Determinants of Firm Performance in LAC: What Does the Micro Evidence Tell Us?

Matteo Grazzi & Carlo Pietrobelli (Eds.)
Forthcoming 2015

Prepared for:
Innovation & Governance in Development Conference
November 26, 2014
UNU-MERIT
Latin America Recently

- Boosted by external factors, LAC saw relatively strong growth over the past decade, but growth remained weaker than dynamic East Asian economies.
- Even with average growth rates of 6.5% between 2004 and 2008, GDP/capita still remains at about 1/4 of US levels.
Productivity growth is missing

Despite sustained GDP in the last decade, a long-run look shows that LAC has seen relative declines in productivity. In fact LAC growth can be mainly attributed to factors accumulation rather than increases in productivity.

Index of Productivity Relative to US (1960=1)

Growth Accounting:
LAC vs Comparison Countries (1960-2011) (%)

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Δ GDP per capita</th>
<th>Δ Factors Accumulation</th>
<th>Δ TFP</th>
<th>% Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>(a)</td>
<td>(b)</td>
<td>(c)</td>
<td>(c) / (a)</td>
</tr>
<tr>
<td>LAC</td>
<td>1.91</td>
<td>1.67</td>
<td>0.24</td>
<td>11.9%</td>
</tr>
<tr>
<td>USA</td>
<td>1.99</td>
<td>1.21</td>
<td>0.78</td>
<td>39.2%</td>
</tr>
<tr>
<td>China</td>
<td>6.04</td>
<td>4.21</td>
<td>1.83</td>
<td>30.3%</td>
</tr>
<tr>
<td>Finland</td>
<td>2.74</td>
<td>1.44</td>
<td>1.30</td>
<td>47.4%</td>
</tr>
</tbody>
</table>

Source: Fernandez-Arias (2014)

Source: PWT 8.0 (Adapted from Crespi, 2014)
Two main sources of productivity growth drive aggregate efficiency over time:

1. Efficiency gains derived from the **reallocation of resources** from less productive firms (sectors) to more productive ones, due to competition and the processes of (Schumpeterian) creation and destruction through which efficient firms expand, use larger shares of factors and push less efficient firms out of the market, and through the entry (exit) or more (less) efficient firms.

2. Efficiency gains that occur **within firms**, due to better production methods, organization, innovation at the plant-level, learning and capability development, etc.
Firm Heterogeneity and Productivity Growth

- In LAC, most research has focused on macroeconomic conditions and business climate, using aggregate data.
- At policy level, the priority given to macroeconomic reforms has shifted interest away from the microeconomic dimension, leading many LAC governments to place microeconomic concerns further down on the policy agenda.
- This approach fails to take into account the heterogeneity of firms and their idiosyncratic characteristics.

Our data shows high heterogeneity in labor productivity at the firm-level not only across sectors, but also within sectors.

![Graph showing the distribution of labor productivity among firms in manufacturing and services sectors.]

- Many low productive firms
- Few highly productive firms
World Bank Enterprise Survey Data

• Firm-level dataset of 135 World countries. 31 are Latin American and Caribbean countries
  – 2 waves (2006 and 2010); 2010 wave included 14 Caribbean small island states for the first time
  – Covers the manufacturing and services sectors.
  – Interviews firm owner or firm manager
  – Survey universe: Nonagricultural, non-extracting, and formal private sector.

• IDB financed questionnaire modules on innovation and participation in public programs, enabling deeper analysis.

• The standardization of Enterprise Surveys across all countries strengthens the level of external validity and provides ground for comparisons across countries in the region and world.

• Data Limitations include:
  – Does not include informal firms, which can be upward of 70% of total GDP in LAC countries
  – Under representation of service firms
The Book

We use World Bank Enterprise Survey data to empirically analyze the determinants of productivity at the firm level. The chapters include:

1. Caribbean Countries are Small, but their Firms can Grow to be More Productive
2. Innovation Dynamics & Productivity: Evidence for Latin America
3. Innovative Activity in the Caribbean: Drivers, Benefits, and Obstacles
4. ICT, Innovation and Productivity: Evidence from LAC Firms
5. On-the-Job Training in Latin America and the Caribbean
6. Credit Access in Latin American Enterprises
7. Business Performance in Young Latin American Firms
8. International Linkages, Value Added Trade, and LAC Firms’ Productivity
Spotlight on ICT

- Vast research recognizes the impact ICTs have had on modern business practices, such as increasing the efficiency of internal processes or expanding market reach. ICTs as “enabling factor” for innovation.
- This chapter explores the determinants of broadband adoption and assesses their relationship with innovation and productivity in the context of LAC.
- ICT diffusion is still quite low in the region, although firm level diffusion differs.
Spotlight on ICT

- Focus on both inter-firm and intra-firm ICT diffusion. We estimate the following equation in order to model the probability of a firm to adopt ICT:

\[
Pr (ICTADOPTION=1) = F (\alpha + \beta_0*RankEffects + \beta_1*LocationEffects + \beta_2*EpidemicEffects + \beta_3*CountryEffects + \beta_4*SectorEffects)
\]

- Evidence of the presence of both epidemic and rank effects, where larger, older, skill-intensive, exporter and urban firms are more likely to adopt ICTs. However, once adopted, size and location lose importance.

- Additionally, results show a positive relationship between broadband and firm-performance. In particular, firms that have adopted broadband increase their probability of innovating and productivity. This effect is found to be mainly related to the use of broadband to perform research and development activities. The combined use for different activities is found to have an additional positive effect on firm performance.
The Heterogeneous Impacts of innovation on productivity

- Returns to innovation depend on the position of the firm in the productivity distribution.
- Firms at the bottom of the distribution (1st quartile) returns are not higher than 35%, however these returns increase to more than 65% for firms at the top of the distribution (4th quartile).
- Lower returns at the bottom of the distribution suggest that the constraints are not primarily financial, but have to do with firm characteristics, such as: the lack of complementary assets or the lack of appropriability of innovation.

Productivity Distribution by Decision to Innovate

Source: Crespi, Tacsir, & Vargas (Forthcoming, 2015)
To Sum Up: Preliminary Findings

• **Innovation**: The effects of innovation on productivity are positive in both Caribbean and LA. In LA, the TFP of innovative firms is 50% higher than in non-innovative firms. In the Caribbean, size is less of an obstacle to undertaking innovation than in Latin America.

• **Training**: OJT is found to have a significant positive effect only on large firms and tends to focus mainly on skilled workers, helping to amplify the already existing skills gap.

• **Credit Access**: Labor productivity is also positively associated with a higher demand for credit and better access to finance. Larger, older and less export-oriented firms are more likely to demand bank credit and consequently less likely to be financially constrained.

• **International Linkages**: Firms operating in exporting industries tend to be more productive than firms operating in industries whose value added comes from imported inputs. Upstream GVC position has a positive impact on firm performance.
Policy Implications

- So far, macroeconomic reforms in LAC have not been sufficient to foster productivity and growth to satisfactory levels. **Policies that better target within-firms improvements are necessary**.

- Heterogeneity of firms requires policies tailored to distinct firm needs. For example in innovation policies, specific policies for specific kinds of firms:
  - **Low productivity firms**: Technology extension services, on-the-job training, etc.
  - **High productivity firms**: University-industry collaborations, contract research, specialized labs, etc.
ICT: Intra-Firm Diffusion

- Does not differ substantially from inter-firm model. Human capital, age and international openness remain important drivers of ICT diffusion in most specifications. However, some interesting differences occur:
  - **Firm size**: When sample selection is controlled for, size coefficients become smaller, and the coefficients become insignificant for medium firms (services) and for small firms (manufacturing). This seems to indicate the existence of a dimension threshold, above which size does not matter for intra-firm diffusion, and that this threshold is lower in the case of manufacturing with respect to services.
  - **Location**: No strong statistical evidence is found for being located in a city, which suggests that location effects are important in the decision to adopt broadband, but not for how extensively it is used.
  - **Foreign ownership**: Negative correlation between foreign ownership and intra-firm diffusion (only in manufacturing sector). This suggests that ICTs are important for communication with headquarters, but not for research and relations with providers and clients (the activities used to build the intensity index).