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# Firm Dynamics, Productivity Growth, and Job Creation in Developing Countries: The Role of Micro- and Small Enterprises

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*The conventional wisdom on firm dynamics, productivity growth, and job creation in developing countries is based on data that, by design, excludes a vast number of micro- and small enterprises, many of which are informal. Some may not view this exclusion as an issue, on the grounds that the omitted economic units reflect survivorship rather than entrepreneurship. However, the thresholds that determine the truncation of the data are relatively arbitrary, and the firms that are typically excluded are associated with a large share of total employment. This paper assesses the ways in which the conventional wisdom on developing countries would change if micro- and small enterprises were taken into account in the analyses. The assessment shows that micro- and small enterprises account for a greater share of gross job creation and destruction than acknowledged by the conventional wisdom. It also reveals a greater dispersion of firm productivity, a weaker correlation between firm productivity and firm size, and a smaller contribution of within-firm productivity gains to aggregate productivity growth. This assessment points to new directions in the data and research efforts needed to understand the role of micro- and small enterprises and to identify policies with the potential to foster job creation and aggregate productivity growth in developing countries. JEL Codes: D22, D24, L11, L25, L26, J23, O4*

Growth occurs as jobs become more productive over time but also as more productive jobs are created and less productive jobs are destroyed. Dynamism at the enterprise level underlies this creative production process ([Schumpeter 1934](#)). In the case of advanced economies, the availability of high-quality data to track enterprises over time has led to the accumulation of solid empirical knowledge on the relationship among firm dynamics, productivity growth, and job creation. Although gray

areas remain, an increasingly clear picture has emerged in which most net job creation is associated with young firms, productivity varies widely across firms, and aggregate productivity growth is driven by both productivity gains within firms and reallocation across firms, including entry and exit. There is also evidence that some of the young firms (the so-called “gazelles”) experience rapid gains in productivity and employment, which makes them one of the most important sources of economic growth.

Micro-level data that are supposedly comparable to data from advanced economies are increasingly available in developing countries, mainly in the form of enterprise surveys compiled by official statistical agencies. International partners, including the World Bank, have made consistent efforts to support data collection and research along the lines of advanced economies. Because the quality of the data is not as high as it is in advanced economies and the number of studies is not as large, the accumulated knowledge on developing countries remains more tentative. Some results are in line with the findings for advanced economies but with important nuances. For instance, the dispersion of productivity across firms is found to be higher than in advanced economies. However, surveys of developing countries generally cover formally registered firms and exclude the vast majority of micro- and small enterprises, which are typically informal. It is admittedly difficult to reach economic units that are not formally registered with the authorities, but the result is a disturbing “truncation” of the data.

This paper re-examines the conventional wisdom on firm dynamics, productivity growth, and job creation in developing countries, explicitly accounting for the role played by micro- and small enterprises. The paper first relies on household surveys, labor force surveys, and economic censuses to reconstruct the true distribution by size of economic units and highlight the extent of data truncation. It then summarizes the existing literature on the topic, using the studies of advanced economies as the benchmark and reviewing studies of developing countries conducted with the use of enterprise surveys that are formally similar to those of advanced economies but are truncated. This review allows for the articulation of the conventional wisdom on enterprise dynamics in developing countries. Finally, the conventional wisdom is reassessed by using the true distribution by size of economic units to re-weight the samples of standard enterprise surveys, by combining the resulting insights with those from studies focusing specifically on micro- and small enterprises, and by conducting a meta-analysis of the biases that may arise from the use of truncated data.

The overall result is a new perspective on firm dynamics, productivity growth, and job creation in developing countries:

- Because micro- and small enterprises are under-represented in the data, their contribution to total employment is not adequately captured. Their

contribution to gross job creation and gross job destruction is under-estimated as well. When re-weighting the samples of standard enterprise surveys to recover the true distribution of firms by size, it appears that most gross job creation comes from micro- and small enterprises, even in high middle-income countries. Because churning is the norm among micro-enterprises, gross job destruction is equally important in their case.

- Productivity dispersion in developing countries is wider than generally assumed because micro- and small enterprises have low productivity on average. Productivity is also less correlated with firm size than it is in advanced economies. Many large firms in developing countries are inefficient, which is most likely the result of limited competition. However, micro- and small enterprises are a heterogeneous group, with some paying higher labor earnings than formal sector jobs. In sum, in developing countries, a multiplicity of “mice” and a few “elephants” dominate the economic landscape, whereas “gazelles” are rare.
- The under-representation of micro- and small enterprises also results in a distorted image of the contribution of firm dynamics to aggregate productivity growth. Most obviously, the truncation of the data causes the growth of some firms – or their formalization – to be misconstrued as entry, whereas declines in size or shifts to the informal sector can be misclassified as exits. These measurement errors lead to an over-estimation of the gains from entry and an under-estimation of the gains from exit. Because micro-enterprises are prone to churning, there is also an over-estimation of the productivity gains from reallocation.

This reassessment of the conventional wisdom points to new directions in the data and research efforts needed to understand the role of micro- and small enterprises and to identify the policies with the potential to foster job creation and aggregate productivity growth in developing countries.

## The Size Distribution of Firms

Even in advanced economies, the distribution of firms is skewed toward micro- and small enterprises. In the case of the United States, this was shown by [Neumark, Wall, and Zhang \(2009\)](#) using the National Establishment Times Series (NETS), which covers both employers and self-employment businesses and reports approximately 13.1 million firms and 14.7 million establishments in a typical year. According to this study, firms with fewer than 20 employees account for more than 26 percent of total private sector employment, and firms with fewer than 50 employees account for approximately 36 percent. Also for the United States, [Haltiwanger, Jamin, and Miranda \(2010\)](#) using a rich dataset of employers based

on the Census Bureau Business Dynamics Statistics and the Longitudinal Research Database (LRB) and found that more than 35 percent of employment from startups is in firms with fewer than 20 employees, and more than 70 percent of employment is in firms with fewer than 50 employees.<sup>1</sup> The picture is similar among advanced economies in Europe. According to the Structural Business Statistics database of EUROSTAT, firms with fewer than 20 employees account for approximately 37 percent of total private sector employment, and those with fewer than 50 employees account for approximately 47 percent (EUROSTAT 2013).<sup>2</sup>

Micro- and small enterprises represent an even larger share of the total number of firms in developing countries. Pagés (2010) reported that more than 80 percent of registered manufacturing establishments in Argentina, Bolivia, El Salvador, and Mexico have fewer than 10 employees. According to ADB (2009), approximately 90 percent of formal registered manufacturing establishments employ five to 59 workers in China, Indonesia, Korea, the Philippines, and Taiwan (China). Outside the manufacturing sector, the share of micro- and small enterprises is even higher. Again, Pagés (2010) reported that micro-enterprises alone account for 94 percent of the services sector of Mexico. Freund et al. (2012) showed that their share reaches approximately 98 percent of all private sector establishments in Tunisia. ADB (2009) estimated that there are more than 14 million informal enterprises in India's manufacturing sector, which is more than four times the number of formal enterprises.

Because most micro-enterprises and many small firms in developing countries operate without formal registration with official authorities, reaching them through survey instruments is difficult. Additionally, most surveys in developing countries truncate their target population of firms from below, with thresholds typically varying from one to 20 employees. The focus on formal firms and the size thresholds imply that many more micro- and small enterprises are excluded from the datasets in developing countries than in advanced economies.

However, with very few exceptions, these are the datasets on which analyses of firm dynamics are conducted. For example, the smallest size group in the analysis by Ayyagari, Demirgüç-Kunt, and Maksimovic (2011b) is firms with fewer than 20 employees. In their data, the median employment share of enterprises in this size group across all countries is 17 percent, and the mean is 21 percent. These shares are below those observed in the United States and advanced economies in Europe. Also, according to the data reported in that paper, firms in that size group account for 15 percent of private sector employment on average in 11 transition countries, with a maximum share of 22 percent in Estonia. However, according to the Structural Business Statistics database of the EUROSTAT, they account for over 40 percent of employment in the same sectors in these 11 countries (EUROSTAT 2013).<sup>3</sup> The differences are largely driven by the fact that their data do not cover

firms with zero to four employees and only take into account permanent, full-time employment.

A straightforward way to grasp the importance of micro- and small enterprises in developing countries is to reconstruct the size distribution of firms from household surveys and labor force surveys that are representative of the entire population. In a number of countries, such surveys ask interviewees about the size of the businesses which they own or work at, including the possibility of working on their own. Answers to this question can be used to estimate the distribution of businesses by size.<sup>4</sup> This distribution differs quite dramatically from that implied by World Bank Enterprise Surveys (figure 1).<sup>5</sup> The share of micro-enterprises (defined as those with fewer than 10 employees) is higher when relying on household and labor force surveys, and especially so in developing countries.<sup>6</sup> Further, the distribution based on household or labor force surveys is relatively stable over time, whereas the distribution based on Enterprise Surveys fluctuates erratically for some countries.

The limited coverage of informal firms and the truncation of firms below a certain threshold may bias empirical analyses on the relationship among firm dynamics, job creation, and productivity growth in developing countries.

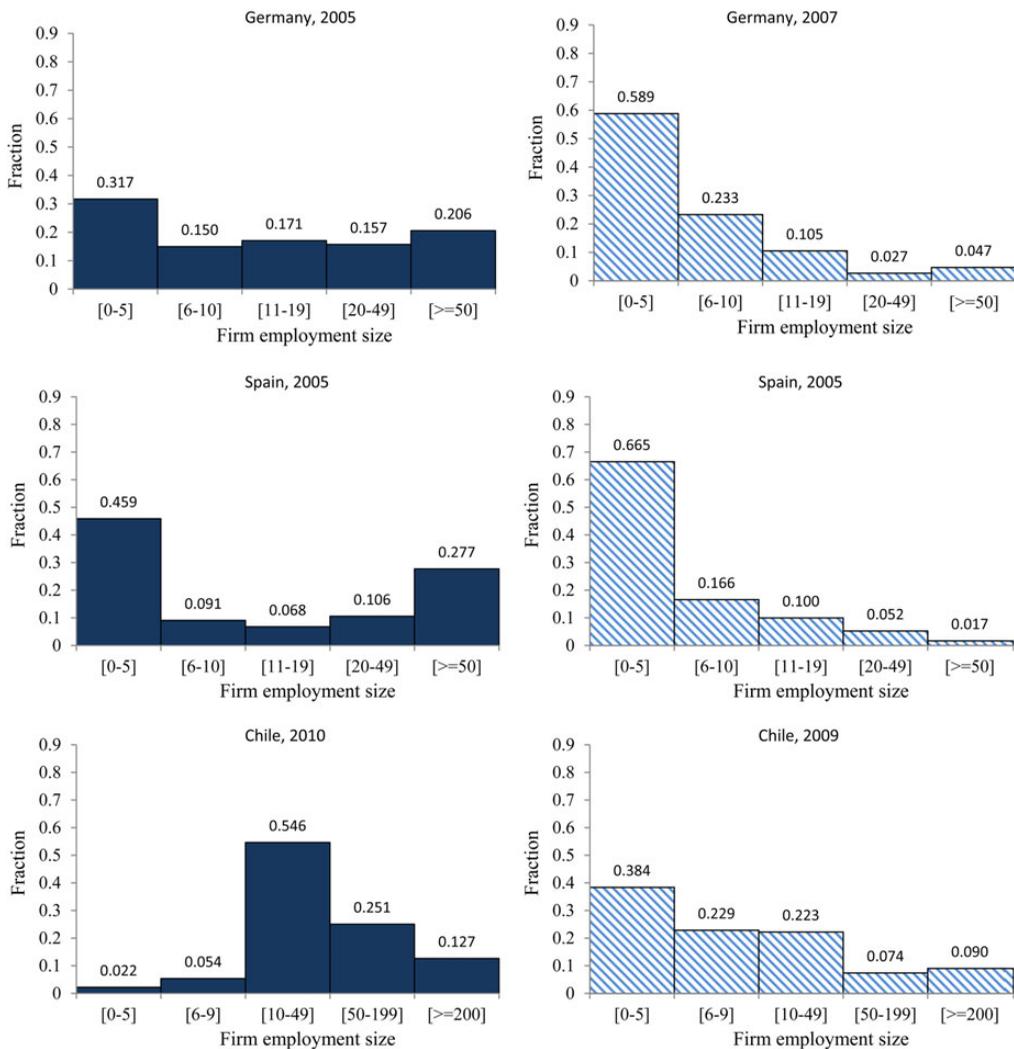
This potential bias is illustrated by the change in the relationship between development level and establishment size across countries depending on the data used. Unlike the World Bank Enterprise Surveys, a new dataset by [Bento and Restuccia \(2014\)](#) includes micro-enterprises and informal firms. This new dataset, which covers manufacturing establishments across 124 countries between 2000 and 2012, was developed from economic censuses and enterprise surveys that use comprehensive business registries as their sampling frame. The dataset includes household businesses with premises and takes into account both paid and unpaid workers. Based on this dataset, the average establishment size is strongly positively correlated with GDP per capita; the elasticity is approximately 0.26.

The same analysis yields a drastically different picture if World Bank Enterprise Surveys are used instead (figure 2). To ensure comparability, the only enterprise surveys considered are those conducted between 2002 and 2011 that contain information on sampling weights and on both full-time employees and temporary workers.<sup>7</sup> Fifty-nine developing countries meeting these criteria are included in the [Bento and Restuccia \(2014\)](#) dataset. For these 59 countries, the elasticity of the average establishment size to GDP per capita is approximately 0.31 and it is significant. In contrast, the elasticity is -0.03 but is not significant if World Bank Enterprise Surveys are used. The difference is not surprising given that the correlation between the average establishment sizes in the two datasets is barely 0.22.

The under-sampling of micro- and small enterprises affects not only the perceived static distribution of firms by size but also the assessment of firm dynamics. Available empirical evidence suggests that micro- and small enterprises often experience a different life cycle than their larger counterparts do. If the extent of

under-sampling is correlated with firm size, the result will be a distorted picture of the contribution firms of different sizes make to aggregate job creation and productivity growth. Sample truncation may also lead to the mistaken classification as firm “entry” of what is in reality a transition from a smaller size—poorly captured by the survey—to a larger size, or from informality to formality. Similarly, firm “exit” could actually be a transition to a smaller size that is out of the purview the survey.<sup>8</sup>

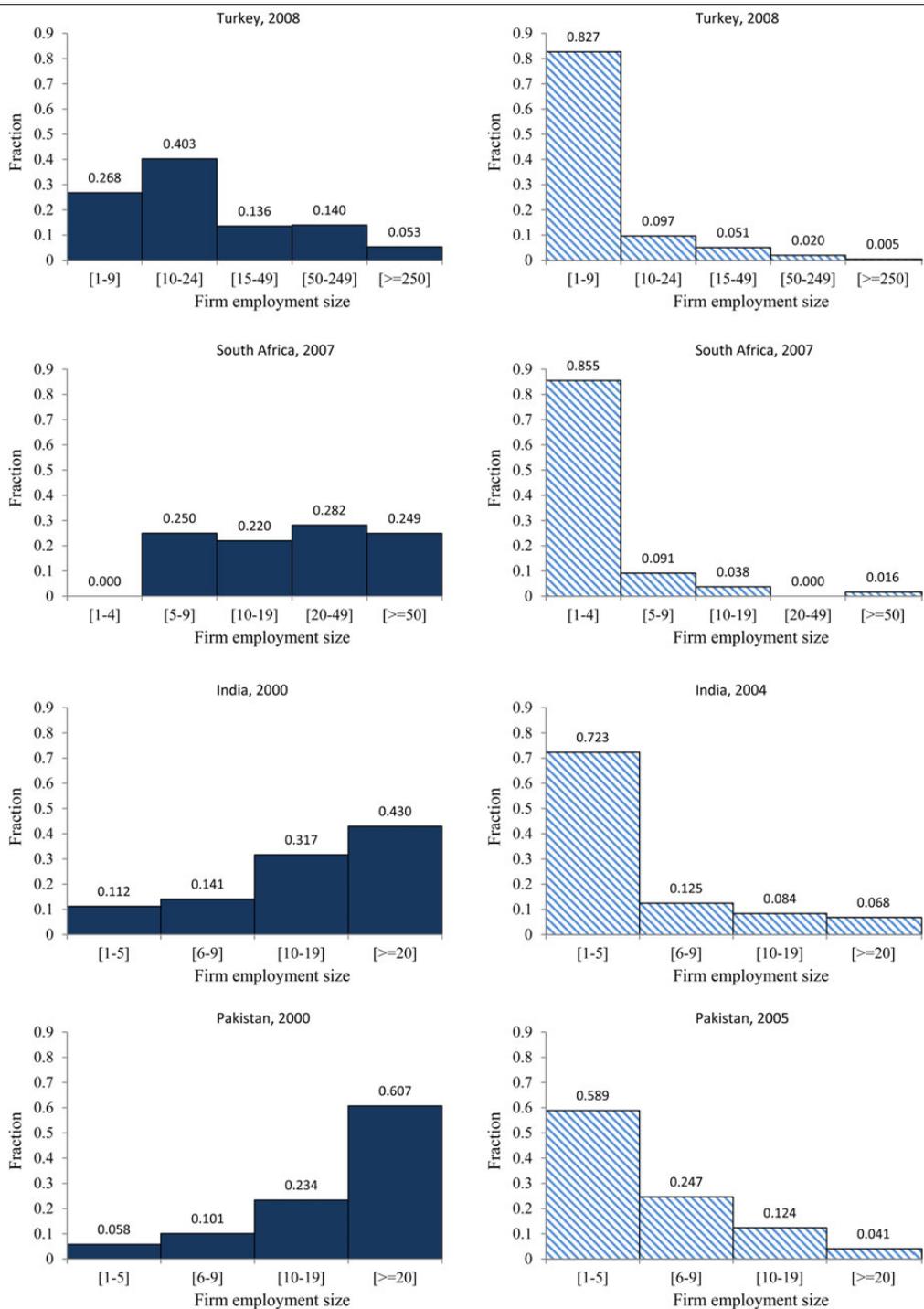
**Figure 1.** Enterprise Surveys Do Not Capture Small Businesses Well



Source: Authors' calculations based on data from I2D2 and World Bank Enterprise Surveys.

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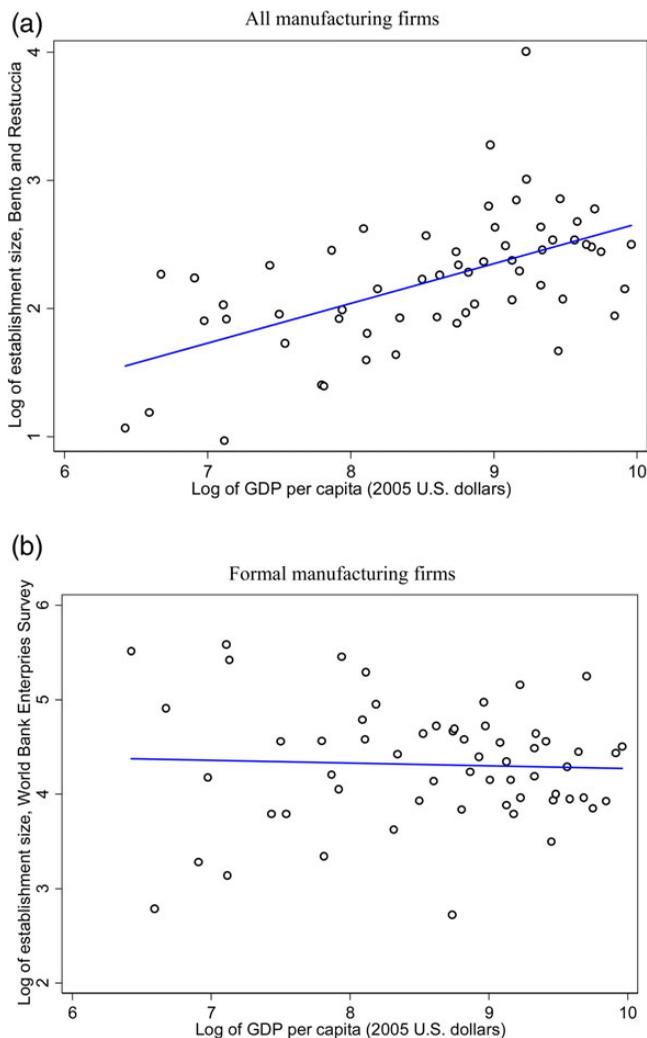
**Figure 1.** Continued.



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**Figure 2.** Truncated Data Biases the Relationship between Establishment Size and Development

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Source: Authors' calculations based on data from [Bento and Restuccia \(2014\)](#) and World Bank Enterprise Surveys.

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## Advanced Economies as the Benchmark

Although the literature on job creation and destruction, firm productivity, and firm dynamics is vast, for the purpose of this review, it can be conveniently regrouped under three main questions. The first question, which is of direct interest to policy makers, is which enterprises create more jobs. Its answer may refer to net job creation or to gross job creation and destruction flows. A second question concerns the

extent to which productivity varies across enterprises. If the dispersion is wide, the question of who creates more jobs is relevant not only from an employment point of view but also from the perspective of aggregate productivity gains. Finally, a third question concerns the relative contribution of firm entry and exit, productivity gains at the firm level, and labor reallocation across firms to economic growth. Answering this question requires an understanding of the life cycle of firms.

### *Question 1: Which Firms Create More Jobs?*

Worldwide, commentators and politicians are quick to claim that small and medium enterprises are the main engine of job creation. Researchers are not so sure. [Birch \(1981, 1987\)](#) was the first to provide evidence in support of the standard claim for the United States. His methodology, however, was questioned on measurement and statistical grounds ([Davis and Haltiwanger 1992](#)). No systematic relationship between the net job creation rate and plant size in the manufacturing sector was found by [Davis, Haltiwanger, and Schuh \(1996\)](#). However, [Neumark, Wall, and Zhang \(2009\)](#) revisited this question using the National Establishment Times Series between 1992 and 2004 and concluded that firms with fewer than 20 employees contribute the largest share of net job creation, disproportionate to their employment share. These authors also concluded that the relationship between the net job creation rate and firm (or establishment) size was negative in both the manufacturing and the services sectors.

The validity of the standard claim of the importance of firm size becomes less clear when the age of enterprises is considered as well. Using the richer Census Bureau Business Dynamics Statistics and Longitudinal Research Database, [Haltiwanger, Jamin, and Miranda \(2010\)](#) confirmed that the net job creation rate is larger among smaller establishments. However, their results also indicate that the relationship between the net job creation rate and firm (or establishment) size becomes much weaker when controlling for firm age. Their more robust finding concerns firm age. Younger firms exhibit higher rates of net job creation, but with the vast majority of young firms and startups being small, there appears to be a relationship between the net job creation rate and firm size.

Net changes in employment hide a considerable amount of gross job creation and gross job destruction. The magnitude of these gross employment flows was first highlighted by [Davis, Haltiwanger, and Schuh \(1996\)](#). Each year, millions of jobs are created as a result of growth in existing businesses and the entry of new businesses. At the same time, millions of jobs are destroyed as businesses contract or close. According to [Haltiwanger \(2011\)](#), between 1980 and 2009, approximately 17 percent of all jobs in the United States were created within the same year by expanding or entering business; simultaneously, approximately 15 percent of all jobs disappeared as a result of contracting or exiting businesses. Furthermore, 18

percent of gross job creation was accounted for by entrants, and 17 percent of gross job destruction was due to firms exiting.

Similar to the case of net job creation, the general claim that small enterprises are the main creator of jobs in gross terms comes into question when firm age is considered. [Neumark, Wall, and Zhang \(2009\)](#) found that the smallest firms contribute a disproportionate share of gross job creation and a slightly disproportionate share of gross job destruction. Again, however, age is a more important determinant of gross job creation than size. [Haltiwanger, Jamin, and Miranda \(2010\)](#) confirmed that rates of gross job creation and gross job destruction were higher among younger firms. Startups, in particular, account for almost 20 percent of gross job creation, though they represent only 3 percent of total employment.

### *Question 2: How Much Dispersion Is There in Productivity?*

Simple economic models assume a representative firm and hence no dispersion of productivity other than that created by policy distortions. However, more complex models can account for industry equilibria with heterogeneous producers—generally related to the “creative destruction” process. For example, [Nelson \(1981\)](#) treated firms as entities that make technological bets with inherent uncertainties and end up with different productivities. [Jovanovic \(1982\)](#) modeled firms with a time-invariant efficiency parameter, implying that a firm’s productivity varies initially but converges over time to a constant value. [Ericson and Pakes \(1995\)](#) extended the model to incorporate stochastic shocks, which can cause very productive firms to experience losses in efficiency.<sup>9</sup> These models vary in their assumptions regarding sunk costs, the stability of productivity, market selection, and learning. However, they all imply that over time more productive firms expand at the expense of less productive ones. As a result, a positive correlation between productivity and firm size can be expected, indicating allocative efficiency.

Empirical results from advanced economies have consistently revealed a large dispersion of productivity even within narrowly defined industries. [Syverson \(2004\)](#) found that within industries at the four-digit SIC level in the US manufacturing sector, the average ratio of total factor productivity (TFP) between plants in the 90th and 10th percentiles was 1.92. Using a revenue measure of TFP, [Hsieh and Klenow \(2009\)](#) found that the ratio was as high as 3.3; it was even higher when using a physical measure of TFP. [Faggio, Salvanes, and Van Reenen \(2010\)](#) documented that the dispersion of productivity within industries in the United Kingdom has trended upwards for the past couple of decades. [Bartelsman, Haltiwanger, and Scarpetta \(2009a\)](#) exposed a large dispersion of both TFP and labor productivity within industries in France, Germany, Netherlands, the United Kingdom, and the United States.<sup>10</sup>

Based on simple economic models of the firm, it would be tempting to interpret this observed dispersion in productivity as the result of measurement error. However,

detailed microeconomic case studies have documented wide productivity gaps for specific industries. Further, meaningful correlations emerge between the estimated productivity and the level of wages, export success, and the use of modern technology (Bartelsman and Doms 2000). In line with the more complex models, empirical evidence following the decomposition proposed by Olley and Pakes (1996) confirms that a positive relationship between labor productivity and firm size exists at the industry level in France, Germany, the Netherlands, the United Kingdom, and the United States (Bartelsman, Haltiwanger, and Scarpetta 2009a). The relationship is strongest in the United States, where the average labor productivity is 50 percent higher than if employment was randomly allocated across firms within each industry. The corresponding figure for the Western European countries is between 20 and 30 percent, which indicates less allocative efficiency.

### *Question 3: Which Firms Drive Productivity Gains?*

Greater allocative efficiency among surviving firms is only one of the mechanisms through which a country's aggregate productivity can grow. This is the so-called "between" effect – the increasing output shares of high-productivity plants and the decreasing shares of low productivity plants. Other mechanisms are productivity growth within surviving firms, and the entry and exit of firms whose productivity differs from the average.

Assessing the relative contribution of these mechanisms has been a controversial matter. In their pioneering work, Baily, Hulten, and Campbell (1992) found that the "between" effect accounted for a large share of aggregate productivity growth in manufacturing in the United States. The findings are sensitive to the decomposition methodology, however. Reviewing existing studies and comparing several methods, Foster, Haltiwanger, and Krizan (2001) concluded that the contributions of different components fluctuate with the business cycle and vary across industries. As for the contributions of entry and exit, they are larger the longer the time horizon over which the changes are measured. In manufacturing, a robust finding is that the contribution from within-firm gains is sizable, but in the retail sector aggregate productivity growth is almost entirely driven by entry and exit (Foster, Haltiwanger, and Krizan 2006).

Relying on harmonized methodologies and indicators, Bartelsman, Haltiwanger, and Scarpetta (2004, 2009b) concluded that in advanced economies within-firm gains contribute the bulk of aggregate productivity growth. They also found that the between effect varies significantly across countries and that the exit effect is always positive. Although the entry effect tends to be positive in European countries, it is negative in the United States. The weaker contribution of entrants in the United States may suggest greater market selection and learning by doing. Surviving entrants also expand more rapidly in the United States than in other

advanced economies, whereas low productivity entrants exit more rapidly (Bartelsman, Scarpetta, and Schivardi 2005).<sup>11</sup>

The case of the United States highlights the importance of understanding the life cycle of firms (Dunne, Roberts, and Samuelson 1989; Davis, Haltiwanger, and Schuh 1996; Sutton 1997; Caves 1998). In the manufacturing sector of the United States, 35-year-old plants are, on average, almost 10 times larger than they were at birth in terms of employment; they are also nine times more productive (Hsieh and Klenow 2011). Similar evidence was provided for all firms with paid labor in Portugal by Cabral and Mata (2003), who found that age plays an important part in shaping firm size distribution. Young firms tend to be small, but they become larger as they age. The firms that survive over time were initially larger than the rest, but the effect of this difference in initial sizes is small in comparison with the effect of aging.

Not all firms go through the same life cycle, however. An important insight by Birch and Medoff (1994) is the distinction among “mice”, “gazelles”, and “elephants”. Gazelles are rapidly growing firms that account for much of the net growth in employment, and are also characterized by rapid productivity gains (Henrekson and Johansson 2010; Acs 2011). In contrast, mice are small firms that never grow much, whereas elephants are large and stagnant firms that may, on occasion, shed large numbers of jobs. The coexistence of mice and gazelles within the universe of firms cast doubts on the idea that startups are the main source of economic dynamism because startups could belong in either of these groups (Shane 2009). Additionally, startups’ chances of success depend not only on their own characteristics but also on the characteristics of the metropolitan areas in which they operate (Acs and Mueller 2008).

## Conventional Wisdom on Developing Countries

Micro-level data that are supposedly comparable to data from advanced economies are increasingly available in developing countries, mainly in the form of enterprise surveys compiled by official statistical agencies. International partners, including the World Bank, have made consistent efforts to support data collection and research along the lines of advanced economies. Similar questions on enterprise dynamics, productivity growth, and job creation have been addressed in numerous studies. Because the quality of the data is not as high as it is in advanced economies and the number of studies is not as large, the accumulated knowledge on developing countries is more tentative.

### *Question 1: Which Firms Create More Jobs?*

The transition from a planned economy to a market-based one offers a useful laboratory to understand firm dynamics because the restructuring of the state sector

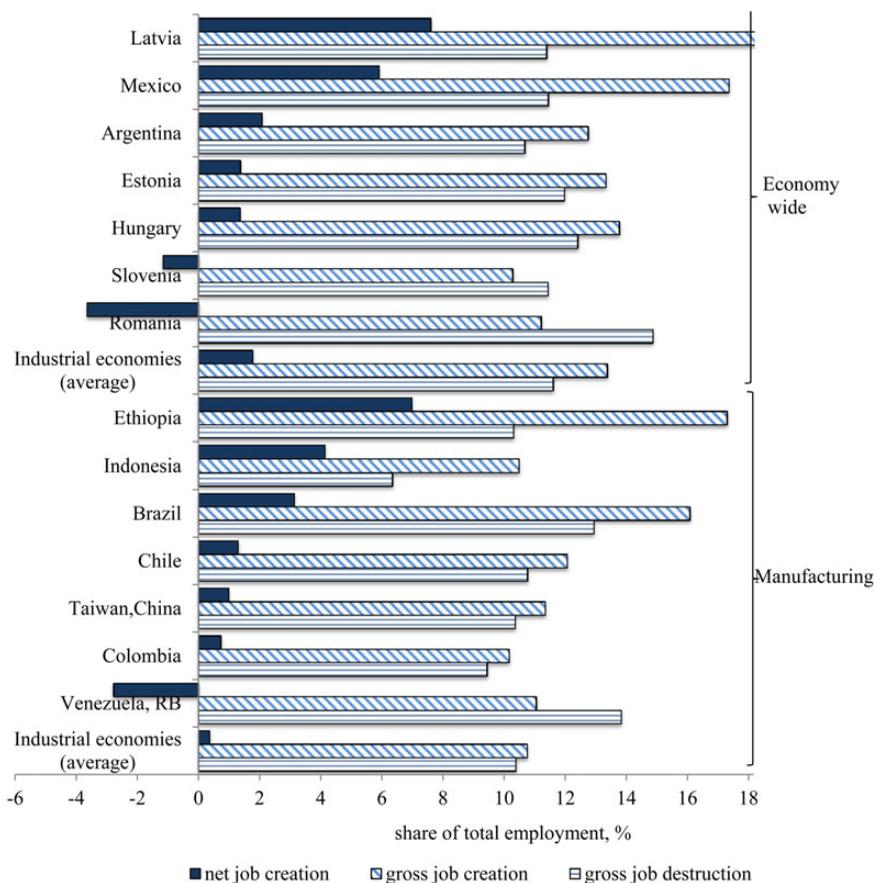
typically entails massive job destruction, whereas the emergence of a private sector should lead to substantial job creation. A careful review of the literature on this process shows that it involved clearly different phases (Haltiwanger, Lehmann, and Terrell 2003). In early stages of the transition, gross job destruction was large and dominated gross job creation; subsequently, gross job creation increased, and net job creation became positive. Eventually, the rates of gross job creation and destruction largely converged to the levels seen in the United States.

The rates of gross job creation and destruction are also high in other developing countries, although these countries have not experienced the turmoil of transition economies. For instance, Roberts (1996) and Tybout (2000) claimed that gross rates of job creation and destruction are greater in Chile, Colombia, and Morocco than they are in the United States. However, differences in methodologies and indicators often hinder cross-country comparisons. Using a harmonized approach, Bartelsman, Haltiwanger, and Scarpetta (2009b) conducted a thorough analysis of establishment-level data from five transition economies from Central and Eastern Europe, six Latin American countries, and three emerging economies from East Asia.<sup>12</sup> This analysis revealed a high degree of employment turbulence in all countries, reflected in simultaneously large gross job creation and job destruction flows. In the manufacturing sector, between 7 and 20 percent of all jobs are created during the year, and a similar proportion is destroyed (figure 3). These ratios are comparable to what is observed in the United States and other advanced economies.

In contrast with the emerging consensus for advanced economies, there is controversy regarding the nature of the relationship between firm age, firm size and the net job creation rate in developing countries. The first comprehensive study to assess this relationship, by Ayyagari, Demirgüç-Kunt, and Maksimovic (2011b), was based on enterprise surveys from 99 countries. The results showed the importance of establishment size, not age, in explaining net job creation. According to this study, small plants and mature plants—defined as those with five to 99 employees and older than 10 years, respectively—are the greatest contributors to net job creation. Controlling for firm age, smaller plants display higher net employment growth rates.

However, a more recent study focusing on the manufacturing sector in India by Martin, Nataraj, and Harrison (2014) reached the opposite conclusion. This study used data from the Annual Survey of Industries, which is representative of registered manufacturing firms in the country.<sup>13</sup> By design, the survey only includes establishments with 20 or more employees (10 or more if the establishment uses a power source). Based on this dataset and controlling for firm age, job creation was positively correlated with establishment size between 2000 and 2007. Factories with more than 50 employees contributed positively to net job creation, whereas micro- and small factories with fewer than 20 employees contributed negatively.

**Figure 3.** Simultaneous Job Creation and Destruction Characterize All Economies



Source: Bartelsman, Haltiwanger, and Scarpetta (2009) and Shiferaw and Bedi (2009). Data refer to the periods indicated in parentheses: Argentina (1996–2001), Brazil (1997–2000), Canada (1984–97), Chile (1980–98), Colombia (1983–97), Estonia (1996–2000), Ethiopia (1997–2007), Finland (1989–97), France (1989–97), Germany (1977–99), Hungary (1993–2000), Indonesia (1991–4), Italy (1987–94 and 1988), Latvia (1983–98), Mexico (1986–2000), the Netherlands (1993–5), Portugal (1983–98), Romania (1993–2000), Slovenia (1991–2000), Taiwan, |China (1986, 1991), United Kingdom (1982–98), United States (1989–91 and 1994–6), and Venezuela, RB (1996–8).

### Question 2: How Much Dispersion Is There in Productivity?

When comparable establishment-level data are used, the dispersion of productivity is found to be higher in developing countries than in advanced economies. This finding was initially obscured by the reliance on comparisons involving different levels of aggregation for the data, different methodologies (for instance, stochastic or deterministic frontiers), or different measures of productivity. Thus, in a review

on manufacturing firms in developing countries, [Tybout \(2000\)](#) concluded that productivity dispersion was not higher in developing countries and that average deviations from the efficiency frontier were not typically larger than those observed in advanced economies.

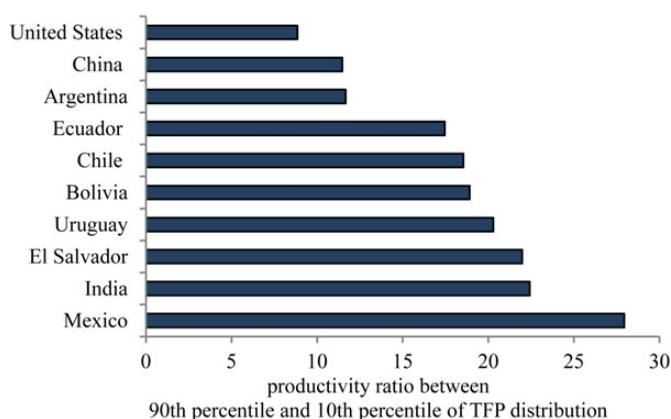
A much-cited study by [Hsieh and Klenow \(2009\)](#) compared the dispersion of productivity within narrowly defined manufacturing industries in China, India, and the United States and found it to be larger in the former two countries. For China and India, the data are drawn from three rounds of annual surveys of manufacturing enterprises, with TFP measured based on both revenue and quantities. As a benchmark, in the United States, the TFP of a firm in the 90th percentile of the productivity distribution is approximately 8.9 times higher than that of a firm in the 10th percentile. In contrast, the ratio reaches 11.5 in China and a staggering 22.4 in India. Relying on the same methodology, [Pagés \(2010\)](#) computed firm- or establishment-level physical TFP in the manufacturing sector of seven Latin American countries and found even larger dispersion in these countries (figure 4). Although detailed data for other sectors are scarce, the dispersion of TFP among retail traders in Mexico and among communication and transportation businesses in Uruguay also appeared to be sizable.

A positive correlation is generally found between firm productivity and firm size, suggesting the existence of static allocative efficiency. Based on the World Bank Enterprise Surveys for developing countries, [Ayyagari, Demirgüç-Kunt, and Maksimovic \(2011a\)](#) documented that large firms are typically more productive than small firms. Using the same type of surveys, the [World Bank \(2012\)](#) replicated the approach for a broader sample of 102 developing countries and found that firm

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**Figure 4.** The Dispersion of Productivity in Manufacturing is Greater in Developing Countries

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Source: [Pagés \(2010\)](#).

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size is positively correlated with labor productivity and export success. Across 47 developing countries, it also found that firm size is positively correlated with innovative activities such as developing new product lines, introducing new technology, outsourcing, and engaging in joint ventures with foreign partners.

However, the correlation between firm size and firm productivity is found to be lower in developing countries than in advanced economies. In Bangladesh, it has even been claimed that the correlation is negative (Fernandes 2008). Transition economies, in turn, provide clear evidence on the importance of market competition. [Bartelsman, Haltiwanger, and Scarpetta \(2009a\)](#) showed that the correlation between labor productivity and firm size within narrowly defined manufacturing industries in Central and Eastern European countries was close to zero at the beginning of their transition. However, the correlation increased substantially during the 1990s as market mechanisms gained in strength. [Wang and Yao \(1999\)](#) and [Lin \(2012\)](#) documented a similar pattern in China's case. In the 1990s, the new small township and village enterprises were found to be less productive than large and medium-size private companies but more dynamic and productive than large SOEs. Their flexibility in decision making and responsiveness to market signals more than compensated for their lack of human and financial resources. More generally, [Ayyagari, Demirgüç-Kunt, and Maksimovic \(2011a\)](#) showed that large state-owned enterprises (SOEs) without foreign competitors are less productive and innovative than other large firms.

### *Question 3: Which Firms Drive Productivity Gains?*

A burgeoning literature has addressed the contribution of firm entry, firm exit, growth at the firm level and employment reallocation across firms to aggregate productivity growth in developing countries. Most studies, however, are country specific. The focus has been transition economies, Latin American countries, and emerging economies in East Asia. More recently, comparable studies on other regions, particularly Sub-Saharan Africa, are starting to emerge.

Country-specific studies generally suggest that reallocation, especially through entry and exit, makes a positive contribution to aggregate productivity growth and that the contribution of reallocation is larger following market-oriented reforms. For instance, [Tybout \(1996\)](#) showed that the productivity of exiting plants is much lower than the industry average in Chile and that new entrants move up to the industry average after three or four years in Colombia. For Chile and Colombia, [Pavcnik \(2002\)](#) and [Eslava et al. \(2004\)](#) found that aggregate productivity growth following trade reforms is largely driven by the reallocation of market shares from less productive to more productive firms.<sup>14</sup> [Aw, Chen, and Roberts \(2001\)](#) found that within-firm gains make a sizable contribution in most industries in Taiwan (China) but that the productivity differential between entering and exiting firms is

important too. A similar conclusion was reached by [Haltiwanger et al. \(2007\)](#) and [Brandt, van Biesebroeck, and Zhang \(2012\)](#) in the case of China's manufacturing sector during the market reform era.

In the Indian case, [Harrison, Martin, and Nataraj \(2013\)](#) found that aggregate productivity growth underwent three distinct phases from 1985 to 2004, with the sub-periods differing in the intensity of market-oriented reform. From 1985 to 1990, aggregate productivity growth was driven by both within-firm gains among surviving firms and firm entry and exit. In 1991–4, the period immediately following India's market reforms, the reallocation of market share between firms became the most important contributor to aggregate productivity growth. However, from 1998 to 2004, aggregate productivity growth was again mainly driven by within-firm gains and entry and exit.

Business cycles also affect the relative contribution to aggregate productivity growth of firm entry, firm exit, growth at the firm level and employment reallocation across firms. In Indonesia, during the Asian economic crisis contributions from firm entry and reallocation among surviving firms became stronger, and the impact from firm exit became more negative ([Hallward-Driemeier and Rijkers 2011](#)). This sensitivity to the business cycle is consistent with evidence from the United States. In Morocco, reallocation among incumbent firms and net entry contribute to productivity growth, but the impact of net entry is often smaller ([Hallward-Driemeier and Thompson 2009a,b](#)).

The use of harmonized methodologies and indicators allowed [Bartelsman, Haltiwanger, and Scarpetta \(2004, 2009b\)](#) to make more meaningful comparisons between developing countries and advanced economies. Their results showed that the patterns were very similar in both cases. Overall, productivity gains within firms drive aggregate productivity growth. However, employment reallocation and firm entry and exit play a stronger role in promoting aggregate productivity growth in the longer term (defined as five years or more). The contribution of employment reallocation among surviving firms is smaller than that of firm entry and exit. In most developing countries, the exit of low productivity firms is prominent in promoting productivity growth, but in transition economies the entry of new firms often plays a more important role. This is due to both very high rates of firm turnover and the substantive productivity gaps between entrants and surviving firms. However, transition economies also display considerable churning—simultaneous entry and exit of firms that may not be conducive to aggregate productivity growth.

Churning seems to be more common in Sub-Saharan African countries, especially among small firms. Using enterprise surveys from nine of these countries, [van Biesebroeck \(2005\)](#) showed that small firms rarely move to the top of the size and productivity distributions and contribute little to aggregate growth, whereas large firms tend to grow faster.<sup>15</sup> Using the same surveys for Ghana, Kenya, and Tanzania, [Soderbom, Teal, and Harding \(2006\)](#) further illustrated the divide

between small and large firms. Efficiency contributes to the survival of large firms, but being relatively productive does not prevent small firms from going out of business. In Côte d'Ivoire, larger firms are also less likely to exit (Klepper and Richmond 2011). In Ghana, this is true for both larger firms and older firms (Frazer 2005). In Ethiopia, Bigsten and Gebreyesus (2007) and Shiferaw (2007, 2009) showed that the mobility of formal manufacturing plants (with at least 10 employees) across the size distribution is limited. Entry and exit occur predominantly among small firms, and the immediate contribution of this turnover to aggregate productivity does not appear to be very large.

## The Role of Micro- and Small Enterprises

To generate an undistorted picture of firm dynamics, productivity growth and job creation in developing countries, it is necessary to correct the biases that may arise from the exclusion or underrepresentation of micro- and small firms in enterprise surveys. Different approaches can be combined to this effect. Household and labor force surveys can be used to recalibrate the firm size distribution that emerges from enterprise surveys. Studies based on data from both formal and informal enterprises can provide complementary insights to the literature on micro- and household enterprises. Further, meta-analysis can shed light on the direction of the biases that emerge due to relying on truncated data.

### *Question 1: Which Firms Create More Jobs?*

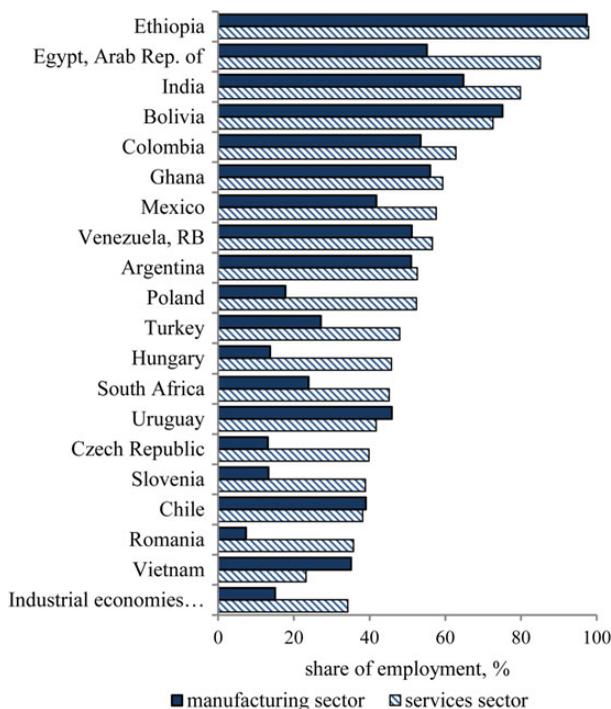
The literature on household enterprises and the informal sector consistently suggests the important role of micro-enterprises in total employment and job creation. Fox and Sohnesen (2012) conducted surveys of household enterprises in nine Sub-Saharan African countries and found that almost all of the labor force participants from low-income groups were engaged in household-based activities or informal enterprises. These economic units generated the majority of new nonfarm jobs. Similar evidence has been found beyond Sub-Saharan Africa (Banerjee and Duflo 2011). Micro- and small enterprises account for the vast majority of employment in Peru (Göbel, Grimm, and Lay 2011). Household businesses grow alongside large enterprises, and the informal sector represents a significant component of non-farm job creation in Vietnam (Nordman, Nguyen, and Roubaud 2011).

The underrepresentation of micro- and small firms by enterprise surveys leads to an underestimation of the contribution this group makes to total employment and gross job flows. One way to overcome this limitation is to reconstruct the size distribution of firms from household and labor force surveys that are representative of the entire population. The resulting size distribution can then be used to recalculate the weights that apply to observations from enterprise surveys.

This methodology was used to reconstruct the distribution of employment by the size of the business in 19 developing countries and advanced economies (World Bank 2012). The results show that micro-enterprises alone contribute the bulk of employment, even in middle-income countries (figure 5). For example, in the manufacturing sector of Ethiopia micro-enterprises account for a staggering 97 percent of employment. However, even in the manufacturing sector of Chile, an upper middle-income country that has already joined the Organisation for Economic Cooperation and Development, their employment share is approximately 39 percent. With a few exceptions, the employment share of micro-enterprises in the services sector is higher than in manufacturing. Even in transition economies, where private sector entry is only two decades old, micro-enterprises account for 10 to 20 percent of employment in manufacturing and 30 to 50 percent of employment in services.

The reweighting of observations from enterprise surveys can also be used to estimate gross job creation and destruction by firm size. The World Bank (2012) applied this approach to Chile’s national survey of manufacturing enterprises, the Annual National Industrial Survey, which captures more than 90 percent of

**Figure 5.** The Employment Share of Micro-enterprises is Greater in Developing Countries



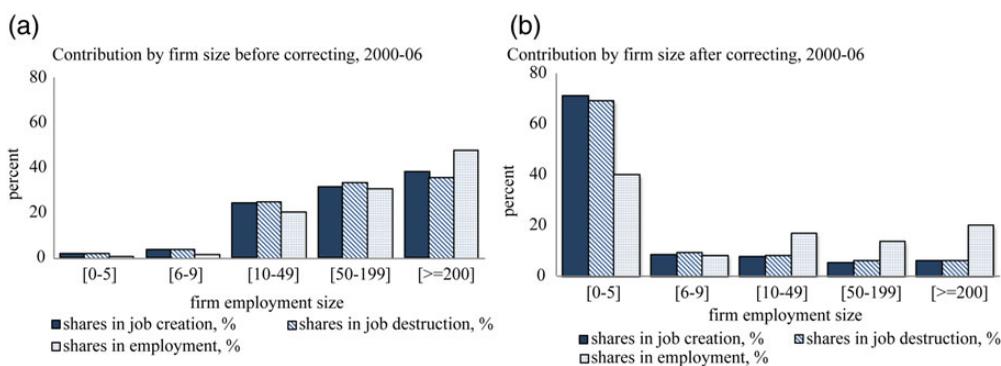
Source: World Bank (2012).

employment among establishments with more than 50 employees but less than half among establishments with 10 to 49 employees and only a fraction of micro-enterprises. When weights are recalculated based on the size distribution of businesses emerging from Chile’s main household survey, the estimated gross job creation and destruction become much larger, and micro-enterprises contribute to the bulk of gross job flows (figure 6). This estimate should not be taken literally because the micro-enterprises for which information on job creation and destruction is available in the Annual National Industrial Survey are not necessarily representative. However, even with this caveat, the difference is so large that it changes the picture of gross job creation and destruction.

Another way to overcome the underrepresentation of micro- and small firms by enterprise surveys is to reconstruct the size distribution using the more comprehensive economic censuses. In the case of India, for example, the economic censuses of 1998 and 2005 can be used to reassess the findings on net job creation by establishment size from [Martin, Nataraj, and Harrison \(2014\)](#) based on the Annual Survey of Industries from 2000 to 2007.

According to the economic censuses and using the approach proposed by [Davis, Haltiwanger, and Schuh \(1996\)](#), the annualized job creation by all manufacturing establishments amounted to 1.7 percent of average employment ([CSO 2001, 2008](#)). This is also the annualized net job creation rate that [Martin, Nataraj, and Harrison \(2014\)](#) estimated based on the Annual Survey of Industries. The difference between the data sources is the “unorganized” sector – plants with fewer than 10 employees and all plants with fewer than 20 employees that do not use power. It follows that the net job creation rate is the same – 1.7 percent – in both the organized and unorganized sectors. However, this is not what [Martin, Nataraj, and Harrison \(2014\)](#) found. Because firms grow or contract over time, the Annual

**Figure 6.** Micro-enterprises Account for Most Job Creation and Destruction



Source: [World Bank \(2012\)](#).

Survey of Industries contains a sizeable number of firms below 20 employees. The estimated net job creation rate in their case is -3.1 percent. Such a large difference casts doubt on job creation rates by establishment size estimated on the basis of truncated data.

### *Question 2: How Much Dispersion Is There in Productivity?*

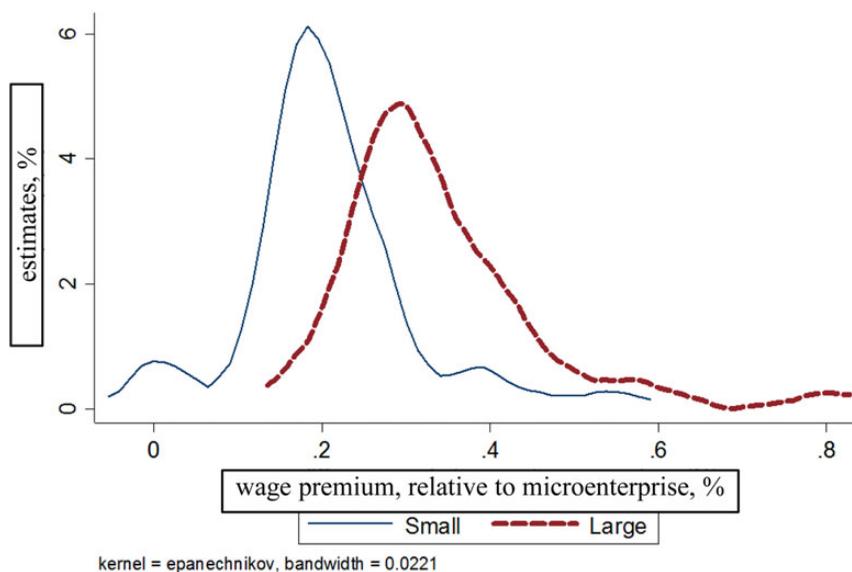
Measuring the productivity of micro-enterprises is difficult, but labor earnings and other dimensions of the quality of jobs provide indirect evidence of their performance. Numerous studies have documented that the micro- and even small enterprises of developing countries tend to be a means of subsistence for the poor (Schoar 2010). Based on household surveys from 18 developing countries, Banerjee and Duflo (2011) found that 44 percent of the people living on fewer than US\$1 a day in urban areas and 24 percent of those in rural areas work in a non-agricultural business where they secure dismally low earnings. A majority of these businesses have little capital and lack a fixed address.

A vast body of literature has documented that labor earnings are, on average, lower in informal businesses than in formal firms. Good summaries of this literature are provided by Leontaridi (1998), Perry et al. (2007), and Ruffer and Knight (2007), among others. Using data from household and labor force surveys in 33 developing countries, Montenegro and Patrinos (2012) showed that labor earnings in micro-enterprises are lower than in small and medium-sized firms, even after controlling for worker characteristics such as age and education (figure 7). These findings are consistent with results from country and regional studies (e.g., Van Biesebroeck 2005).

Low labor earnings can be partly attributed to the very small capital of most micro-enterprises. Using Mexico's National Survey of Micro Enterprises, McKenzie and Woodruff (2006) found that the median investment of new micro- and small enterprises is very low in some sectors. For instance, it is below US\$100 in construction and personal services, which is less than half of the monthly earnings of a low-wage worker. Based on surveys from seven Sub-Saharan African countries, Grimm, Kruger, and Lay (2011) showed that the median capital stock of an urban informal enterprise was less than US\$80. Fox and Sohnesen (2012) documented that 25 to 45 percent of micro-enterprises use their home as their primary point of operation and that another 10 to 40 percent simply work on the street.<sup>16</sup> Many of these micro- and small firms are located in rural areas and absorb some labor slack during the low agriculture season, which is consistent with the findings of earlier studies, including Mead and Liedholm (1998) and Liedholm (2002).

The flip side of limited assets is high returns to capital. McKenzie and Woodruff (2006) reported marginal return rates of 15 percent per month among Mexican micro- and small firms with investment levels below US\$200. Using data from a

**Figure 7.** Labor Earnings are Lower in Micro-enterprises



Source: [Montenegro and Patrinos \(2012\)](#).

Notes: Data are from 138 household and labor force surveys spanning 33 countries over 1991–2010. The premium is estimated based on an earnings equation, controlling for worker characteristics. Large firms employ more than 50 workers, and small firms employ 10 to 50 workers.

randomized experiment in Guanajuato (Mexico), [McKenzie and Woodruff \(2008\)](#) estimated the marginal returns to capital in micro-enterprises with less than \$900 of capital stock to be in the range of 20 to 33 percent a month, which is three to five times higher than market interest rates. Based on data from a randomized experiment in Sri Lanka, De Mel, [McKenzie, and Woodruff \(2008\)](#) found the marginal returns to capital in micro-enterprises to be 4.6 to 5.3 percent per month – substantially higher than market interest rates. [Udry and Anagol \(2006\)](#), [Göbel, Grimm, and Lay \(2011\)](#), and [Grimm, Kruger, and Lay \(2011\)](#) reported similar results for micro-enterprises in Ghana, Peru, and other Sub-Saharan African countries, respectively.

Low labor earnings together with high returns to capital suggest an inefficient combination of production factors in micro-enterprises and, hence, lower productivity than in larger firms. However, averages can be misleading; there is also evidence of a wide dispersion of productivity among micro-enterprises ([Sutton and Kellow 2010](#)).

Labor earnings are higher in some micro-enterprises than in larger firms. Using data from employment and labor force surveys in Brazil, Mexico, and South Africa, [Bargain and Kwenda \(2011\)](#) showed that some self-employed workers receive a

significant earnings premium that may compensate for the absence of the benefits typically associated with formal jobs. However, the relative size of this group varies considerably across countries. Most of the self-employed enjoy an earnings premium in Mexico, but few do so in South Africa. Using a household survey panel from Vietnam, [Nordman, Nguyen, and Roubaud \(2011\)](#) found that labor earnings in the informal sector depend on job status; informal self-employed workers generally receive a premium relative to formal wage workers, and the premium becomes higher when moving up the pay ladder. Using data from a survey on micro- and small enterprises in Madagascar, [Nordman, Rakotomanana, and Roubaud \(2012\)](#) found qualitatively similar results: earnings in the informal sector vary depending on the worker's job status, and most of the self-employers enjoy an earnings premium.

A similar dispersion is found in relation to assets and returns to capital. In the Sub-Saharan African countries covered by their study, [Grimm, Kruger, and Lay \(2011\)](#) showed that the average capital stock among the top quintile of urban informal enterprises is more than 60 times the median capital stock. The average monthly profit of this group is seven times the median. De Mel, [McKenzie, and Woodruff \(2008\)](#) found that returns to capital vary significantly in Sri Lanka. Among the participants in their randomized experiment, 20 percent of male-owned enterprises and 60 percent of female-owned enterprises had returns lower than market interest rates. One salient factor underlying the variation is entrepreneurial ability, including years of education, and numeracy and cognitive processing capability. [De Mel, McKenzie, and Woodruff \(2009a\)](#) further showed that entrepreneurial ability significantly and substantially affect the incidence of innovation among micro- and small enterprises, which directly affects firm profitability. [Grimm, Knorringa, and Lay \(2012\)](#) found similar evidence for Sub-Saharan African countries.

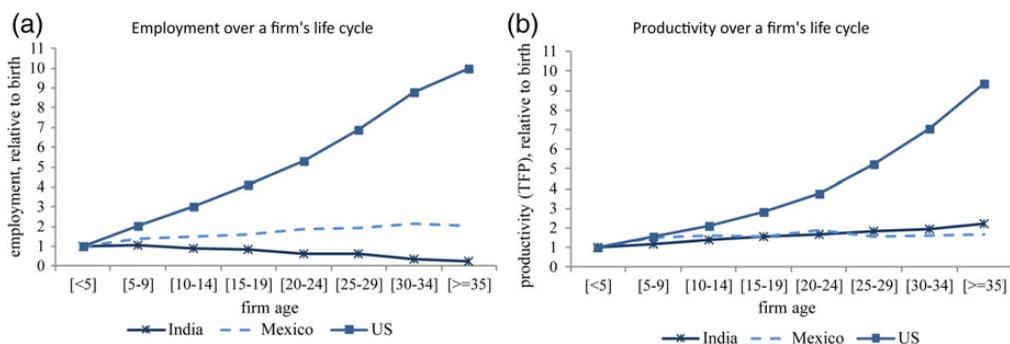
### *Question 3: Which Firms Drive Productivity Gains?*

To the best of our knowledge, there are no studies based on data representative of all firm sizes to assess the relative contribution to aggregate productivity growth of gains at the firm level, reallocation across firms, and entry and exit in developing countries. However, a meta-analysis can shed light on the potential biases of decompositions based on truncated data. Such a meta-analysis relies on the findings of recent studies that have attempted to gain a deeper understanding of the life cycle of firms, including micro-enterprises, in the context of developing countries. Some of these studies have been able to overcome the limitations of official censuses and surveys by either using censuses with comprehensive coverage or merging data sets of formal firms with those of informal firms. Others (admittedly only a handful) have relied on data that specifically allow them to analyze the dynamics of micro-enterprises and informal businesses.

Using comprehensive datasets that cover micro- and small enterprises, [Hsieh and Klenow \(2011\)](#) compared the life cycle of manufacturing plants in India and in Mexico relative to that observed in the United States. For India, they merged the Annual Survey of Industries, a census of manufacturing plants with at least 100 employees supplemented by a random sample of formally registered establishments with fewer than 100 employees, with the Survey of Informal Establishments of the National Sample Survey. For Mexico, they relied on the Mexican Economic Census, which is a complete enumeration of all fixed establishments in Mexico. The only establishments not included in the Economic Census are street vendors, which are unlikely to be important for manufacturing. Following cohorts of firms over their life cycle, the study showed that the average employment of 35-year-old plants was one-fourth of the average employment at birth in India, and the average employment of 35-year-old plants was twice the average employment at birth in Mexico. Productivity growth displayed similar patterns in both countries. This finding is in sharp contrast to what is observed in the United States, where by age 35, both plant size and productivity are approximately eight times higher on average (figure 8).

A similar comparison, this time involving a sub-Saharan African country, was attempted by [Sandefur \(2010\)](#). The data were from Ghana's National Industrial Census, which incorporates all manufacturing firms in the country, both formal and informal (household enterprises are excluded though). Following the work on Portugal by [Cabral and Mata \(2003\)](#), changes in the size distribution of firms between 1987 and 2003 were decomposed into changes due to selection among entrants and changes due to the aging of surviving firms. The results showed that in Ghana's case the evolution of firm size over time was almost entirely driven by selection and not by aging. The Ghanaian firms that survived from 1987 to 2003 were abnormally large to begin with and did not constitute a representative sample

**Figure 8.** The Majority of Firms Grow Little in Developing Countries

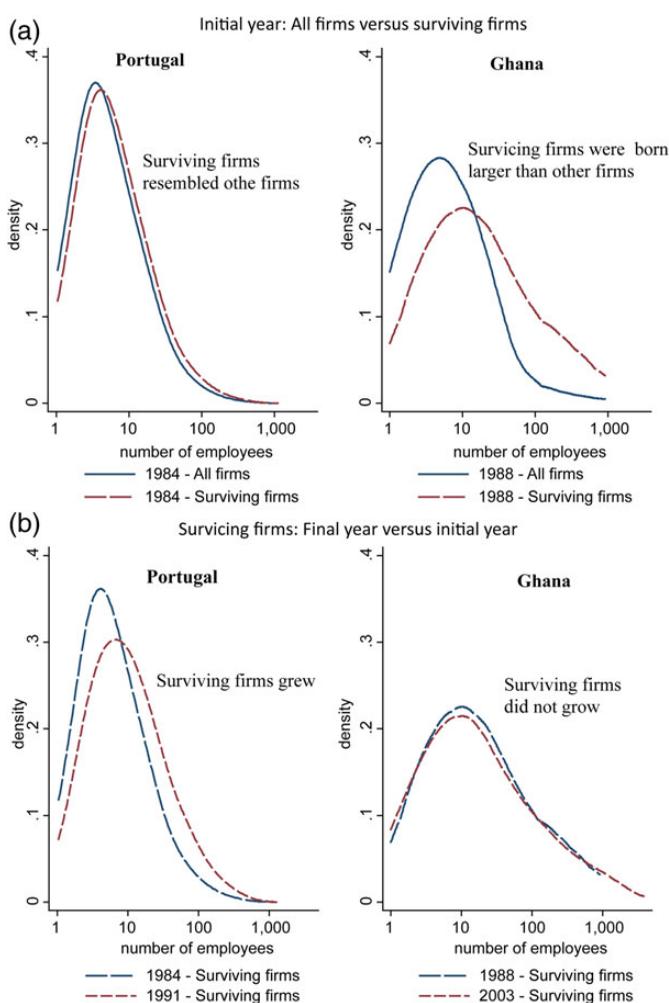


Source: [Hsieh and Klenow \(2011\)](#).

of the universe of firms. On average, the growth of these surviving firms was negative. This is the opposite of what was observed in Portugal's case (figure 9).

A number of studies have corroborated the lack of dynamism of micro- and small firms in the informal sector. Using Mexico's National Urban Employment Survey, Fajnzlber, Maloney, and Rojas (2006) found that individuals who start micro-enterprises are much more likely to remain the sole worker than to hire other workers and increase the size of their business. Following the same cohort of own-account firms between 1987 and 2001, they documented that approximately

**Figure 9.** Aging Does Not Contribute Much to Firm Growth



Source: Cabral and Mata (2003) and Sandefur (2010).

52 percent of them stayed at the same scale, whereas only 0.7 percent grew to become enterprises with at least five employees. In Sub-Saharan African countries, [Fox and Sohnesen \(2012\)](#), [Grimm, Kruger, and Lay \(2011\)](#), [Kinda and Loening \(2008\)](#), and [Loening and Imru \(2009\)](#) showed that few household enterprises expand into employing beyond the household, even when they are able to survive for a long time.

The picture that emerges from studies that explicitly consider micro- and small enterprises can be summarized in the form of three stylized facts:

- *Slow within-firm growth*: Surviving firms grow more slowly in developing countries than in advanced economies in terms of both employment and productivity. It does not follow that productivity growth is lower among the micro- and small enterprises of developing countries than among their larger firms. Whereas the former group is mainly made of “mice”, the latter includes “elephants” that were born large and grow little.
- *Massive but undifferentiated entry and exit*: Micro- and small enterprises constantly churn through entry and exit, creating many jobs but destroying almost as many along the way, and likely contributing little to aggregate productivity growth. Productivity differences among entering, exiting, and surviving businesses are smaller among micro- and small enterprises than among larger firms.
- *Limited gains from reallocation*: The reallocation of resources is closer to a random process in developing countries than in advanced economies. The correlation between firm productivity and firm growth is weaker, as reflected in the relative scarcity of gazelles and the prevalence of churning among micro-enterprises. Reallocation may not be less buoyant than in advanced economies, but it is less likely to result in aggregate productivity gains.

Building on these three stylized facts, predictions can be made regarding the sign of possible biases from relying on truncated data distributions to assess the drivers of aggregate productivity in developing countries. The analysis follows the decomposition proposed by [Melitz and Polanec \(2012\)](#), which, in turn, extends the methodology of [Olley and Pakes \(1996\)](#). The decomposition expresses aggregate productivity growth between two periods as the sum of four components: i) within-firm gains, calculated as the average productivity change among surviving firms; ii) between effect, defined as the change of the covariance between size and productivity among surviving firms; iii) gains from entry, computed as the employment share of the entrants multiplied by the difference between the weighted average productivity of entrants and that of surviving firms; and iv) gains from firm exit, as the employment share of the exiting firms multiplied by the difference between the weighted average productivity of surviving and exiting firms.

Three predictions emerge from this exercise (table 1). First, because of the limited gains from reallocation among micro- and small enterprises, decompositions of

**Table 1.** Ignoring Micro-enterprises Biases the Assessment of the Drivers of Aggregate Productivity Growth

Component	Analytical expression*	The role of micro- and small enterprises	Conventional wisdom bias
Within-firm gains	$\Delta\bar{\varphi}_S$	Productivity growth among surviving firms is lower in developing countries than in advanced economies ( $\Delta\bar{\varphi}_S$ is small). However, it may not be lower among the micro- and small enterprises of developing countries than among their larger firms because the latter include stagnant or declining “elephants”.	Within-firm gains may be over- or under-estimated
Between effect	$\Delta cov(\varphi, s)$	Churning implies that it is not necessarily the most productive firms that survive and expand in developing countries, and churning is more prevalent among micro- and small enterprises than among larger firms ( $\Delta cov(\varphi, s)$ is small)	Gains from between effect are over-estimated
Entry of new firms	$e \times (\Phi_e - \Phi_s)$	The sample truncation implies that, among firms that enter with a size below the threshold, surviving firms that reach a relatively high employment level are treated as statistical entrants. The correlation between firm productivity and firm size is smaller in developing countries than in advanced economies, but it is positive. This means that the average productivity of statistical entrants is higher than that of true entrants (the true $(\Phi_e - \Phi_s)$ is smaller). Churning among micro-enterprises also implies that there are more true entrants than there are statistical entrants (the true $e$ is larger).	Losses (gains) from entry are under- (over-) estimated
Firm exit	$x \times (\Phi_s - \Phi_x)$	The sample truncation implies that surviving firms that fall below a relatively high employment level are treated as statistical exists. The correlation between firm productivity and firm size is positive, and the average productivity of statistical exits is higher than that of true exits (the true $(\Phi_s - \Phi_x)$ is larger). Churning among micro-enterprises also implies that there are more true exits than there are statistical exits (the true $x$ is larger).	Gains (losses) from exit are under- (over-) estimated

*Source:* The analysis follows the decomposition proposed by [Melitz and Polanec \(2012\)](#), which extends the methodology of [Olley and Pakes \(1996\)](#).

*Notes:* The decomposition expresses aggregate productivity growth between two periods as the sum of four components: i) within-firm gains, calculated as the average productivity change among surviving firms, ( $\Delta\bar{\varphi}_S$ ); ii) the between effect, defined as the change of the covariance between size and productivity among surviving firms, ( $\Delta cov(\varphi, s)$ ); iii) gains from entry, computed as the employment share of the entrants, ( $e$ ), multiplied by the difference between the weighted average productivity of entrants and that of surviving firms, ( $\Phi_e - \Phi_s$ ); and iv) gains from firm exit as the employment share of the exiting firms, ( $x$ ), multiplied by the difference between the weighted average productivity of surviving and exiting firms, ( $\Phi_s - \Phi_x$ ).

aggregate productivity gains based on truncated data tend to over-estimate the between effect. Second, the gains (losses) from firm entry are over-estimated (under-estimated). The correlation between firm productivity and firm size is smaller in developing countries than in advanced economies, but it is positive. This means that the average productivity of statistical entrants is higher than that of true entrants. Churning among micro-enterprises also implies that there are more true entrants than there are statistical entrants. Third, for the reasons stated above, the gains (losses) from firm exit are under-estimated (over-estimated). The contribution of within-firm gains, in contrast, may be either over- or under-estimated when using truncated distributions. Productivity growth among surviving firms is lower in developing countries than in advanced economies. However, it may not be lower among the micro- and small enterprises of developing countries than among their larger firms because the latter include stagnant or declining “elephants”. Therefore, the direction of the bias (if any) depends on the specific context.

## Conclusion

The conventional wisdom on firm dynamics, productivity growth, and job creation in developing countries is based on data that, by design, exclude a vast number of micro- and small enterprises, most of which are informal. Researchers are generally aware of this truncation of the data, although they may under-estimate its real extent. Some may not view it as an issue on the grounds that the omitted economic units reflect survivorship rather than entrepreneurship (Schoar 2010). From that perspective, the conventional wisdom and its associated analyses (e.g., on the most important constraints faced by firms) provide a good characterization of the “real” private sector.

However, there are two important issues with this view. The first one is the relative arbitrariness in the thresholds that determine the truncation of the data. There is no reason to believe that a firm with 10 workers is substantially different from one with eight, but the number of firms belonging to that small interval can be very large. The second issue is that a large share of total employment is associated with the firms that are typically excluded from enterprise censuses and surveys.

This paper assesses the ways in which the conventional wisdom on developing countries would change if micro- and small enterprises were taken into account in the analyses. Several tentative conclusions emerge from this analysis, including the greater role played by micro- and small enterprises in gross job creation and destruction, the greater dispersion of firm productivity, the weaker correlation between firm productivity and firm size, and the smaller contribution of within-firm productivity gains to aggregate productivity growth. However, it is difficult to take

this assessment much farther in the absence of better quality data on the economic units that are typically excluded from enterprise censuses and surveys.

The limitations of truncated enterprise censuses and surveys call for an effort to collect more comprehensive firm data. There have been creative efforts in this direction, which could be emulated in a more systematic manner. For instance, Fajnzlber, Meloney, and Rojas (2006) combined information from labor force surveys with surveys on micro-enterprises to adequately cover the informal sector. [Cling, Razafindrakoto, and Roubaud \(2005\)](#) produced 1-2-3 surveys for a handful of countries, a combination of household and enterprise surveys specifically designed to capture informal sector businesses. The Global Entrepreneurship Monitor (GEM) research program collected cross-country data on entrepreneurs, including those from micro- and small firms ([Kelley, Bosma, and Amorós 2010](#)). Several countries, including India, Mexico, and Peru, have taken the lead in compiling data on informal enterprises on a regular basis.

Data quality and comparability is another challenge to address. In developing countries very few micro-enterprises keep reliable financial records. The information they provide is based on recall, which is subject to a myriad of problems ([De Mel, McKenzie, and Woodruff 2009b](#)). As a result, it is difficult to distinguish between expenditures for household consumption and those for business operations. Even the labor input is difficult to capture because the boundaries between the time spent on either household chores or business activities are often blurred, and unpaid work by household members, particularly children, is not adequately accounted for. Production by micro-enterprises also tends to be more seasonal. An effort to improve the quality and comparability of data on micro- and small enterprises requires a systematic effort to address these issues to the greatest extent possible.

There are implications for research as well. This paper assesses how the use of truncated data can bias the answer to questions such as which firms create more jobs, how much dispersion there is in productivity, or which firms drive productivity gains. However, the answers are necessarily tentative at this stage. There are good examples of studies that address these issues with more comprehensive data and that pay attention to the methodological challenges that arise along the way. The work by [Hsieh and Klenow \(2011\)](#) is a case in point. Because many micro- and small enterprises are informal, the nature of regulations may be less important for them than the characteristics of the cities in which they operate. For instance, [Ghani and Kanbur \(2013\)](#) explored whether agglomeration effects differ between formal and informal sector units in India's cities. More research of this sort is needed.

Finally, explicitly accounting for micro- and small enterprises also has important policy implications. There is awareness that in many developing countries, "informal is normal". However, from a policy perspective, there is a tendency to think in terms of a dual economy model, where the growth of the modern sector will eventually lead to the disappearance of subsistence units. The consequence is a focus on

revamping formal sector regulations, even if many of these regulations are irrelevant for informal micro- and small enterprises. The emphasis is often on larger firms on the grounds that they tend to be more productive, but this focus amounts to ignoring that they can also be “elephants”. Although there are notable exceptions, such as [Nichter and Goldmark \(2009\)](#) and [De Mel, McKenzie, and Woodruff \(2009a\)](#), little thinking goes into policies to support productivity growth among the micro- and small enterprises that employ the bulk of the labor force and to help more “gazelles” emerge from among them.

## Notes

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1. In a typical year, the Longitudinal Business Database reports approximately 6 million firms and 7 million establishments with at least one paid employee. The Census Bureau also reports more than 15 million self-employment businesses. It follows that NETS combines employer and self-employment businesses but does not reflect the universe of businesses.

2. The data referred to here were updated on January 7, 2013. The numbers are weighted averages of data from Austria, Belgium, Cyprus, Finland, France, Germany, Italy, Luxembourg, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. The data cover total business economy, repair of computers, and personal and household goods, except financial and insurance activities.

3. The 11 countries are Bulgaria, Croatia, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovak Republic, and Slovenia. In this comparison, the data from EUROSTAT are limited to the sectors considered by [Ayyagari, Demirgüç-Kunt, and Maksimovic \(2011b\)](#), namely, manufacturing, services, construction, transport, storage, communications, and computer and related activities.

4. The surveys of a number of countries ask both employers and employees about the size of their company. The size distributions that emerge from these two answers tend to be consistent with each other.

5. Because the classification of businesses by size differs across household and labor force surveys, the exercise regroups the size thresholds considered by World Bank Enterprise Surveys to make the classification comparable between the types of surveys.

6. Results for two advanced economies (Germany and Spain) and five developing countries (Chile, India, Pakistan Turkey, and South Asia) are reported, but the patterns are similar for other countries. The estimated distributions can be provided upon request.

7. These surveys do not report unpaid workers. The conclusion is the same when average establishment size is calculated based on permanent full-time employees.

8. [Bartelsman, Haltiwanger, and Scarpetta \(2009b\)](#) review the measurement and analytical challenges of handling micro-level data, including the sampling problem.

9. More recent approaches include those by [Melitz \(2003\)](#) and [Asplund and Nocke \(2006\)](#).

10. See [Bartelsman and Doms \(2000\)](#) for a review of earlier studies.

11. Additional evidence on the contribution of firm dynamics to aggregate productivity growth is provided by [Bartelsman and Doms \(2000\)](#), [Ahn \(2001\)](#), and [Syverson \(2011\)](#), among others.

12. The countries were Estonia, Hungary, Latvia, Romania, and Slovenia in Central and Eastern Europe; Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela in Latin America; and Indonesia, the Republic of Korea, and Taiwan (China) in East Asia.

13. The sampling universe for the ASI includes all the establishments registered under Sections 2(m)(i) and 2(m)(ii) of the Factories Act, 1948, that is 10 or more workers with the aid of power or 20 or more workers without the aid of power. It also includes all the establishments that is registered under the Bidi and Cigar Workers (Conditions of Employment) Act 1966, and all electricity undertakings that are not registered with the Central Electricity Authority (CEA).

14. Pavcnik (2002) also found that the productivity of exiting plants is much lower than that of surviving plants.

15. The nine countries are Burundi, Cameroon, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Tanzania, Zambia, and Zimbabwe. The data collection was coordinated by the World Bank as part of its Regional Program on Enterprise Development (RPED).

16. The core analysis of the paper is based on nationally representative household survey data from Burkina Faso, Cameroon, Republic of Congo (urban only), Ghana, Mozambique, Rwanda, Senegal, Tanzania, and Uganda.

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