Stunted Growth: Why Don't African Firms Create More Jobs?

Leonardo Iacovone, Vijaya Ramachandran, and Martin Schmidt

Abstract

Many countries in Africa suffer high rates of underemployment or low rates of productive employment; many also anticipate large numbers of people to enter the workforce in the near future. This paper asks the question: Are African firms creating fewer jobs than those located elsewhere? And, if so, why? One reason may be that weak business environments slow the growth of firms and distort the allocation of resources away from better-performing firms, hence reducing their potential for job creation.

The paper uses data from 41,000 firms across 119 countries to examine the drivers of firm growth, with a special focus on African firms. African firms, at any age, tend to be 20–24 percent smaller than firms in other regions of the world. The poor business environment, driven by limited access to finance, and the lack of availability of electricity, land, and unskilled labor has some value in explaining this difference. Foreign ownership, the export status of the firm, and the size of the market are also significant determinants of firm size.

However, even after controlling for the business environment and for characteristics of firms and markets, about 60 percent of the size gap between African and non-African firms remains unexplained.

JEL Codes: D22, D24, L2, L25, O12, O14, O55

Keywords: Africa, underemployment, finance, economic growth

Center for Global Development
www.cgdev.org

Working Paper 353
February 2014

Stunted Growth: Why Don't African Firms Create More Jobs?

Leonardo Iacovone
World Bank

Vijaya Ramachandran
Center for Global Development

Martin Schmidt
University of Maryland

The authors are grateful to Alan Gelb, Alvaro Gonzalez, Christian Meyer, Simon Quinn, Mans Soderbom, Gaiv Tata, Michael Wong, an anonymous external reviewer, and seminar participants at the annual conference of the Center for the Study of African Economies at Oxford University and the Africa Finance and Private Sector Group at the World Bank, for comments and suggestions.

CGD is grateful for contributions from the Australian Agency for International Development, the Danish Ministry of Foreign Affairs, and the William and Flora Hewlett Foundation in support of this work.

Leonardo Iacovone, Vijaya Ramachandran, and Martin Schmidt. 2014. "Stunted Growth: Why Don't African Firms Create More Jobs?." CGD Working Paper 353. Washington, DC: Center for Global Development.
http://www.cgdev.org/publication/stunted-growth-why-don't-african-firms-create-more-jobs-working-paper-353

Center for Global Development
2055 L Street., NW
Washington, DC 20036

202.416.4000
(f) 202.416.4050

www.cgdev.org

Contents

Introduction

Many countries in Africa suffer high rates of under-employment or low-productivity employment. In addition, because of demographic factors, many countries anticipate that large numbers of people will enter the workforce in the near future. Therefore, there is an urgent need to understand the drivers of job creation in the private sector, and the constraints that prevent firms from hiring more workers. One possibility is that market imperfections and weak business environments lower the productivity of firms and prevent resources from being allocated toward better- performing firms, thereby reducing the overall potential for job creation.

We use the existing literature on firm growth to construct a simple model.[1] We draw from learning models, which indicate that there is a positive correlation between firm growth and productivity. These models emphasize the role of the entrepreneur (or manager) in the learning process. Early learning models describe managerial capacity as fixed or innate (Jovanovic, 1982), while subsequent theoretical models allow for human capital formation to impact managerial efficiency and firm growth (Pakes and Ericson, 1998). A firm "learns" about its productivity over time--efficient firms invest and expand while less productive ones stay small, shrink or exit. This class of models also predicts that firm age and size are both negatively correlated with firm growth: as firms grow older or become larger, their rate of growth slows. After controlling for age, larger firms grow more slowly because they are already at a higher level of productivity. Consequently, they have limited scope to increase productivity further (Evans and Leighton, (2002); Bates (1990); McPherson (1996); Sutton (1997)).

A recent study by Hsieh and Klenow (2012) is particularly relevant. Hsieh and Klenow show that in the U.S., the average 40 year-old plant employs almost eight times as many workers as a typical plant five years or younger. In contrast, Indian plants grow very little in terms of employment or output. Mexico is in the middle--the average 40 year-old Mexican plant employs twice as many workers as an average new plant. Hsieh and Klenow find that this pattern holds across many industries and for formal and informal establishments alike. The authors conclude that this pattern reflects lower investments by Indian and Mexican

[1] Models of firm growth can be separated into two groups--those that rely on "stochastic" models of growth based on Gibrat's Law, and those that rely on "learning" models.[1] Stochastic models describe firm growth as drawn from a distribution. "Lucky" firms are those firms that repeatedly draw high rates of growth over time. In these models of firm evolution, firm size and firm growth are independent of each other. However in practice various models may include both "stochastic" features as well as "learning" features such as in Jovanovic (1982).

plants in process-efficiency, quality, and market access, due to distortions that impede allocation of resources toward firms with higher productivity and higher growth potential.

Various Africa-specific papers also shed some light on the issue of firm growth. Harrison et al (2013) find that when they control for geography, political competition and the business environment, formal African firms lead in productivity levels and growth. They conclude that Africa's disadvantages arise from its weak business environment, including the lack of infrastructure and finance. Sandefur (2010) uses a panel of Ghanaian firms, spanning 17 years, to model firm dynamics. In contrast with the results for analysis of American and European firms, he finds that "entry of new firms and selection on observable characteristics, rather than within-firm growth," dominates industrial evolution in Ghana. Teal (1999) also looks at firm-level data for Ghana. He finds that the removal of high levels of protection combined with substantial real devaluations have changed the environment in which Ghanaian manufacturing firms operated in the 1990s. Teal finds that the rate of job creation in Ghana's manufacturing sector is highest in medium-sized firms and that small firms do not grow more rapidly than larger firms. Hallward-Driemeier et al. (2010) find that African firms face enormous uncertainty with regard to the policy environment. As such, they argue that firms face deals rather than rules—that policies are enacted in a firm-specific manner even if in theory, all firms in a country are subject to the same policies. Consistency in policy implementation improves with stronger institutions and better governance.

In this paper, we build on the work of Hsieh and Klenow (2012). Using data from 41,000 firms across 119 countries, we examine the relationship between size and age at the firm level, with a special focus on African firms.[2] We find that African firms, at any age level, tend to be systematically smaller than firms in other regions of the world. We look at the impact of business environment measures as well as certain types of firm characteristics. These include access to as finance, infrastructure, legal rights, availability of skilled labor, access to land, foreign ownership and/or export status. We find that these variables do have some explanatory power but cannot fully explain the slower growth of employment in African firms. Going forward, the paper is divided into four additional sections. First, we present the data. Second, we describe our model and present the main results. Third, we discuss the possible reasons behind the "stunted growth" of African firms. Finally, we conclude with a summary of key findings and some policy implications.

[2] "Africa" refers to Sub-Saharan Africa only, throughout this paper.

The Data

The analysis described in this paper is based on firm-level data from the World Bank's Enterprise Surveys. The Enterprise Surveys collect qualitative information on a country's perceived business environment as well as quantitative firm performance measures, predominantly in the formal service and manufacturing sectors of the economy. The data set integrates all surveys that have been conducted after 2006, which use a common global methodology. As such, we analyze data from 119 countries, of which 41 are in Sub-Saharan Africa.[3]

The surveys cover formal firms in the following sectors--manufacturing, construction, retail, wholesale, hospitality and other services--that are classified according to ISIC Rev 3.0 and cover the ISIC codes 15-37, 45, 50-52, 55, 60-64, and 72. Interviewers conduct face-to-face interviews using standardized questionnaires for the manufacturing and service sectors. Topics covered include information on firm characteristics, the business environment, access to finance, annual sales, costs of inputs and labor, workforce composition, and basic performance measures. These data are representative at the size, sector and location levels.

We divide our sample into five age quintiles, using the age distribution of the entire sample of firms (i.e. the global data set). This yields the following quintiles: age quintile 1 contains firms that are between 0 and 6 years old, age quintile 2 is from 7 to 11 years, age quintile 3 is from 12 to 16 years, age quintile 4 from 17 to 26 years and age quintile 5 contains firms that are more than 27 years old. We then calculate the number of firms in each of the five age quintiles by country.

We discard data from Yemen (477 observations) and Iraq (756 observations) because these countries on their own are not sufficiently representative of the Middle East/North Africa region. We also discard data from firms that appear to be more than 100 years old (which we regard as outliers) and from firms that do not have information about their age (882 observations). This gives us a sample of 50,470 firms. Missing values for size of the firm at the start of operations, and other variables, yield a final sample of 41,005 firms, which we use to obtain our baseline estimates.

The list of surveyed countries is shown in Figure 1. There are 41 African countries in the sample, and 78 comparator countries (divided across three regions—Asia, Latin America and

[3] See www.enterprisesurveys.org/Methodology for more information. We exclude firms in which the government holds at least 50 percent of shares.

Eastern Europe). Figure 2 shows the median value of firm size, by age quintile, for each of the four regions; we can see that African firms are smaller than firms in other regions, for almost every age quintile. Figure 3 shows the kernel density estimation of the size distribution of firms for all firms in the sample, grouped by region. The size distribution of firms in Africa peaks at about 7 employees per firm. We see that there is a higher share of African firms at low levels of employment than in other regions, and that the density of larger firms is lower in Africa than elsewhere.

The problem of the "missing middle," described variously in the literature with regard to the middle class and/or the business sector, is clearly visible in Figure 3. Less visible, due to the truncation of the sample at 5 employees, is the number of firms that are very small. Presumably, this share is higher for Africa than elsewhere. We also do not know how many firms elected to stay in the informal sector as we only observe the size and distribution of firms that are formally registered.

Figure 4 shows the age distribution of firms by region. We see that African firms are younger than firms elsewhere, peaking at around 10 years of age. However, African firms are not small only because they are young. Figure 5 shows the employment distribution of firms, conditional on age. This figure plots the *residual* from a regression of firm size on age quintiles—it shows that factors other than age are driving the smaller size of African firms. Figure 5 also shows that a large number of African firms have an observed size that is *below* the size predicted by their age. Figure 6 shows the distribution of the size at the start of operations for firms in Africa, Asia, Eastern Europe and LAC. This figure also shows that African firms are smaller at the start of operations relative to firms in other regions, but this difference is not as pronounced as in Figure 3 (which describes current firm size). This suggests that the gap between African and non-African firms becomes more pronounced after birth.

We now turn to a simple model of firm growth, from which we derive our econometric model.

The Model and Main Results

Do firms grow differently in different environments? Figure 7a describes firm growth in an "ideal" business environment. In this scenario, high- productivity firms are able to grow and thrive (because they are able to access credit, have good property rights and/or a steady supply of electricity, etc.) while low-productivity firms stay small and even exit early. Figure

7b shows what happens in a "distorted" business environment. In this scenario, high-productivity firms are not able to grow and are closer in size to low-productivity firms. Distortions such as the lack of enforcement of property rights may also mean that low-productivity firms are able to survive longer, although they are not able to grow or compete with firms in better business environments.

Augmented forms of the learning model of firm growth capture the ideas described above ((Evans (1987); Variyam and Kraybill (1992); Hall (1987)). Based on these models, we describe firm growth in the following manner:

$S_t' = G(S_t, A_t)^{\tau}(S_t)\, e^{ut}$

where S_t' and S_t represent the firm's final and initial size, respectively, τ denotes the time interval, G represents the growth function, A represents firm age, and u is the log-normally distributed error term. The augmented form of this model adds a vector X to measure the business environment and characteristics of the firm. A first-order expansion yields the following equation:

$$Y_i = \frac{\log(S_{t'}) \log(S_t)}{\tau} = \beta_0 + \beta_1 \log(S_t) + \beta_2 \log(A_t) + \sum_{i=3}^{n} \beta_i X_i + u_t$$

Thus, the current size of the firm (Y) is a function of starting size (S), age (A), and a vector (X) of firm characteristics and business environment variables. Given our conceptual model, we are interested in the vector X. In addition, we are interested in whether firms are larger when they operate in larger markets. Also, what is the relationship between current size and initial size? Finally, a firm's capabilities are often embedded in ownership or export status, so we also ask--are foreign-owned firms and exporting firms able to grow more than their domestic/non-exporting counterparts?

To answer these questions, we regress size of the firm (in logs) on age dummies (rather than age as a continuous variable), startup size (in logs), a limited vector of firm characteristics including firm status (foreign-owned, exporter) and an Africa dummy. This estimation is followed by more enhanced models that include measures of the business climate and firm characteristics, individually and then all together.[4] It is followed by a final estimation, which

[4] Previous research on informal firms in several African countries shows that a stronger business climate results in a clearer performance division between high and low-productivity firms. This appeared to be the case

adds back the Africa dummy to see if there is an Africa effect even after controlling for these various measures. [5]

In order to estimate the impact of the business environment on firm size, we measure five key business environment variables as follows:

Infrastructure: The number of power outages suffered by the firm in the previous 30 days.

Access to finance: The share of working capital that is financed by sources other than retained earnings. These might include banks, non-bank financial institutions such as microfinance institutions, credit cooperatives, credit unions or finance companies, purchases on credit from suppliers and advances from customers, and other sources such as moneylenders, friends, etc.

Access to Land: Index of access to land provided by the World Bank's *Investing Across Borders* project. This is an un-weighted average of four sub-indices, which measure access to land. These sub-indices are described on the project's website as follows:

> *Strength of lease rights index* (0-100): Compares economies on the security of legal rights they offer to investors interested in leasing industrial land—whether or not foreign and domestic companies are treated differently and whether the land can be subleased, subdivided, mortgaged, or used as collateral.
>
> *Strength of ownership rights index* (0-100): Compares economies on the security of legal rights they offer to investors interested in purchasing industrial land.
>
> *Access to land information index* (0-100): Compares economies on the ease of access to land-related information through the countries' land administration systems including land registries, cadastres and land information systems.
>
> *Availability of land information index* (0-100): Compares economies on the availability of key information to interested private parties through land administration institutions.

---

in South Africa, with very productive formal firms and "survivalist" informal firms and a bi-modal productivity kernel density function (Gelb et al, 2009).

[5] We acknowledge that relying on cross-sectional data has some shortcomings. In particular, there may be a confounding cohort and age effects. However, as discussed in Hsieh and Klenow (2012) cross-sectional estimates of growth equations are remarkably close to panel estimates. Furthermore, as an additional robustness check we estimate our model using data only for firms born in or after 1990 in order to limit the influence of these cohort effects; this estimation yields similar results to estimates for the entire sample.

***Skill ratio of the workforce*:** Ratio of skilled to unskilled workers in the firm.[6] In addition, the capital-labor ratio of the firm is included as a control variable so we can measure the effect of the skill ratio accurately.

Legal rights: The strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending in the private sector. This variable is taken from the World Bank's Doing Business database and is measured on a scale of 0 to 10.

We use city-level averages of the measures of the business environment described above, except for land and legal rights where we use measures at the national level. Table 1 shows non-pairwise and pairwise correlations across the five measures—these are not correlated to a point that we would be worried about collinearity. Additionally, in order to reduce spurious significance, the error terms are clustered by country-city-age quintile as suggested by Moulton (1990).[7]

In order to control for firm characteristics, we include size of the firm at the start of operations as well as age quintile dummies, and a dummy that is set to 1 if the firm is foreign-owned or an exporter. Typically, foreign-owned or exporting firms are more capable—they are better managed and/or have more qualified workers. Gross national income is included (in log form) as a measure of overall market size of the country in which the firm carries out its operations. We expect firms operating in larger markets to be larger than those in very small countries.[8]

Table 2 shows the results of the "baseline" regressions of the determinants of firm size for our sample of over 40,000 firms. Equation (1) simply regresses firm size (in logs) on age, market size and size at start. Equation (2) includes a dummy set to 1 if the firm is located in Africa. Firms are larger in every age quintile relative to the default (the youngest age quintile);

---

[7] The clustering issue is best looked at by example--imagine the effect of being located in village X on whether or not a household has access to water. The probability that two households in village X have access to water is likely to be positively correlated (as they are in the same cluster). Therefore, it is necessary to correct for intra-cluster correlation whenever the dependent variable is at a more disaggregated level (having access to water in a household) than the independent variable (being in village X). As the independent variables that measure the business environment are likely to be somewhat similar across firms and are measured at a slightly aggregated level, we take into account the intra-cluster correlation across firms. Consequently, we cluster the standard errors by country, city, and age quintile.

[8] We control for sector-specific effects, because some sectors may employ more people, on average, than others. Sector dummies could also pick up differences in fixed costs across sectors; these differences possibly affect levels of employment as well. The addition of an Africa dummy does not change the results, suggesting that sector-specific differences are not different in Africa than elsewhere.

this difference is both positive and significant. Firms in larger markets also grow more; the coefficient on ln GNI is both positive and significant. Firms that start out big stay big—this difference is also significant at the 1 percent level of confidence. And firms in Africa, at any age level, are about 24 percent smaller than firms in other parts of the world, even after controlling for market size and initial size. This is mostly a shift effect; the coefficient on the Africa dummy interacted with age quintile dummies in Equation (3) is mostly negative but not always significant.

Table 3 shows the results of regressing individual measures of the business environment on firm size. Equations (4-5) shows that firm size is negatively correlated with the number of days lost to power outages; the coefficient on this measure of the business climate is also statistically significant. Access to finance (as measured by whether working capital is bank-financed) and access to land are included in Equations (6-7) and (8-9) and are also significant and positively correlated with firm size. Legal rights are significant in determining firm size [Equations (10-11)] while a larger supply of unskilled workers results in larger firms in the manufacturing sector [Equations (12-13)].[9]

Firm characteristics matter in determining firm size. In every regression, exporting and foreign-owned firms are larger as are those operating in larger markets, reflecting the higher capabilities of these types of firms. Size at start of operations is also positively correlated with firm size. Finally, it is interesting to note that the size of the Africa dummy changes a fair bit across these regressions; some measures of the business climate appear to have quite a lot of explanatory power with regard to the size of African firms.

Table 4 combines all of the business climate variables into a single model. Equation (14) describes the results of this model while Equation (15) includes an Africa dummy. With this combined model, we see that three measures of the business climate (outages, finance, and skills) are significant in determining firm size. Startup size is also significant, as are being foreign and being an exporter. Location in a larger market is significant, as before. Sector

[9] The consistently negative result for the skills ratio raises an interesting question. It suggests that, at least as far as employment growth is concerned, the most successful firms are those able to hire large numbers of less skilled workers rather than those that rely on high skills levels to expand. This result is consistent with the result found in Gelb et al 2013. Of course, some level of skills is essential but it appears that this is outweighed by the supply of unskilled labor.

dummies are included in all of the regressions reported in Tables 2-4, but not shown in the tables.[10]

The results described in Equation [15] can be illustrated with a simple example. A domestic, non-exporting firm in age quintile 3 (12 to 16 years old) in the food sector would have 25.4 employees if located outside Africa, and only 21.8 employees if located within the African continent. A firm that exports its products is larger, but exporting does not outweigh the "Africa effect"—even exporters located inside Africa are smaller--40.3 employees vs. 47 employees elsewhere. Finally, a foreign firm would have 40.8 employees if located outside Africa and only 35 employees if located within the African continent.

Recent research by Bloom et al suggests that management capacity is an important variable of firm productivity (Bloom et al, 2013; Bloom and Van Reenen, 2007). Unfortunately the firm-level data do not include sufficient data on this variable to include it in the analysis--the closest proxy is foreign ownership, which is known to imply higher levels of management capacity, among other things. However, combining the importance of management with the above-mentioned result on worker skills might suggest that employment growth is highest when more skilled management coincides with a large supply of less skilled workers. This hypothesis must be explored further.

Perhaps the most interesting result is that after controlling for the business environment (which adds about 5 percent of explanatory power) and firm and market characteristics, the dummy variable measuring whether a firm is located in an African country remains negative and significant at the 1 percent level of confidence. The value of the coefficient on the Africa dummy is -0.153 in the final regression, as compared to -0.244 in the baseline regression (which controlled only for age, market size, and size of the firm at the start of operations).[11]

[10] An alternative specification was estimated which included the ratio of capital to labor as an additional control. This did not change the results but did reduce the sample size by almost three-quarters (to just 9,000 observations) because of the lack of data on capital stock.

11 Especially considering the current focus on power in Africa, it is interesting that inclusion of the power variable does not weaken the Africa dummy. Granted that power is indeed a problem, the results suggest that unreliable power is not particularly a problem for Africa, but is more pervasive.

This result indicates that about 60 percent of the variation in the size of African firms remains unexplained, even after controlling for firm characteristics and variables capturing business environment.[12]

Why Are African Firms Not Growing?

We consider one more descriptive picture before moving on to possible explanations of our results. Figures 8a and 8b show that there may be constraints that prevent small firms from growing and large firms from exiting in Nigeria as compared to Brazil. Figure 8a shows the productivity distribution of firms by size quartile in the food processing sector in Nigeria. We see that the distributions overlap quite a bit—there are very productive small firms in Nigeria as well as relatively unproductive large firms. In Brazil, the situation is quite different. There is a clearer relationship between size and productivity—more productive firms are able to grow and are larger than unproductive firms, which remain small.[13] These figures are indicative of the fact that not only is the median size of firms smaller in Africa, but the distribution of firms is also different between Africa and other parts of the world.

Small firms may also want to stay below the government's radar in Africa. Figure 9 shows the change in management time spent dealing with government regulation when a firm goes from being small (below 50 workers) to being large (above 100 workers). We see that the burden of dealing with government increases substantially with size; this may act as a brake on firm growth. To understand this and other factors, we conduct robustness checks on the equations estimated in Tables 2-4. Several variables are added separately to Equations [1] and [15] to see if they can shed light on some of the unexplained variance (Table 5). These include the exports-to-GDP ratio as a measure of openness, two indices of transport inefficiency—ease of shipping and competition in shipping (drawn from the World Bank's Logistics Performance Index), the coefficient of variation of terms of trade (to measure volatility), government expenditures as a ratio of GDP, time to resolve insolvencies, and foreign ownership.

Table 5 shows the results of robustness checks for Equation [1] and Equation [15] with the inclusion of each of these variables. All of the variables included for the robustness checks are significant in the baseline regression and almost all are significant in the final regression as well. All have the expected sign as well—openness (as measured by the exports-to-GDP

[12] Equations (1) and (2) were also estimated using the final, smaller sample of 19,793 firms. The Africa dummy has a value of -0.168 in this specification.

[13] This issue is also discussed in Bartelsman (2013).

ratio) and fewer transport inefficiencies are correlated with more firm growth, as is higher government spending. Greater volatility in the terms of trade and the time to resolve insolvency is negatively correlated with firm size. ***But with the exception of the coefficient of variation for terms of trade, the addition of these variables does little to change the sign and size of the Africa dummy.*** Our model is very robust to variations in specification and indicates that the Africa effect prevails, even after controlling for these additional measures of the business climate and government policy.

Other Explanations

The overall price level in Africa could also be a factor in determining the size of firms. Analysis in Gelb et al. (2013) of 188 countries from the Penn World Tables shows that the slope of the relationship between PPP prices and income for African countries is significantly different between African and other countries. Figure 10 shows the results of these calculations. Relative to other middle-income countries, those in Africa are only slightly more costly, but the normal relationship breaks down for low-income Africa; on average, PPP price indices are around the global average for a country at South Africa's level of income. Relative to low-income comparators like Bangladesh, Vietnam and also India, African countries are considerably more costly. Gelb et al. (2013) show that in absolute terms, and excluding South Africa as a middle-income country, the average PPP for a sample of African countries is about 20 percent higher than the average for the four poorest comparators (Bangladesh, Indonesia, Philippines and Vietnam). Ethiopia stands out as cheap in absolute terms, but is still higher-cost relative to a global average extrapolated to its level of income. Africa's higher costs may result in a lower level of competitiveness and consequently, in a distribution of firms that is different (smaller) than distributions in other countries.

There is also increasing evidence that many African economies are dualistic in nature, with enclaves of high-productivity firms, which are also high cost (Gelb et al., 2013). Industrial labor costs are far higher in Africa than one might expect, given levels of gross domestic product (GDP) per capita. Part of this is an "enclave effect": both labor costs and labor productivity are far higher for firms in many African countries, relative to GDP per capita, than in comparator countries (Figure 11). This may reflect a steeper labor cost curve; as firms are larger and more productive, their labor costs increase more in Africa than elsewhere.

At a more "micro" level, issues related to trust between managers and workers, as firms transition away from family-only employees, may play a role in limiting firm size. Bloom et al. (2012) find that managers at headquarters place greater trust in managers of subsidiary firms in "high trust" countries, this in turn increases productivity by affecting the organization of firms and allowing more efficient firms to grow. Atkin et al. (2011) find that a lack of trust of outsiders (and the difficulty of punishing them for shirking) means that firms are limited to employing family members. Finally, the pressure to share profits among family members may also limit the growth of African firms. These are themes that need to be explored further to understand the slower growth of African firms.

Conclusion

The business environment and certain characteristics of firms do appear to play a role in determining firm size; and improvements to the business environment in many African countries may result in firms employing larger numbers of people, for every age cohort. Measures of the business climate and of firm and market characteristics, when taken together, explain about 40 percent of the difference of the size gap between African firms and firms elsewhere. But this also means that 60 percent of "the Africa effect" is not accounted for. Possible explanations may include the high cost of living in many African countries. Many African economies appear to have dualistic manufacturing sectors, where there is a steep premium for the cost of labor associated with increased size. At a more micro level, the lack of trust between employers and employees, and the need to share profits with extended family members are possible explanations, in need of further research. The role of competition also needs to be explored. Finally, a better understanding of why firms choose to enter a particular sector might also shed light on the dynamics of firm growth.

The results in this paper are of particular importance, given that many countries in Africa suffer high rates of unemployment, and that many also anticipate large numbers of people to enter the workforce in the near future. Our results point to two important facts. First, there are constraints imposed by the business environment and by firm and market characteristics that limit the growth of African firms; these can be alleviated by policy reforms. Second, there appear to be constraints that are not captured by these measures--these require further research in order to design appropriate policies for job creation.

Tables and Figures

Table 1: Correlation of Business Climate Variables

	Outages	Finance	Land	Legal	Skill
Outages	1				
Finance	-0.26	1			
Land	-0.37	0.32	1		
Legal	0.18	0.04	0.29	1	
Skill	-0.008	-0.15	-0.08	-0.06	1

Pairwise correlation

	Outages	Finance	Land	Legal	Skill
Outages	1				
Finance	-0.16	1			
Land	-0.09	0.33	1		
Legal	0.12	0.06	0.24	1	
Skill	-0.035	-0.13	-0.04	0.03	1

Table 2: Baseline regressions

	(1)	(2)	(3)
	ln emplmnt	ln emplmnt	ln emplmnt
Age2	0.224***	0.214***	0.217***
	(0.0297)	(0.0265)	(0.0344)
Age3	0.413***	0.382***	0.411***
	(0.0324)	(0.0295)	(0.0354)
Age4	0.530***	0.503***	0.529***
	(0.0370)	(0.0345)	(0.0421)
Age5	0.783***	0.753***	0.774***
	(0.0445)	(0.0425)	(0.0502)
ln GNI	0.0867***	0.0657***	0.0654***
	(0.00513)	(0.00554)	(0.00555)
ln Startup Size	0.591***	0.588***	0.589***
	(0.00740)	(0.00731)	(0.00733)
Africa		-0.244***	-0.202***
		(0.0237)	(0.0386)
Age2 X Africa			0.000613
			(0.0525)
Age3 X Africa			-0.102
			(0.0611)
Age4 X Africa			-0.0924
			(0.0689)
Age5 X Africa			-0.0696
			(0.0886)
Constant	-0.642***	-0.0414	-0.0510
	(0.121)	(0.134)	(0.134)
r2	0.447	0.452	0.452
N	41005	41005	41005

Standard errors in parentheses
="* p<0.05 ** p<0.01 *** p<0.001"

Note: Dependent variable is log (number of employees in the firm) for Tables 3-5. Sector dummies are included in all estimations but not reported.

Table 3: Individual Business Climate Regressions

	(4) ln emplmnt	(5) ln emplmnt	(6) ln emplmnt	(7) ln emplmnt	(8) ln emplmnt	(9) ln emplmnt	(10) ln emplmnt	(11) ln emplmnt	(12) ln emplmnt	(13) ln emplmnt
Age2	0.238***	0.223***	0.177***	0.187***	-0.220	-0.122	0.199**	0.214***	0.358*	0.346*
	(0.0351)	(0.0311)	(0.0530)	(0.0510)	(0.136)	(0.136)	(0.0617)	(0.0574)	(0.161)	(0.144)
Age3	0.432***	0.396***	0.235***	0.236***	-0.458**	-0.379*	0.344***	0.338***	0.626***	0.556***
	(0.0378)	(0.0344)	(0.0592)	(0.0564)	(0.168)	(0.165)	(0.0677)	(0.0631)	(0.180)	(0.163)
Age4	0.562***	0.534***	0.329***	0.325***	-0.600**	-0.551**	0.570***	0.554***	1.132***	1.051***
	(0.0421)	(0.0390)	(0.0631)	(0.0609)	(0.212)	(0.207)	(0.0828)	(0.0779)	(0.202)	(0.183)
Age5	0.853***	0.820***	0.630***	0.624***	-0.197	-0.169	0.796***	0.749***	1.678***	1.565***
	(0.0497)	(0.0474)	(0.0861)	(0.0826)	(0.286)	(0.289)	(0.0974)	(0.0938)	(0.199)	(0.188)
ln GNI	0.0813***	0.0614***	0.0697***	0.0624***	0.0691***	0.0557***	0.0929***	0.0710***	0.104***	0.0734***
	(0.00532)	(0.00571)	(0.00618)	(0.00626)	(0.00730)	(0.00787)	(0.00527)	(0.00557)	(0.00637)	(0.00697)
ln Startup Size	0.549***	0.547***	0.596***	0.594***	0.563***	0.561***	0.550***	0.548***	0.553***	0.549***
	(0.00711)	(0.00706)	(0.00872)	(0.00866)	(0.00830)	(0.00827)	(0.00720)	(0.00716)	(0.00738)	(0.00730)
Africa		-0.235***		-0.106***		-0.136***		-0.245***		-0.289***
		(0.0225)		(0.0250)		(0.0289)		(0.0214)		(0.0254)
Outages	-0.00568***	-0.00549***								
	(0.00122)	(0.00108)								
Finance			0.00834***	0.00737***						
			(0.00171)	(0.00157)						
Land					0.00463***	0.00439***				
					(0.00121)	(0.00103)				
Legal Rights							0.0194**	0.0185**		
							(0.00714)	(0.00593)		
Skill Ratio									-0.00142	-0.00295*
									(0.00175)	(0.00145)
Foreign	0.413***	0.444***	0.407***	0.418***	0.527***	0.539***	0.421***	0.452***	0.452***	0.484***
	(0.0232)	(0.0228)	(0.0266)	(0.0264)	(0.0281)	(0.0278)	(0.0235)	(0.0230)	(0.0255)	(0.0250)
Exporter	0.637***	0.600***	0.588***	0.574***	0.597***	0.580***	0.636***	0.598***	0.674***	0.630***
	(0.0268)	(0.0270)	(0.0327)	(0.0327)	(0.0311)	(0.0313)	(0.0267)	(0.0270)	(0.0281)	(0.0283)
	Age X Outages		Age X Finance		Age X Land		Age X Legal Rights		Age X Skill Ratio	
	-0.000723	-0.0000277	0.00220	0.00161	0.00632**	0.00486*	0.00615	0.00132	-0.00186	-0.00185
	(0.00216)	(0.00201)	(0.00244)	(0.00238)	(0.00194)	(0.00190)	(0.0104)	(0.00930)	(0.00237)	(0.00209)
	-0.00501	-0.00375	0.00881***	0.00841***	0.0120***	0.0106***	0.0108	0.00635	-0.00310	-0.00258
	(0.00277)	(0.00252)	(0.00257)	(0.00248)	(0.00236)	(0.00231)	(0.0114)	(0.0105)	(0.00262)	(0.00234)
	-0.00415	-0.00362	0.0108***	0.0105***	0.0160***	0.0151***	-0.00709	-0.00888	-0.00873**	-0.00797**
	(0.00381)	(0.00374)	(0.00250)	(0.00240)	(0.00297)	(0.00289)	(0.0137)	(0.0131)	(0.00294)	(0.00266)
	-0.0112**	-0.0102**	0.0114**	0.0111**	0.0141***	0.0135***	0.000464	0.00442	-0.0134***	-0.0123***
	(0.00395)	(0.00387)	(0.00370)	(0.00355)	(0.00397)	(0.00401)	(0.0183)	(0.0179)	(0.00293)	(0.00275)
Constant	-0.419**	0.115	-0.556***	-0.338*	-0.568**	-0.178	-0.859***	-0.268*	-1.010***	-0.0660
	(0.131)	(0.139)	(0.150)	(0.153)	(0.179)	(0.193)	(0.130)	(0.135)	(0.178)	(0.196)
r2	0.479	0.484	0.492	0.493	0.484	0.485	0.477	0.482	0.475	0.481
N	39839	39839	27093	27093	28686	28686	39887	39887	35702	35702

Standard errors in parentheses
="* p<0.05 ** p<0.01 *** p<0.001"

Table 4: Full Model Regressions

	(14)	(15)
	ln emplmnt	ln emplmnt
Age2	0.181***	0.183***
	(0.0387)	(0.0362)
Age3	0.368***	0.360***
	(0.0401)	(0.0368)
Age4	0.511***	0.501***
	(0.0421)	(0.0387)
Age5	0.814***	0.802***
	(0.0498)	(0.0464)
ln GNI	0.0653***	0.0448***
	(0.00991)	(0.0114)
ln Startup Size	0.601***	0.598***
	(0.00961)	(0.00950)
Africa		-0.153***
		(0.0379)
Outages	-0.00559*	-0.00627**
	(0.00223)	(0.00222)
Finance	0.0102***	0.00818***
	(0.00131)	(0.00145)
Land	0.00337	0.00374*
	(0.00176)	(0.00163)
Legal Rights	0.00319	0.0105
	(0.00738)	(0.00721)
Skill Ratio	-0.00892***	-0.00941***
	(0.00114)	(0.00111)
Foreign	0.464***	0.472***
	(0.0325)	(0.0324)
Exporter	0.634***	0.615***
	(0.0370)	(0.0371)
Constant	-0.102	0.475
	(0.250)	(0.296)
r2	0.505	0.506
N	19793	19793

Standard errors in parentheses
="* p<0.05 ** p<0.01 *** p<0.001"

Table 5: Robustness Checks on the Africa Effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	employment_	employment_	employment_	employment_	employment_	employment_	employment_	employment_	employment_	employment_
Age2	0.213***	0.183***	0.211***	0.184***	0.230***	0.192***	0.228***	0.189***	0.206***	0.177***
	(0.0266)	(0.0365)	(0.0264)	(0.0359)	(0.0306)	(0.0393)	(0.0308)	(0.0392)	(0.0268)	(0.0375)
Age3	0.381***	0.361***	0.376***	0.364***	0.397***	0.375***	0.389***	0.372***	0.368***	0.349***
	(0.0295)	(0.0373)	(0.0293)	(0.0367)	(0.0328)	(0.0397)	(0.0328)	(0.0397)	(0.0300)	(0.0380)
Age4	0.500***	0.500***	0.499***	0.504***	0.520***	0.526***	0.512***	0.523***	0.495***	0.494***
	(0.0345)	(0.0389)	(0.0340)	(0.0386)	(0.0388)	(0.0408)	(0.0389)	(0.0407)	(0.0342)	(0.0389)
Age5	0.751***	0.803***	0.753***	0.807***	0.776***	0.839***	0.772***	0.838***	0.754***	0.796***
	(0.0424)	(0.0467)	(0.0422)	(0.0463)	(0.0461)	(0.0488)	(0.0466)	(0.0486)	(0.0424)	(0.0466)
Africa	-0.245***	-0.150***	-0.241***	-0.142***	-0.265***	-0.153***	-0.277***	-0.162***	-0.245***	-0.218***
	(0.0236)	(0.0382)	(0.0242)	(0.0398)	(0.0286)	(0.0400)	(0.0274)	(0.0412)	(0.0232)	(0.0417)
ln GNI	0.0661***	0.0447***	0.0688***	0.0495***	0.0382***	0.0320*	0.0266**	0.0366*	0.0670***	0.0329**
	(0.00549)	(0.0114)	(0.00546)	(0.0133)	(0.00831)	(0.0150)	(0.00905)	(0.0166)	(0.00542)	(0.0120)
ln Startup Size	0.588***	0.597***	0.585***	0.595***	0.584***	0.596***	0.584***	0.596***	0.589***	0.600***
	(0.00731)	(0.00958)	(0.00723)	(0.00955)	(0.00769)	(0.01000)	(0.00780)	(0.0100)	(0.00742)	(0.00957)
Outages		-0.00807***		-0.00731**		-0.00744**		-0.00773**		-0.00792***
		(0.00222)		(0.00256)		(0.00246)		(0.00247)		(0.00206)
Finance		0.00772***		0.00822***		0.00800***		0.00752***		0.00536**
		(0.00146)		(0.00158)		(0.00157)		(0.00155)		(0.00166)
Land		0.00356*		0.00308		0.00293		0.00353		0.00428*
		(0.00167)		(0.00175)		(0.00213)		(0.00203)		(0.00168)
Legal Rights		0.0121		0.0103		0.00919		0.0124		0.0161*
		(0.00718)		(0.00785)		(0.00915)		(0.00886)		(0.00735)
Skill Ration		-0.00894***		-0.00912***		-0.00948***		-0.00930***		-0.00787***
		(0.00113)		(0.00114)		(0.00120)		(0.00119)		(0.00112)
Foreign		0.472***		0.472***		0.490***		0.488***		0.471***
		(0.0328)		(0.0329)		(0.0359)		(0.0353)		(0.0328)
Exporter		0.614***		0.613***		0.616***		0.615***		0.623***
		(0.0376)		(0.0377)		(0.0384)		(0.0383)		(0.0377)
Export to GDP Ratio			0.00214***	0.00101						
			(0.000622)	(0.00130)						
Shipping					0.191***	0.0952				
					(0.0395)	(0.0864)				
Transport Competitivene:							0.259***	0.0346		
							(0.0432)	(0.0788)		
Govt Expenditure									0.0108***	0.0163***
									(0.00248)	(0.00349)
Constant	-0.0467	0.479	-0.179	0.363	0.108	0.593	0.228	0.603	-0.228	0.490
	(0.132)	(0.296)	(0.134)	(0.340)	(0.167)	(0.338)	(0.169)	(0.351)	(0.132)	(0.292)
r2	0.452	0.505	0.453	0.505	0.438	0.500	0.439	0.499	0.454	0.507
N	41005	19493	40793	19493	34723	17984	34723	17984	40852	19493
Standard errors in parentheses										
="* p<0.05	** p<0.01	*** p<0.001"								

Table 5(contd): Robustness checks on the Africa Effect

	(11)	(12)	(13)	(14)	(15)	(16)
	employment_	employment_	employment_	employment_	employment_	employment_
Age2	0.216***	0.194***	0.219***	0.193***	0.222***	0.183***
	(0.0267)	(0.0373)	(0.0275)	(0.0378)	(0.0259)	(0.0366)
Age3	0.372***	0.366***	0.384***	0.365***	0.387***	0.360***
	(0.0296)	(0.0367)	(0.0301)	(0.0377)	(0.0288)	(0.0371)
Age4	0.492***	0.508***	0.507***	0.503***	0.520***	0.504***
	(0.0346)	(0.0377)	(0.0354)	(0.0388)	(0.0340)	(0.0390)
Age5	0.752***	0.813***	0.760***	0.800***	0.769***	0.806***
	(0.0425)	(0.0454)	(0.0423)	(0.0453)	(0.0414)	(0.0465)
Africa	-0.202***	-0.0906*	-0.249***	-0.168***	-0.238***	-0.127***
	(0.0274)	(0.0385)	(0.0245)	(0.0394)	(0.0233)	(0.0374)
ln GNI	0.0692***	0.0491***	0.0659***	0.0489***	0.0691***	0.0447***
	(0.00555)	(0.0112)	(0.00585)	(0.0115)	(0.00565)	(0.0114)
ln Startup Size	0.589***	0.597***	0.588***	0.600***	0.567***	0.597***
	(0.00737)	(0.00953)	(0.00759)	(0.00969)	(0.00725)	(0.00949)
Outages		-0.00569**		-0.0112***		-0.00610**
		(0.00205)		(0.00208)		(0.00222)
Finance		0.00866***		0.00717***		0.00816***
		(0.00144)		(0.00147)		(0.00144)
Land		0.00360*		0.00196		0.00373*
		(0.00152)		(0.00167)		(0.00164)
Legal Rights		0.000922		0.00984		0.0102
		(0.00749)		(0.00724)		(0.00726)
Skill Ratio		-0.0100***		-0.00780***		-0.00942***
		(0.00113)		(0.00111)		(0.00111)
Foreign		0.470***		0.473***	0.641***	0.566***
		(0.0325)		(0.0327)	(0.0298)	(0.0389)
Exporter		0.605***		0.621***		0.603***
		(0.0375)		(0.0376)		(0.0376)
Terms of Trade	-0.542***	-0.774***				
	(0.114)	(0.193)				
Insolvency Time			-0.0417***	-0.0434***		
			(0.00798)	(0.0122)		
Africa X Foreign					-0.308***	-0.259***
					(0.0458)	(0.0624)
Constant	-0.0575	0.560	0.0915	0.603*	-0.137	0.476
	(0.133)	(0.289)	(0.142)	(0.282)	(0.137)	(0.296)
r2	0.454	0.507	0.452	0.506	0.466	0.507
N	40180	19493	39466	19493	40243	19793
Standard errors in parentheses						
="* p<0.05	** p<0.01		*** p<0.001"			

Figure 1: Countries Covered by Enterprise Surveys

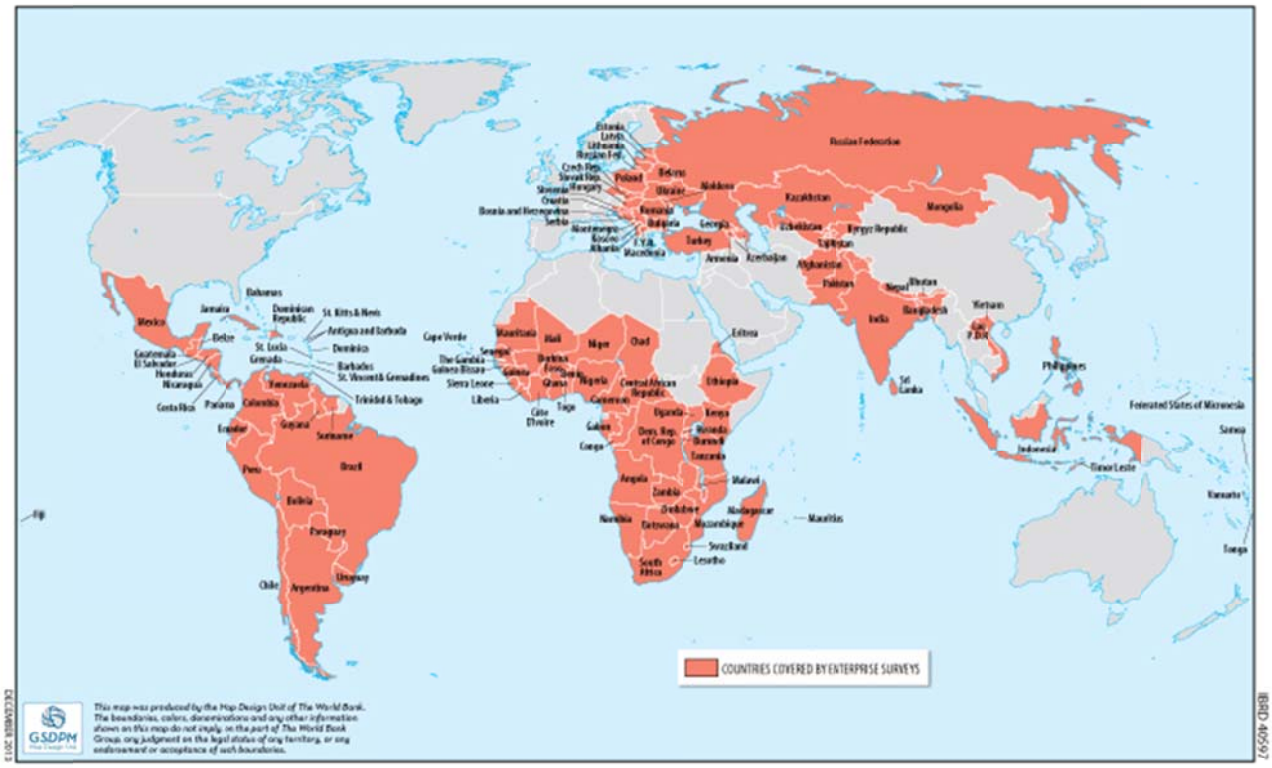


Figure 2: Median firm size, by age quintile

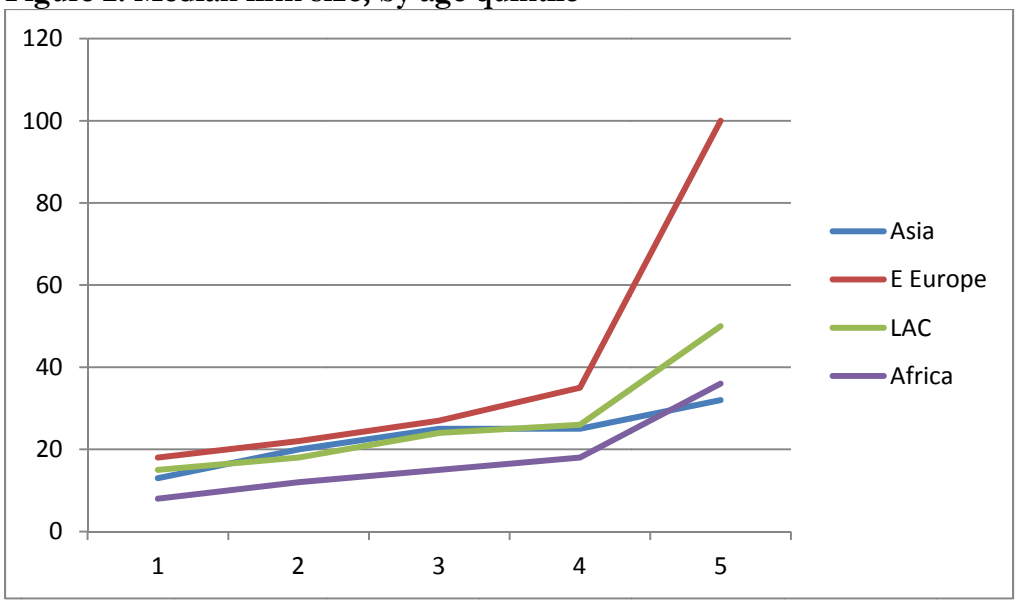


Figure 3: Employment distribution of firms in the sample

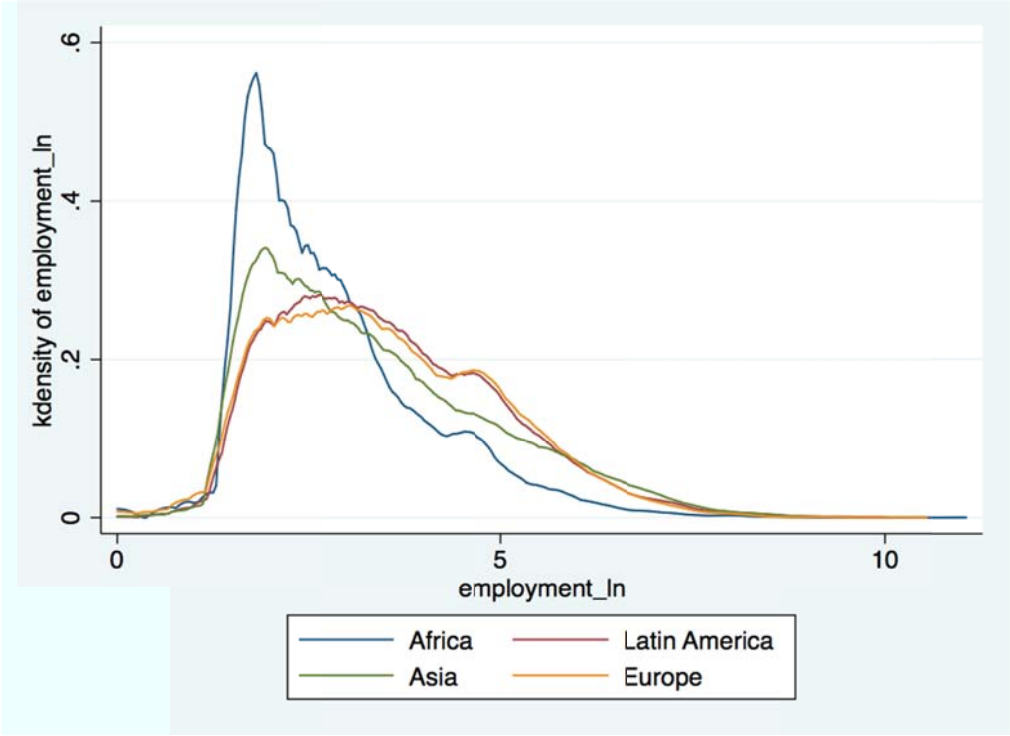


Figure 4: Distribution of firms by age

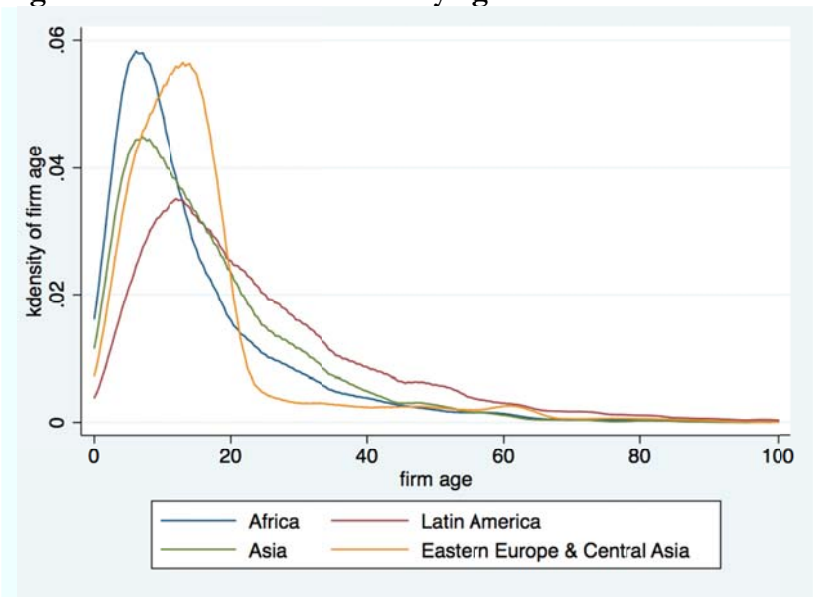


Figure 5: Employment distribution of firms, conditional on age

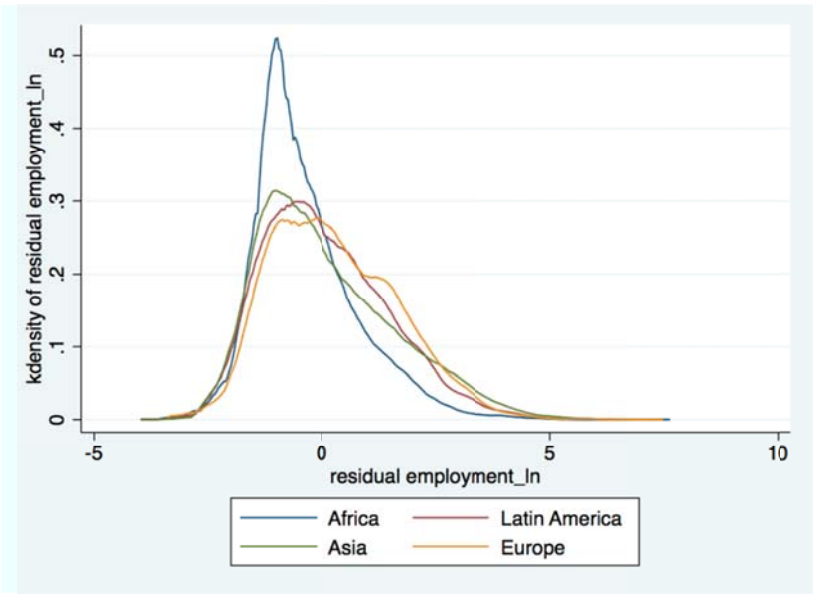


Figure 6: Distribution of initial size of firm, by region

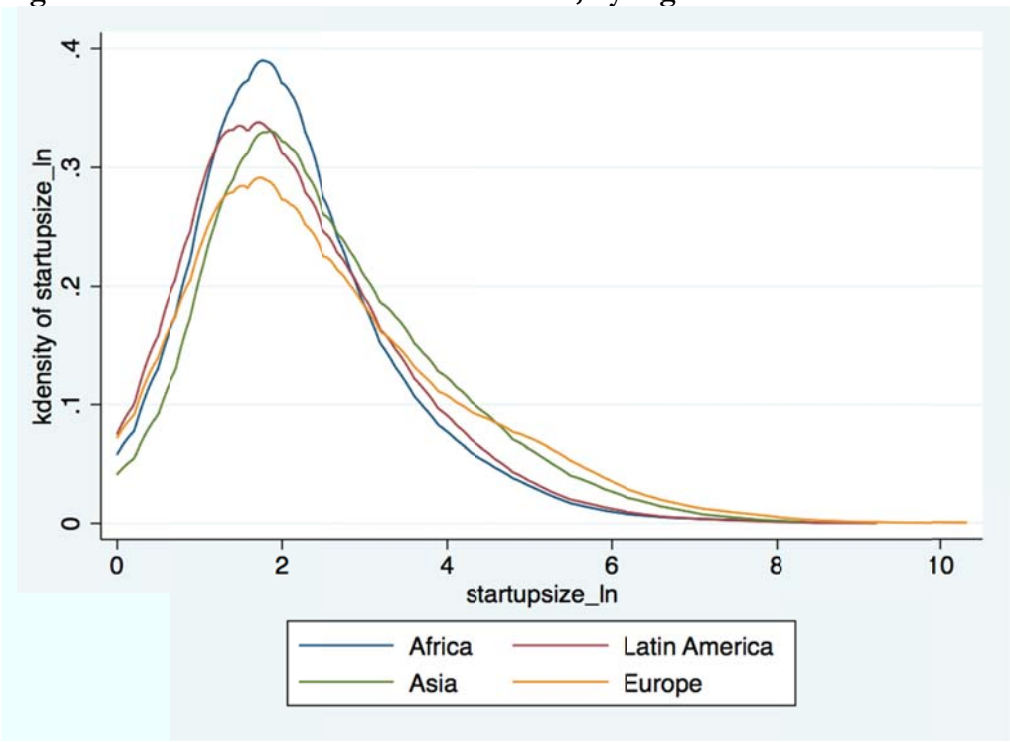


Figure 7a:

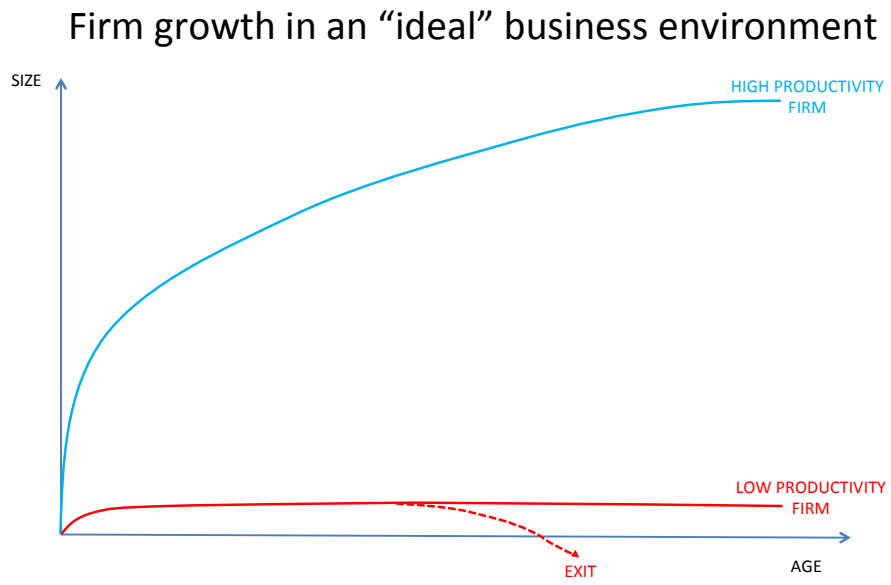


Figure 7b:

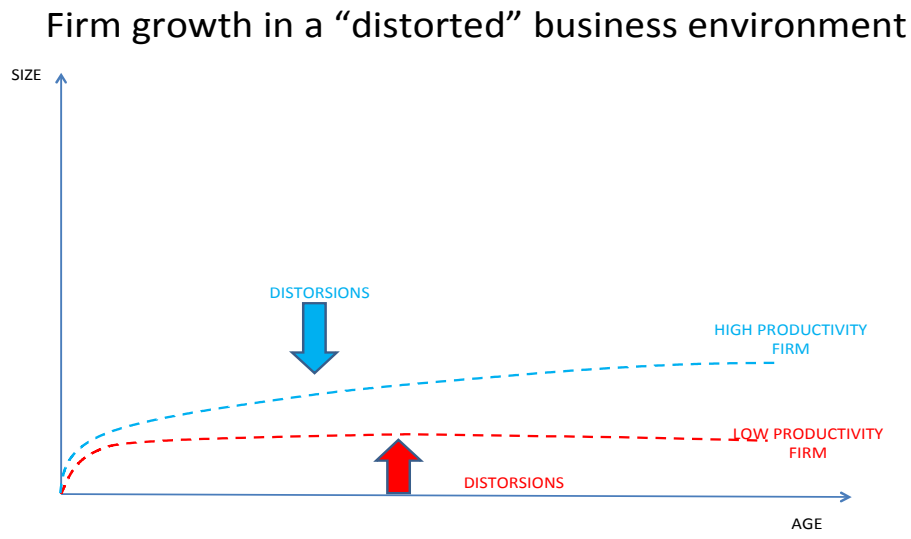


Figure 8a: Productivity of firms by size quartile in the food processing sector in Nigeria

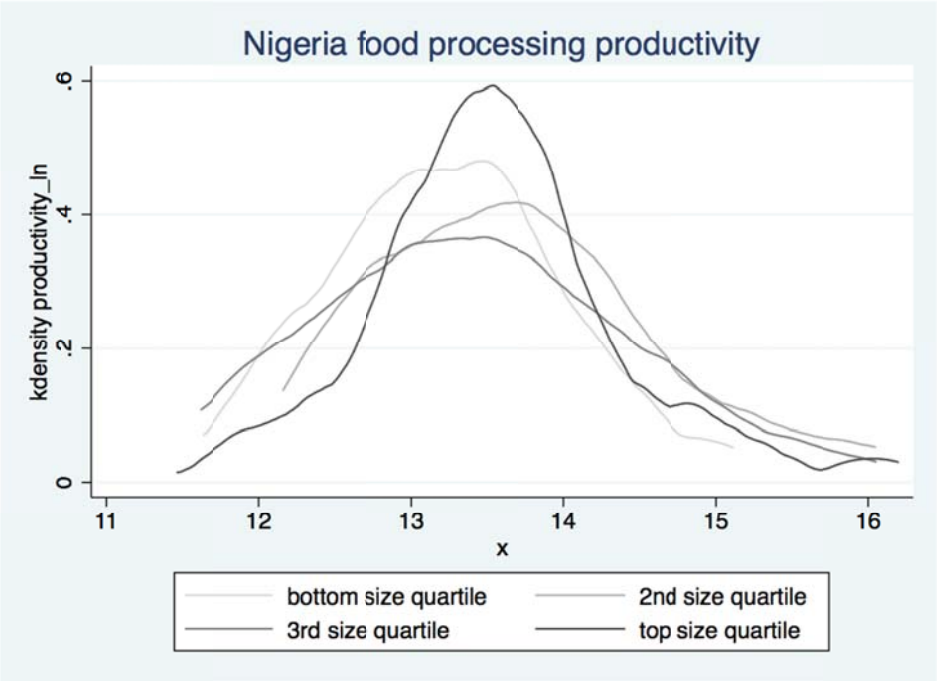


Figure 8b: Productivity of firms by size quartile in the food processing sector in Brazil

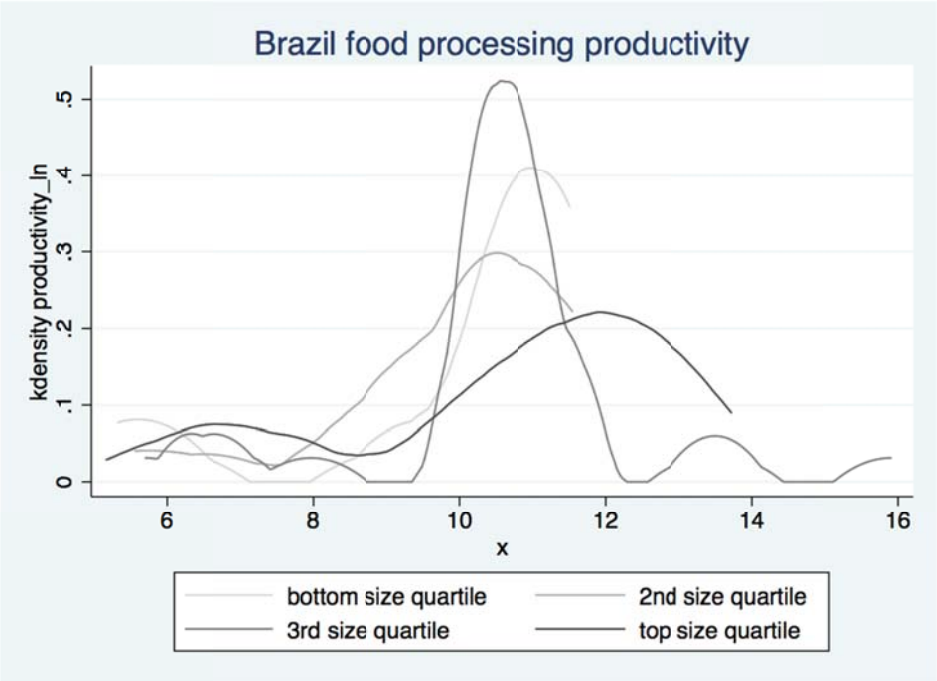
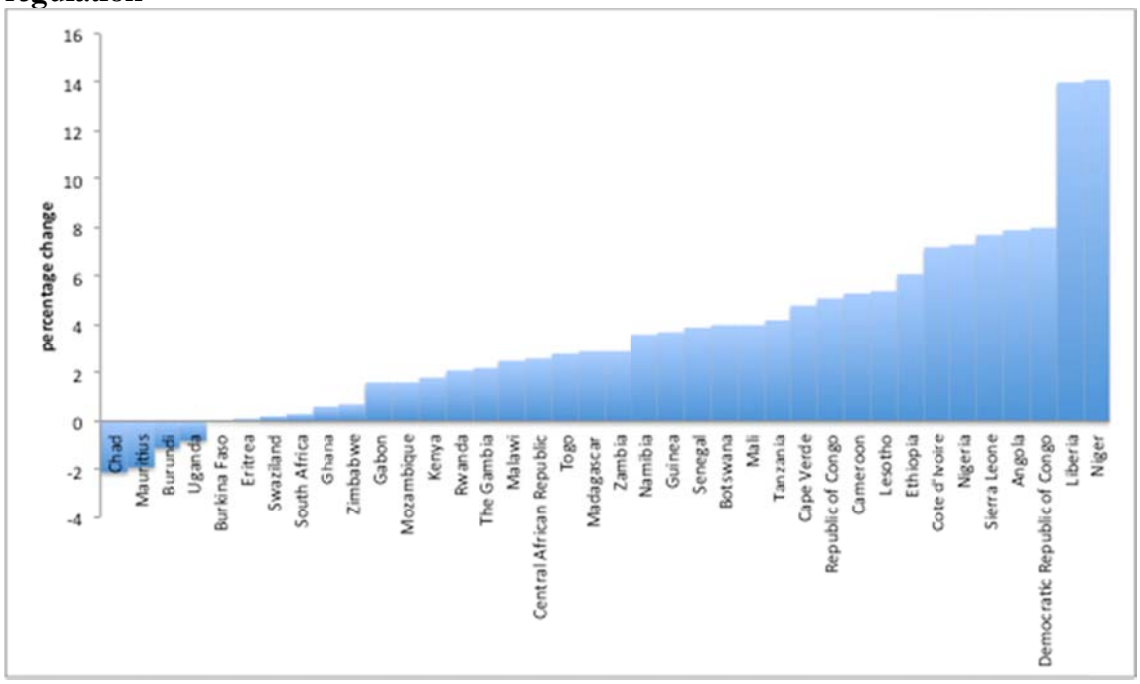
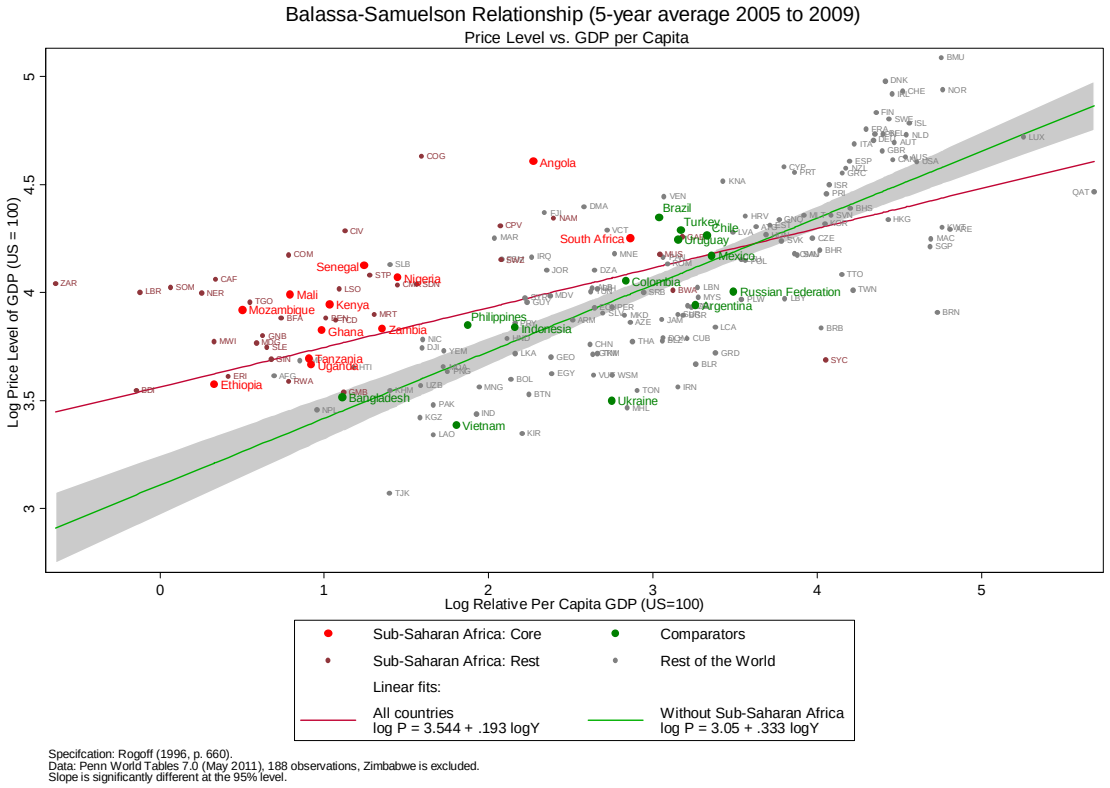


Figure 9: Change in management time spent dealing with government regulation



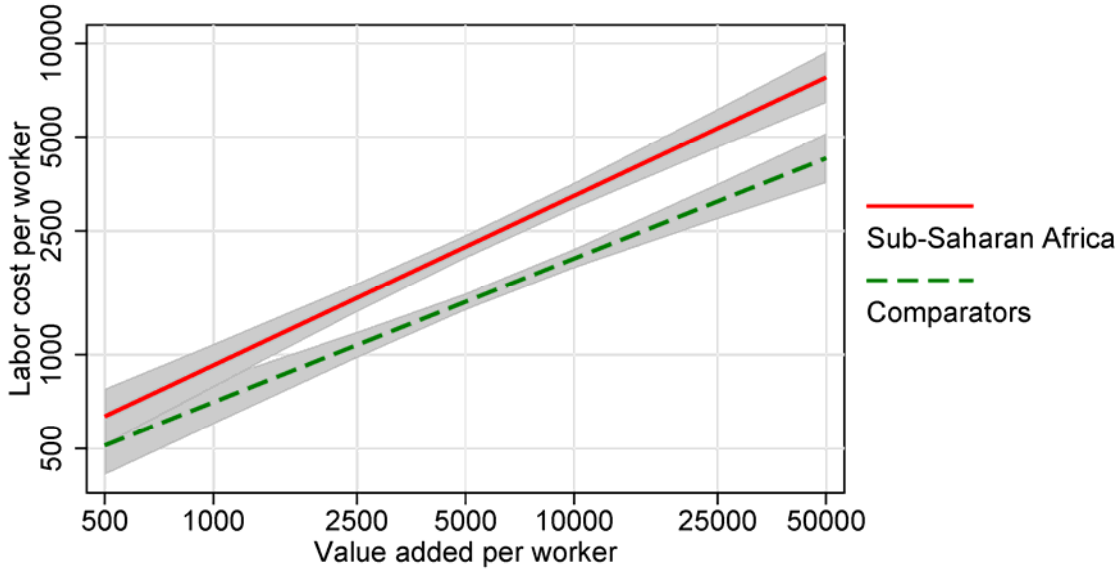
Source: Enterprise Surveys

Figure 10: Balassa-Samuelson Estimation



Source: Gelb et al, 2013

Figure 11: The High Cost of Labor in Africa



Source: Gelb et al (2013)

References

Atkin, David, Amit M. Khandelwal, and Jonathan Vogel. Institutions, Family Firms and the Lack of Manufacturing Employment: Evidence from Ethiopia. Oct. 2011. PPT.

Bartelsman, Eric, John Haltiwanger, and Stefano Scarpetta. 2013. "Cross-Country Differences in Productivity: The Role of Allocation and Selection." American Economic Review 103 (1): 305–34.

Bates, Timothy. "Entrepreneur human capital inputs and small business longevity." The Review of Economics and Statistics (1990): 551-559.

Bloom, Nicholas, Benn Eifert, Aprajit Mahajan, David McKenzie, and John Roberts. 2013. "Does Management Matter? Evidence from India." The Quarterly Journal of Economics 128 (1).

Bloom, Nicholas, and John Van Reenen. 2007. "Measuring and Explaining Management Practices Across Firms and Countries." The Quarterly Journal of Economics 122 (4) (November 1): 1351–1408.

Bloom, Nicholas, Raffaella Sadun, and John Van Reenen. "The Organization of Firms Across Countries." The Quarterly Journal of Economics 127.4 (2012): 1663-1705.

Evans, David S. "Tests of alternative theories of firm growth." The Journal of Political Economy 95.4 (1987): 657-674.

Evans, David S., and Linda S. Leighton. "Some empirical aspects of entrepreneurship." Entrepreneurship: critical perspectives on business and management 1 (2002): 146.

Gelb, Alan, Christian Meyer and Vijaya Ramachandran. "Does Poor Mean Cheap? Africa's Industrial Labor Costs in Comparative Perspective," CGD Working Paper #325. Center for Global Development 2013.

Gelb, Alan, Taye Mengistae, Vijaya Ramachandran, and Manju Kedia Shah, "To Formalize or Not to Formalize? Comparisons of Microenterprise Data from Southern and East Africa," CGD Working Paper #175. Center for Global Development 2009.

Hall, Bronwyn, " The Relationship Between Firm Size and Firm Growth in the U.S. Manufacturing Sector," Journal of Industrial Economics, 35.4 (1987).

Hallward-Driemeier, Mary, Gita Khun-Jush and Lant Pritchett, "Deals Versus Rules: Policy Implementation Uncertainty and Why Firms Hate It." NBER Working Paper 16001, May 2010.

Harrison, Ann E., Justin Yifu Lin, and L. Colin Xu. Explaining Africa's (Dis) advantage. No. w18683. National Bureau of Economic Research, 2013.

Hsieh, Chang-Tai, and Peter J. Klenow. The life cycle of plants in India and Mexico. No. w18133. National Bureau of Economic Research, 2012.

Jovanovic, Boyan. "Selection and the Evolution of Industry." Econometrica: Journal of the Econometric Society (1982): 649-670.

McPherson, Michael A. "Growth of micro and small enterprises in southern Africa." Journal of Development Economics 48.2 (1996): 253-277.

Moulton, Brent R. "An illustration of a pitfall in estimating the effects of aggregate variables on micro units." The Review of Economics and Statistics (1990): 334-338.

Pakes, Ariel, and Richard Ericson. "Empirical implications of alternative models of firm dynamics." Journal of Economic Theory 79.1 (1998): 1-45.

Sandefur, Justin. "On the Evolution of the Firm Size Distribution in an African Economy." CSAE Working Paper 2010-05 (2010).

Sutton, John. "Gibrat's legacy." Journal of Economic Literature 35.1 (1997): 40-59.

Teal, Francis. "The Ghanaian manufacturing sector 1991–95: Firm growth, productivity and convergence," The Journal of Development Studies, Vol. 36, Iss. 1, 1999

Variyam, Jayachandran N., and David S. Kraybill. "Empirical evidence on determinants of firm growth." Economics Letters 38.1 (1992): 31-36.