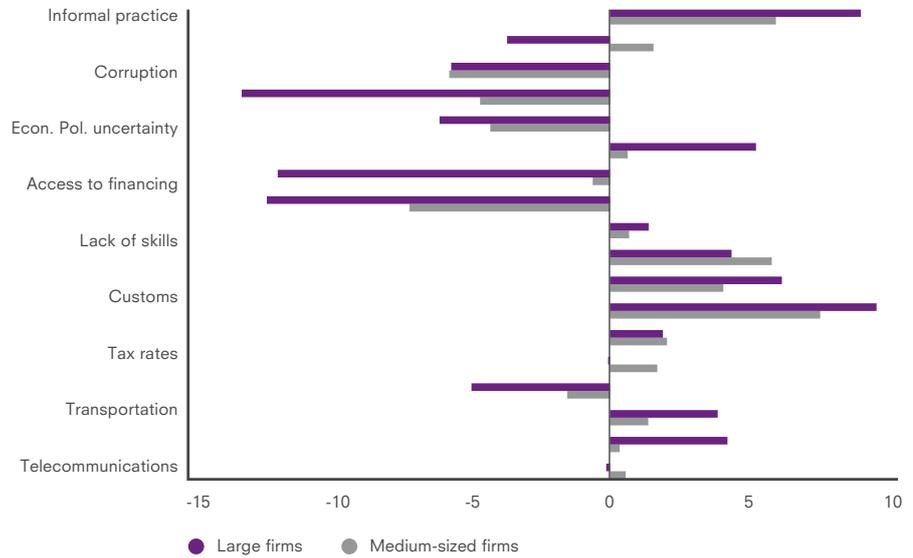
Our analytical work and computer code may be used by statisticians in the IGC countries to add harmonized indicators from their own firm-level data sources to the cross-country dataset. These may then be used to find out how their own policy environment, in comparison with that in reference countries, differentially impacts the development of firms' output and productivity.

## Further Readings

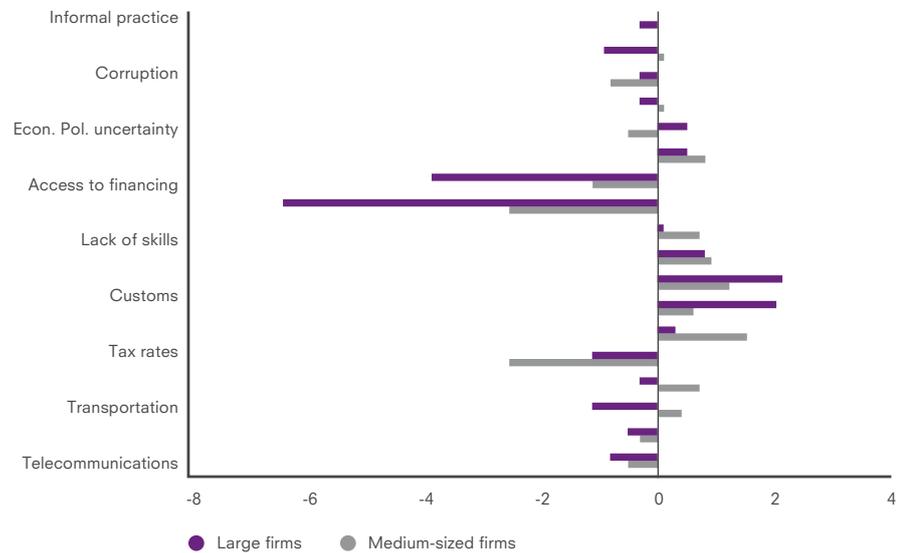
Bartelsman, Eric J., John Haltiwanger, and Stefano Scarpetta, "Cross country and within country differences in business climate", *International Journal of Industrial Organization*. 28 July 2010.

Figure 1: Perceived constraints to the operation and growth potential by firm size (medium-size (20-100) and large firms (100+) versus small firms (fewer than 20 employees)).

Panel A: Latin America and Caribbean region



Panel B: Europe and Central Asia region



## About the authors

*John C. Haltiwanger*, Professor of Economics at the University of Maryland, received his PhD from the Johns Hopkins University in 1981. After serving on the faculty of UCLA and Johns Hopkins, he joined the faculty at Maryland in 1987. In the late 1990s, he served as Chief Economist of the U.S. Census Bureau. He is a Senior Research Fellow with the Longitudinal Employer Household Dynamics Program at the Bureau of the Census and a Research Associate of the Center for Economic Studies at the Bureau of the Census and of the NBER. His recent research has exploited the newly created longitudinal establishment data bases and the longitudinal matched employer-employee data bases that are available at the Bureau of the Census. This research centers on the churning of firms, jobs, and workers in the U.S. economy and the implications of this churning for U.S. productivity growth and the dynamics of the labor market.

*Eric Bartelsman* is Professor of Economics at the Vrije Universiteit in Amsterdam. He studied economics at MIT and received his PhD from Columbia University. He has served as economist at the Federal Reserve Board in Washington DC, as advisor to the CPB, Netherlands, and as head of the economic research department at the Ministry of Economic Affairs in the Netherlands. His research interests focus on the sources of productivity growth, both from a micro and macro point of view. Recently, his work is on international comparisons of the productivity and resource reallocation at the firm-level. Bartelsman is a Fellow of the Tinbergen Institute, and a consortium partner in the EU 6th Framework program EU KLEMS. In 2007, he has been appointed member of the Netherlands Council of Economic Advisors (REA).

The International Growth Centre  
(IGC) aims to promote sustainable  
growth in developing countries  
by providing demand-led policy  
advice based on frontier research.

---

Find out more about  
our work on our website  
[www.theigc.org](http://www.theigc.org)

For media or communications  
enquiries, please contact  
[mail@theigc.org](mailto:mail@theigc.org)

Follow us on Twitter  
[@the\\_igc](https://twitter.com/the_igc)

International Growth Centre,  
London School of Economic  
and Political Science,  
Houghton Street,  
London WC2A 2AE



International  
Growth Centre

Designed by [soapbox.co.uk](http://soapbox.co.uk)