Policy Research Working Paper 4946

Mind the Gap?

A Rural-Urban Comparison of Manufacturing Firms

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June 2009

Policy Research Working Paper 4946

Abstract

This paper compares and contrasts the performance of rural and urban manufacturing firms in Ethiopia to assess the impact of market integration and the investment climate on firm performance. Rural firms are shown to operate in isolated markets, have poor access to infrastructure and a substantial degree of market power, whereas urban firms operate in better integrated and more competitive markets, where they have much better access to inputs. Fragmentation may also help explain why urban firms are much larger, much more capital intensive and why they produce much more output per worker. Capital intensity and labor productivity are strongly correlated with firm size. Manufacturing technology choice does not vary strongly across space and increasing returns to scale are modest at best, suggesting that rural-urban differences in output per worker are predominantly driven by differences in capital intensity and Total Factor Productivity (TFP). The average TFP of firms in rural towns is much higher than that of rural firms in remote areas, but small firms in rural towns are not significantly less productive than small firms in other urban areas. A key finding of the paper is that market fragmentation and investment climate constraints impair the growth of the rural non-farm sector. Whereas urban firms exhibit a healthy dynamism, rural firms are stagnant and lack incentives to invest. Paradoxically, limited local demand due to market fragmentation is the most pressing constraint for rural firms, even though they face more severe supply-side constraints than urban firms. Promoting market towns in Ethiopia might be an effective means of capitalizing on the gains from market integration.

This paper—a product of the Poverty Reduction Group, Poverty Reduction and Economic Management Network and the Agricultural and Rural Development Unit, Africa Region—is part of a larger effort to understand factors determining the investment climate, private sector initiative, and productive employment opportunities.. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at brijkers@worldbank.org, mans.soderbom@economics.gu.se, or jloening@worldbank.org.

Produced by the Research Support Team

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We would like to thank the Ethiopian Central Statistical Agency for being able to make extensive use of the survey data, seminar participants at the 2008 Oriel College Oxford Joint Academic Forum on Economics and Finance, the Ethiopian Ministry of Finance and Economic Development, the Ethiopian Ministry of Agriculture and Rural Development, as well as Magdi Amin, Kathleen Beegle, Paul Collier, Mulat Demeke, Louise Fox, Cornelius van der Meer, Gbemisola Oseni, Pierella Paci, Peter Lanjouw and especially Francis Teal for useful discussions and comments. Financial support from the Research Committee of the World Bank is gratefully acknowledged. The views expressed in this paper are entirely those of the authors; they do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent

1 Introduction

Location and institutions are increasingly recognized as crucial determinants of economic performance (reflected, for example, in the 2009 World Development Report on Economic Geography and the New Economic Geography's rise to prominence). This burgeoning interest in location and institutions has also manifested itself in the growing literature on the impact of the investment climate on firm performance (see e.g. Dollar et al., 2005, World Bank, 2005a), which attempts to explain spatial disparities in economic outcomes by variation in the geographical, institutional and regulatory environment in which firms operate. Dollar et al. (2005) have demonstrated a strong association between firm performance and the quality of the investment climate; firm' productivity and growth are correlated with infrastructure (e.g. access to electricity), export bottlenecks (e.g. days to clear customs) and access to finance (e.g. having an overdraft facility).[1] Conversely, cities with lower customs clearance times, reliable infrastructure, and good financial services attract more foreign investment. Cross-country variation in country's growth rates is highly correlated with increased trade integration. A better investment climate thus seems to promote international economic integration and to stimulate growth (Dollar et al., 2006).

Despite mounting evidence that the investment climate strongly varies both across and within countries, and that its impact on firm performance depends on firm size (see e.g. Sleuwagen and Goedhuys, 2002, Pages et al., 2007), almost all the work on the investment climate thus far has focused on relatively large manufacturing firms in urban areas (notable exceptions include Kinda and Loening 2008, Deininger et al. 2007 and Deininger et al. 2008). Primarily because of a lack of data (Cook and Nixson, 2000, Ayyagari et al, 2003), relatively little is known about the determinants of rural non-farm enterprise performance. It is therefore not clear to what extent the conclusions derived from urban investment climate

[1] Having access to an overdraft facility is only correlated with firm growth, not with Total Factor Productivity (at least not when capital and other variables have been controlled for).

surveys of relatively large manufacturing firms generalize to rural areas, where firms tend to be smaller. Yet, diversification beyond agriculture is often considered a promising pathway out of poverty for poor rural economies and there is a widespread belief that small enterprises may play an important role in especially the early stages of diversifying beyond agriculture (see the discussions in Barret et al, 2001, Lanjouw and Lanjouw, 2001, Reardon et al., 2000).

To address these lacunae in the literature, the World Bank has recently launched five rural investment climate pilot surveys. These surveys have demonstrated that rural non-farm enterprises in developing countries are typically small, not very profitable and unlikely to grow (World Bank, 2005b), and point towards market fragmentation and weak institutions as a plausible explanation for the dismal performance of rural non-farm firms. Fragmentation and institutions are also considered a key part of the explanation for Africa's poor economic performance (Collier and Gunning, 1999, Collier and Venables, 2008). Low levels of economic density and interaction may lead to small, diffuse pockets of demand, which in turn result in small, localized production (Tybout, 2000). More subtly, thin markets may undermine enterprise performance by raising the cost of capital, disincentivizing investment and innovation, and increasing the scope for opportunistic behavior. Moreover, the average cost of supplying public goods and infrastructure, such as electricity, to thin markets is typically high since the provision of infrastructure and public goods are often subject to economies of scale (Collier and Venables, 2008). Rural enterprises are thus likely to operate in less favorable, fragmented business environments.

This paper assesses the hypothesis that market fragmentation and the investment climate are the key constraints to the development of the rural-non-farm economy by comparing and contrasting the performance of rural non-farm enterprises in Ethiopia with their urban counterparts using the most recent rural and urban Ethiopian investment climate surveys, the Rural Investment Climate Survey (RICS) and the Productivity and Investment

Climate Survey (PICS), respectively.

These surveys enable us to contribute to the literature. To start with, the rural-urban comparison documents novel empirical results. The only similar study of rural-urban disparities in enterprise performance we are aware of is the 2004 Sri Lankan investment climate assessment, conducted by the World Bank (World Bank, 2004). In addition, most of the available evidence on rural entrepreneurship is based on household surveys. The rural Ethiopian RICS contains very detailed information on both firms and the business environment in which they operate and thus constitutes an improvement over previous surveys. The RICS also enables us to fill a knowledge gap, since information on even the most basic characteristics of the Ethiopian non-farm enterprise sector was uncertain hitherto (Günter et al., 2007). Secondly, increased variation in key investment climate variables enables us to better estimate to what extent differences in enterprise performance are driven by variation in the investment climate: since most rural firms hardly grow, it would be difficult to identify the determinants of enterprise success on the basis of the rural data alone. The rural-urban comparison thus serves as a method to examine the impact of the investment climate and market integration on firm performance. Thirdly, by studying firms and assessing the empirical relevance of some of the mechanisms often highlighted in theoretical models of spatial disparities in economic outcomes, such as increasing returns to scale and agglomeration effects (see e.g. Romer, 1987, Krugman, 1998), we aim to provide a complementary perspective on the New Economic Geography Literature.

Ethiopia provides a very relevant context to examine the impact of market integration on firm performance, since the Ethiopian economy is characterized by exceptionally high levels of market fragmentation and limited international economic integration. According to the World Bank *"Sheer remoteness and isolation epitomizes life in rural areas"* (World Bank, 2005c, p.69). In addition, reducing remoteness through improvements in transport facilities is considered a promising method to stimulate diversification beyond agriculture, which is considered a promising pathway for development by the Ethiopian government (PASDEP, 2005).

This paper is organized as follows. The next section reviews related literature and presents our hypotheses. Section three describes the data, presents summary statistics and nonparametric analysis of the non-farm enterprise data. Our empirical framework and results for modeling productivity and growth are discussed in section four. A final section concludes.

2 Related Literature

The idea that geographic concentration of economic activity and market integration can enable more efficient production is well-established (for overviews of related literature, see World Bank 2009, Krugman 1998, Venables 2008). To begin with, geographic concentration typically leads to larger markets, which may enable firms to operate at a larger scale and to capitalize on internal economies of scale (Romer, 1987, Krugman, 1991). The empirical evidence for the existence of increasing returns to scale at the firm-level is weak, however; studies using manufacturing data generally cannot reject the hypothesis of constant returns to scale, nor that of homotheticity (see e.g. Söderbom and Teal, 2004). Tybout (2000) argues that there are no large unexploited scale economies in the manufacturing sectors of most developing countries and points out that market size may nevertheless be an important determinant of the scale at which firms operates. Consistent with the idea that larger markets allow firms to operate at a larger scale, Fafchamps and Shilpi (2003) find that the number and size of non-farm enterprises in rural communities in Nepal are positively correlated with proximity to markets. Similarly, Haggblade et al. (2007) argue that growth of the rural non-farm enterprises can only be achieved by promoting the production of "tradeables" as increased production of “nontradeables” will merely result in inflationary pressure due to oversaturation of local demand.

Moreover, firms may benefit from agglomeration economies. Larger markets typically result in thicker markets for capital, labor and material inputs (see e.g. Fujita, Krugman and Venables, 1999), which may affect firms’ firms factor choices. Furthermore, firms may benefit from external economies such as knowledge spillovers, and reduced transaction costs. Of course, concentration may also bring disadvantages such as congestion and increasing land rents (Krugman, 1998).

In addition, larger and thicker markets may enable firms to choose a different technology altogether (see e.g. Jones, 2005 and the discussion in Baptist and Teal, 2008). Clustering of economic activity can also yield dynamic benefits, such as increased innovation (see e.g. Matsuyama, 1991).

Market integration may furthermore reduce the scope for opportunistic behavior Thin markets may not only result in lower local demand (and prohibitively high transaction costs) but might also result in higher levels of market power, which may disincentivize investment and increase the scope for predatory behavior (Collier and Venables, 2008).

Moreover, fragmentation may hamper the provision of public goods. The rural investment climate pilots recently launched by the World Bank indeed suggest that commercial finance, infrastructure development, business, and government services are weaker in rural areas, as a result of the relatively high cost of these services, which in turn appears related to low population density, low levels of economic development, and the slow penetration of commercial activities (World Bank, 2005b).

2.1 Hypotheses and approach

Our eclectic discussion of related literature suggests that urban areas are likely to be more conducive to efficient production and enterprise growth since urban markets are better integrated and the quality of urban public infrastructure is likely to be better. Rural firms are likely to face severe supply-side constraints, such as poor infrastructure and limited public services. These may result in prohibitively high transaction costs restricting trade.

Consequently, one may expect rural firms to be smaller, to have more market power, to be less likely to grow, innovate and invest, and to be more vertically integrated. Moreover, one would expect urban areas to have higher labor productivity due to a combination of increasing returns to scale, higher total factor productivity (agglomeration externalities) cheaper inputs and possibly different technologies. Quantitatively predicting the magnitude and relative importance of these mechanisms is difficult. By empirically documenting their relative importance we hope to inform theoretical modeling of spatial disparities in economic activity.

Our approach is to shed light on these hypotheses by first documenting differences in enterprise performance and the investment climate across rural and urban areas and subsequently analyzing to what extent differences in enterprise performance are associated with differences in the rural and urban investment climate. We first focus on static characteristics before turning to an analysis of spatial differences in firms' growth patterns.

3 Data & Descriptives

3.1 Data

This paper draws on the most recent Ethiopian rural and urban investment climate assessments. The rural data are from the 2007 Rural Investment Climate Survey Amhara

(RICS-Amhara), which is representative of four zones of the Amhara region or about half of Amhara's population (18 million). As shown in detail in Loening, et al. (2008) the results obtained for Amhara are fairly similar to those obtained for Ethiopia at large, even though the data are in a technical sense not representative at the national level. In order to be able to analyze how the performance of the non-farm enterprise sector is affected by agricultural outcomes, the RICS-Amhara was augmented with wereda (i.e. district) level indicators of predicted agricultural performance based on new rainfall information, based on NOAA's Africa Rainfall Estimates Climatology dataset 1995-2006.[2]

The urban data are drawn from the 2006 Ethiopia Productivity and Investment Climate Survey (PICS) which covered 14 major cities located in seven regions of Ethiopia, with approximately half of the data coming from Addis (see the Appendix in Mengistae and Honorati (2007) for more information). The PICS comprised a survey of 360 manufacturing firms, supposed to employ at least five employees, as well as a survey of 126 micro-enterprises, 84 of whom were engaged in manufacturing activities, supposed to exclude firms with five employees or more. The former group of firms is referred to as "large" enterprises, while firms in the microenterprise survey are referred to as "small" enterprises. In practice, due to measurement error and changes in size in between being documented in the registry and the timing of the survey, these size boundaries were not strictly adhered to when administering the survey.[3] The surveys mainly differ in sampling frame. For the large manufacturing firms, the national manufacturing census provided the sampling frame whereas informal firms were sampled by means of direct enumeration in key urban clusters such as the Merkato in Addis. Firms without a fixed business location are not covered in the

[2] See World Bank (2007b) and Love et al. (2004) for details.

[3] The microenterprise data consequently contain a substantial number of firms with more than 5 employees, while the "large" urban manufacturing data contains some firms with fewer than 5 employees. For the purpose of our productivity analysis, we exclude firms with more than 10 employees, the conventional cutoff used to define a microenterprise, from the microenterprise sample. For the analysis of growth, we did not use this cutoff, since curtailing the sample at 10 employees might bias our growth estimates downwards.

data, which may bias our sample towards including the more established and possibly larger and more capital intensive firms.

Consistency in the definition of variables is important for the rural-urban comparison to be accurate. Here, we briefly discuss the construction of the most important variables. See the Appendix for more details and more variables. To start with factors of production, we measure labor inputs in terms of the "full-time equivalent" number of employees since the high seasonality of rural enterprise activity renders the total number of workers a misleading indicator of total labor input. We use the replacement value of equipment as our measure of the capital stock. For urban manufacturing microenterprises this variable was imputed on the basis of expenditure data on rented capital. Of course, inaccurate imputations may bias the regression results. Fortunately, our estimates turned out to be rather robust to using different imputations of the capital stock.[4]

3.2 A Bird's-eye view of rural and urban enterprise activity

This section provides an overview of enterprise activity in rural and urban areas in Ethiopia. We first discuss salient enterprise characteristics, before proceeding to assess differences in the investment climate.

3.2.1 Salient enterprise characteristics

Table 1 documents summary statistics on key enterprise characteristics, and reveals large differences in size, factor usage, and productivity across space. These differences are further illustrated by graphs 1, 2, 3 and 4 which plot kernel density estimates of the sample

[4] Results are omitted to conserve space, but available from the authors upon request.

distributions of size, capital per worker, inputs per worker and value added per worker, respectively. Starting with differences in size, graph 1 illustrates that there are virtually no large firms in rural areas, while large-scale activity is common in urban areas. Urban microenterprises are also much larger than rural firms on average. While this finding may be partly driven by the sampling procedure, it also reflects the high seasonality of rural non-farm activities (Loening et al., 2008). Secondly, urban firms use much more capital and more inputs, both in absolute terms and relative to the number of people they employ. Thirdly, they produce much more output per worker, though the relative dispersion of labour productivity is much higher in rural areas (see graph 4), suggesting a lack of competitive pressure.

Differences in factor intensity and labour productivity are strongly correlated with differences in scale, as evidenced by Graphs 5, 6 and 7, which plot the log of the capital labor-ratio, the log of input usage per worker and the log of value added per worker versus the log of firm-size, respectively. Larger firms tend to be more capital intensive, use more inputs per worker, and produce much more value added per worker. Similar relationships between scale, capital intensity and success have been documented for a variety of African countries (see e.g. Söderbom and Teal, 2004, or Teal, 2007). Interestingly, we find sizeable differences in factor intensity across rural and urban areas even when focusing on firms of a comparable size; for example, the median capital intensity of urban microenterprises is approximately 15 times the median capital intensity of enterprises located in rural towns.

Apart from differences in size, factor intensity, and value added per worker, there are marked differences in the composition of the workforce; rural firms employ much more women and rural managers are typically poorly educated, while managers of urban firms typically have at least a high school the degree.[5] In addition, the diversity of manufacturing

[5] Rural non-farm enterprises rely almost exclusively on unpaid household labour, while such labour only accounts for a small minority of the workforce in urban areas. In other words, rural enterprises provide self-employment opportunities, while urban enterprises provide wage labour opportunities. The vast majority of urban enterprises are exclusively managed by men, while most rural enterprises are headed by women.

activities is much larger in urban areas and the activities urban firms engage in often require more skill and expertise.[6]

3.2.2 The investment climate

Table 2 provides descriptive statistics on the investment climate for firms in different locations, which suggest that rural markets are highly fragmented. Rural firms almost exclusively sell to local markets, supplying goods for local consumers, whereas urban firms cater for larger markets, typically selling to other firms and traders.[7] A minority of urban firms even export. The urban economy is thus more specialized; although rural firms are smaller they arguably exhibit a higher degree of vertical integration, perhaps as a response to risk or due to a lack of suppliers of intermediate inputs. The isolated and fragmented nature of rural markets is also reflected in a lack of competitive pressure. Consistent with the predictions of Collier and Venables (2008) that market power is higher in thin markets, more than three quarters of all manufacturers in remote rural areas report not facing any competition. In rural towns 58% of all enterprises report not facing any competition, whereas in urban areas only 2% of all manufacturers are monopolists. The lack of competition may help explain why the relative dispersion of productivity is much greater in rural areas.

Firms in urban areas also have much better access to utilities and credit[8] than rural

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Enterprises operating in rural towns are especially likely to be managed by a woman. Managers of urban enterprises, especially of large enterprises, are much better educated than managers of rural firms; the typical manager of an urban enterprise will have at a minimum attended secondary school, while the overwhelming majority of rural enterprise managers have no education at all.

[6] For example, the urban sample contains firms making plastic bags, whereas most rural enterprises use labour-intensive traditional technologies to produce “Z-goods”, i.e. simple household manufactures geared towards sale on the local market, unlikely to be tradable outside the local community (see e.g. Hymer and Resnick, 1969; and Ranis and Stewart, 1993).

[7] More than 80% of the rural enterprises indicate private individuals (i.e. consumers) are their most important customer, while the corresponding proportion of large manufacturing enterprises indicating that private individuals are their main customers is 45%.

[8] Firms in urban areas also seem to have better access to finance from formal lending institutions, since the majority of them have received credit. In addition, a larger proportion of such credit was provided by banks or

firms, with firms in remote rural areas having the least access. Taking electricity as an example, none of the manufacturers located in remote rural areas use electricity, while in rural towns 19% of all firms use electricity. In urban areas, the situation is very different, with 87% of all microenterprises and virtually all large enterprises using electricity.[9] Moreover, the reliability of electricity supply is better in urban areas. The urban investment climate thus generally seems more favorable than its rural counterpart; yet rural non-farm enterprises enjoy some advantages over urban ones, such as facing less regulation.

According to firm managers markets, credit, transport and electricity are the most pressing problems in rural areas, with transport being less of a constraint in rural towns. In urban areas access to finance and land, taxes and competition are considered the most important constraints (see Table 3 and the Data Appendix for details on how comparability across surveys was ensured). The importance of different constraints also varies with firm size.[10] Though these subjectively reported constraints have to be interpreted with caution (see e.g. Carlin et al., 2006), they suggest that demand constraints are more pressing in rural areas, while supply-side constraints are more important in urban areas. In the next section, we investigate this further.

4 Empirical Strategy and Results

4.1 Productivity

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the government. Urban enterprises also pay much lower interest rates than rural firms. Both findings are probably related to the urban firms' superior ability to raise collateral when taking out a loan.

[9] Though the questionnaire for large manufacturing firms did not contain explicit questions about electricity usage, 99% of all large firms in our sample reported positive expenditure on electricity. The questionnaires for large firms also did not contain any information on usage of phones and cellphones: however, it seems safe to presume that the overwhelming majority of large firms own a phone.

[10] Credit and land are more severe impediments for urban microenterprises, while large urban firms are more likely to complain about taxes (presumably because they are both easier to tax and face higher tax rates).

4.1.1 Model & estimation strategy

To compare and contrast the performance of rural and urban enterprises and to examine how the investment climate impacts on the productivity and technology choice of enterprises we use a standard Cobb-Douglas production function approach, $V = K^{\beta_K} L^{\beta_L} e^{\beta_E \mathrm{E} + \beta_{IC} \mathrm{IC}}$ where value-added *V* is modeled as a function of capital, *K*, labour inputs, *L*, and TFP, which is in turn modeled to be a function of characteristics of the enterprise, *E,* such as its sectoral affiliation and characteristics of the management, as well as investment climate characteristics, *IC*.[11] Our estimable equation thus becomes

$$\ln V = \beta_K \ln K + \beta_L \ln L + \beta_E \mathrm{E} + \beta_{IC} \mathrm{IC} + v \quad (9)$$

where *v* is a zero-mean random error term, assumed to be uncorrelated with the regressors in the model. A key objective is to examine to what extent the differences in labor productivity can be attributed to technology choice, increasing returns to scale, TFP and factor intensity. If internal economies of scale are important, one would expect the sum of the coefficients on capital and labor, to be larger than one (e.g. $\beta_K + \beta_L > 1$). The β_{IC} coefficient vector can be interpreted as measuring the impact of different investment climate characteristics on total factor productivity.

This approach has well-known limitations. From a conceptual point of view, we are only comparing the direct impact of the investment climate on firm productivity across rural and urban areas, while we know that the investment climate may also impact on allocative

[11] We also experimented with the more flexible translog production function, which can be interpreted as a second-order Taylor approximation to a more general production function. Based on this framework, we did not reject the Cobb-Douglas restrictions for any of our estimations. We therefore proceed with the Cobb-Douglas framework, which is remarkably robust across African firm-level data. This facilitates interpretation of the results, and retains comparability with both micro- and macro-approaches to determining the impact of the investment climate (see e.g. Dollar et al., 2005) on firm performance.

efficiency (see e.g. Mengistae and Honorati, 2007).[12] From an econometric point of view, productivity is effectively identified as the residual from the production function. This means that any measurement error or omitted variable bias will be misattributed to differences in enterprise productivity. Despite having a rich and detailed dataset, we cannot control for potentially important variables such as price differences and land usage.[13] In principle, such endogeneity problems could be remedied by means of instrumental variable estimation but, unfortunately, credible instruments are not available in our data.[14] However, Loening et al (2008) check for the potential impact of endogeneity by using local rainfall as a proxy for unobserved demand for non-farm goods (on the grounds that most buyers of non-farm products in rural markets are farmers, and their income is heavily influenced by rainfall) and show that it is a significant when included in the production function, yet does not lead to marked changes in the coefficients on the factor inputs for the rural sample – indicating that the magnitude of potential endogeneity biases is likely to be small. Moreover, there is very little variation in inputs over time, despite frequent shocks. This suggests non-farm enterprises in rural areas do not change their inputs very much, in response to demand shocks. Thus, endogeneity may not be such a big problem, in terms of leading to bias in the OLS estimator. In addition, the available evidence suggests that a rich set of controls may go a long way towards controlling for unobserved productivity. For example, using data on mostly small manufacturing firms in Ghana, Söderbom and Teal (2004) report instrumental

[12] Mengistae and Honorati (2007) have investigated the impact of the investment climate on allocative efficiency and find that shortage of land, financial constraints, and problems of tax administration affect young and small firms more than larger ones and, consequently, have helped incumbent firms protect their market shares.

[13] If prices for outputs and inputs diverge between rural and urban areas, our production function estimates may give misleading estimates of true underlying productivity, presumably overestimating the productivity of urban enterprises, since price levels in urban areas are usually higher than those in rural areas. As pointed out by Eberts and McMillen (1999), failing to control for land may result in a downward biased estimate of the rural-urban productivity gap, since urban firms are more likely to be constrained for space than are rural firms. A priori, it is thus difficult to sign the omitted variable bias.

[14] A less well-documented endogeneity problem that may hamper the identification of production function is that of selection bias (see e.g. Ackerberg et al., forthcoming). Loening et al. (2008) show that such bias is not a problem for rural firms.

variable estimates of production function parameters that are very similar to their OLS counterparts. To check whether the endogeneity of inputs is indeed not a major issue, we compute factor shares using the Solow method and compare them to our estimated production function parameters. If the impact of endogeneity is small, they should not differ very much.

4.1.2 Empirical specifications and results[15]

In Table 5 we present value-added production functions estimated on separate samples of large urban manufacturing firms (column one), small urban firms (column two), and rural manufacturing firms (column three). The explanatory variables are the log of the capital stock, the log of the labor force measured as the equivalent number of full-time employees, activity dummies and the gender as well as the years of schooling of the manager and its square, included to allow for non-linear effects of education on productivity. For rural firms we also add a dummy indicating whether or not a firm is located in a rural town.[16] In column four we add a dummy, while in columns five and six we pool small and large urban manufacturers to test for the existence of increasing returns to scale in urban areas. Table 6 repeats the specifications presented in columns one, two and three of table 5 and adds variables measuring the proportion of firms in a given community that consider a particular constraint – utilities, transport and credit - "a major problem", in order to gage the impact of the investment climate. This procedure ensures that our investment climate proxies are

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[15] Recall that we do not have information on the material inputs usage of services firms. Consequently, our value-added measures assume that such firms indeed do not use zero inputs. This will create omitted variable bias, which is our motivation for focussing on the results for manufacturing firms. Results for services firms are presented in the Appendix.

[16] We tested for differences in technology between firms located in rural towns and other rural areas, yet could not reject the null hypothesis that the technology used by firms in rural towns differs from that used by firms in other rural areas. To be clear, by “technology” we are referring to the coefficients on the capital and labour in the production function.

constant across similar types of firms in each community and has the additional advantage of mitigating endogeneity bias by smoothing the data (Escribano and Guasch, 2005).

The first thing to note is that the coefficients on capital and labour are very similar for large urban manufacturing firms, small urban manufacturing firms and rural manufacturing firms. However, total factor productivity varies substantially and significantly across different types of firms. Firms in rural areas are clearly the least productive. Furthermore, firms located in rural towns are substantially more productive than firms located in other rural areas. Taken together, our results suggest that there are large differences in productivity across rural and urban areas, but that the underlying technologies adopted by different types of firms do not differ radically, at least not in the manufacturing sector. Moreover, the evidence for increasing returns to scale is weak at best.[17]

The characteristics of the manager matter, but not a lot. Overall, the educational attainment of the manager is not strongly correlated with productivity, though we find evidence of a concave relationship between productivity and the educational attainment of the manager in small urban firms, and evidence of a convex relationship in rural towns. However, the variation in the educational attainment of the manager within subsamples is limited except in the case of small urban microenterprises, which means the impact of education on productivity cannot be estimated very precisely. Our results also suggest that there is a negative productivity premium associated with female management and that this premium is most negative in rural areas.

To what extent might these findings be driven by endogeneity? As discussed in section 4.1.1, Loening et al. (2008) have demonstrated that endogeneity is unlikely to be a major issue for the rural data. For the urban data, we have information on expenditure on rental capital and the wage bill, which we use to compute Solow shares. For the largest

[17] When we run a pooled regression small urban firms and large urban firms, the coefficient estimates on capital and labour sum to 1.06, yet are not statistically significantly different from 1. Results are omitted to conserve space but available from the authors upon request.

subsample, the sample of large manufacturing firms, the average of these Solow shares is almost exactly identical to the parameter estimates we obtain by means of OLS. However, for urban manufacturing microenterprises, the average Solow share on capital is .14 points larger, while the Solow share on labor inputs is .09 points smaller. These differences are still within the 95% confidence interval for our parameter estimates. On balance then, it seems that endogeneity may be a moderate problem in the urban manufacturing data, but that the resulting bias is unlikely to be large. Unfortunately, there is little we can do to solve the endogeneity problem since convincing instruments for material inputs and labor usage are not available.

Turning to the investment climate variables, the results suggest that problems with accessing credit are associated with significantly lower productivity for manufacturing firms in rural areas as well as for large manufacturing firms in urban areas. For transport and utilities constraints, the null hypothesis that they do not matter is never rejected. Finally, it is noticeable that some investment climate constraints have the "wrong" sign; for example, the severity of transport problems is positively correlated with the productivity of small manufacturing firms, though not statistically significantly so. As pointed out by Carlin et al. (2006), however, we have to be very careful when interpreting self-reported investment climate variables. For example, subjectively reported credit constraints might well be endogenous to firm performance. It could be that financial institutions locate near productive enterprises. Alternatively, they may only ration credit to the most productive enterprises.

The fact that small urban manufacturers and rural manufacturers use similar technologies enables us to pool the data. Moreover, it enables us to test how TFP varies with the degree of market integration. We focus on the group of small urban firms only as this seems to be the most appropriate comparison group.[18] Pooled regressions are presented in Table 7. In column 1, we test whether the data can indeed be pooled by interacting factors of production with a dummy for being located in a rural area. These interaction terms are jointly and individually insignificant: the null hypothesis that rural firms and small urban enterprises use the same technology cannot be rejected by the data. We have to bear in mind, however, that our estimates are not very precise which may undermine the power of our testing strategy. In column two, we present the pooled baseline specification, which includes controls for capital, labor, subsector and management characteristics. The coefficient on the manager's education and its square are jointly insignificant. In the third and fourth columns, we add location dummies for being located in a remote rural area, remote rural town, Addis Ababa or in another major city. The omitted category in the second column is that of observations for which such information is missing (these are all urban firms), while the omitted category in column four is any firm located in either a rural town or an urban area. These regressions reveal that firms located in remote rural areas are some 50-60% less productive than firms located in rural towns or other urban areas.[19] Obviously, there are many omitted factors associated with location that we have not yet controlled for. Nevertheless, a striking finding here is that the coefficient estimate on being located in a rural town is very similar to the coefficient estimate on being located in another major urban area or even in Addis, which suggests that the benefits of agglomeration are concavely related to city-size. In other words, productivity levels of firms in rural towns are not very different from those in urban areas, but firms in rural remote areas are much less productive than firms located elsewhere.

In column five, dummies for utilities usage are added. Firms which use electricity are

[18] Also, we could not reject the null hypothesis that rural firms and large urban firms do not use different technologies (results are omitted to conserve space).

[19] The null hypothesis that the rural remote dummy is equal to the other location dummies is rejected at the 5% level in both columns, while equality between the other location dummies is not rejected in column 3. For expositional convenience, we pool them in the fourth column.

far more productive than firms which do not, while experiencing power outages is associated with lower productivity. This finding is consistent with the available cross-country evidence on the impact of the investment climate on firm-performance (see e.g. Dollar et al., 2005). Finally, we add investment climate constraints and find that worse access to credit is associated with lower productivity.[20]

Taking stock of the results thus far, we have seen that there are major differences in terms of capital intensity, factor usage and labor productivity across firms in different locations. By contrast, differences in technology usage are surprisingly small and returns to scale are modest at best, suggesting that differences in output per worker are driven by capital intensity and TFP differentials. The documented pattern of TFP differentials furthermore suggests that the TFP gains from market integration are highest at low levels of integration. TFP differentials were shown to be correlated with utilities usage and access to credit. In sum, our results suggest that scale matters, but not because of returns to scale or technology choice.

4.2. Growth

The large differences in the rural and urban size distributions suggest that the rural investment climate does not favor factor accumulation and growth. Comparing the average annual employment growth rate of rural and urban firms in terms of the number of workers corroborates this; whereas urban manufacturing microenterprises grow some 5% each year and large urban manufacturing firms grow an average 9% each year, the rural enterprise growth rate is 0% for enterprises located in rural areas.[21] In addition, rural enterprises are

[20] Following Deininger et al. (2007), we also experimented with interactions between firm-size and investment climate variables, but found no evidence of any effects of interactions between the investment climate and firm-size, perhaps because there is relatively little variation in terms of size in our sample of small enterprises.
[21] These growth rates measure growth in the number of workers, not in terms of days worked.

much less likely to invest, which is consistent with their lower capital intensity.

Tables 7A and 7B present growth matrices of rural and urban manufacturing firms. Since our samples are selected on the basis of their current size, it would be unwise to use these matrices to examine the probability of a firm of a certain size at start-up, with, say, one worker, growing into a firm of a given size, say in between 10 and 20 employees. However, we can use the transition matrices to evaluate how many employees firms a firm of a given current size employed when it started.[22] Of course, it is important to keep in mind that these results, as well as those for the subsequent growth regressions, are conditional on firm survival. The matrices confirm that rural firms are stagnant, while there is a substantial amount of mobility across size categories in urban areas. In particular, the results reveal that a minority of currently medium- and large-sized firms started off as small firms, which indicates that small firms are capable of escaping their initial size category in urban areas, though the very smallest firms, one person enterprises, are seemingly least likely to do so. By contrast, all rural enterprises have remained small.

To identify which firms are most likely to grow, we estimate basic growth regressions using information on the age of the firm and its size at start-up. Obviously, the cross-sectional nature of our data does not enable us to analyze dynamics in detail, and we should consequently be careful in interpreting the results. Following Sleuwagen and Goedhuys (2002), growth is modeled as a function of the age of the firm, a_t, the size of the firm at start-up, S_0, other enterprise characteristics E, and investment climate characteristics IC: $G = g(S_t, a_t)e^{\beta_E \mathrm{E} + \beta_{IC} \mathrm{IC}}$. To allow for non-linear impacts of size and firm-age on growth, as well

[22] The informal firm survey was designed to exclude firms employing more than 10 employees. Consequently, the most successful microenterprises are left out of the survey. On the other hand, the large manufacturing firm survey was intended to exclude firms with fewer than 10 employees, thus excluding the most unsuccessful enterprises. Using information on size at start-up to inform questions about the probability of a firm of a given size ending up in a certain size category is thus likely to yield misleading answers. Since we pool the data across different samples, the resulting biases might partially offset each other. However, given that the underlying population proportions are unknown, it is difficult to gage the magnitude and the sign of the bias. Fortunately, we can still use the information to ask whether firms which are currently large (small) started small (large), since by conditioning on current size, the sample selection bias should be controlled for.

as possible interactions between them, we can approximate the growth function g by a second-order Taylor expansion[23] to arrive at the following estimable equation;

$$\log G = \beta_S logS_0 + \beta_{S^2}(logS_0)^2 + \beta_{age}\, a_t + \beta_{age^2} a_t^{\,2} + \beta_{ageS\,S_0} a_t log\, S_0 * a + \beta_E \mathrm{E} + \beta_{IC}\mathrm{IC} + \mathrm{u} \quad (10)$$

Where u is a normally distributed zero-mean error term.

We estimate this model separately for large urban manufacturing firms, small urban manufacturing firms and rural manufacturing firms[24] controlling for the size of the firm at start-up and its square, the age of the firm and its square, the interaction between size and age, as well as sectoral dummies, characteristics of the manager.

Table 8 presents the results, using the average annual growth rate of the permanent workforce as the dependent variable. The most striking finding is that it is very difficult to predict the growth performance of rural enterprises, as evidenced by the very low R2, presumably because rural firms hardly grow, resulting in limited variation in the data. Also note that firms in rural towns do not grow at a faster rate than firms in other rural areas. Turning to urban areas, there is strong evidence for a negative relationship between initial size and subsequent growth. This finding is consistent with other empirical studies (e.g. Evans, 1987 and Audretsch 1995) and Jovanovic's (1982) model of passive learning, though it may also be the result of measurement error or selection bias. The relationship between the age of the firm and average annual growth is negative but convex, indicating that very young firms grow most rapidly and that growth rates gradually decline as firms mature. Yet, the interaction between the initial size and the age of the firm is positive and significant, which indicates that the negative association between age and size is somewhat muted for firms

[23] Note: we slightly abuse notation here as we take the log of firm-size at start-up but not the log of firm-age.
[24] The results for non-manufacturing firms are very similar and not presented to conserve space, but available from the authors upon request.

which start larger.

The regressions presented in Table 8 are essentially dynamic specifications. In Table 9 we pool small urban and rural firms and estimate the model without conditioning on initial size or the educational attainment of the manager since the educational attainment of the manager is very strongly correlated with location dummies, which we include to capture the heterogeneity in growth performance across localities not explained by the other explanatory variables. In the second column, we add additional investment climate variables, as well as controls for the educational attainment of the manager. Even though initial size is not controlled for, the coefficients on the rural location dummies are negative and significant in these specifications. In addition, firms located in rural towns do not seem to grow faster or slower than firms located in other rural areas; in both cases, firms on average grow some 4% slower than comparable firms in urban areas, consistent with the descriptive statistics. Average annual growth remains negatively related to the age of the firm. Surprisingly, perhaps, none of the additional investment climate variables included in column two matter in these unconditional specifications. In columns three and four, which mimic the specifications presented in columns one and two respectively, controls for initial size are added. We also include the interaction between initial size and the age of the firm. These size variables are always jointly significant at the 1% level and add considerably to the explanatory power of the model, as judged by the improved R2s. Inclusion of these controls, which show that initial size is negatively related to subsequent growth, leads to increased coefficients on the rural dummies. Controls for investment climate characteristics do not matter very much, though we obtain the somewhat anomalous result that electricity usage is negatively associated with growth while power outages are positively associated with growth.[25]

The poor growth performance of rural firms suggests that the costs of dynamic losses

[25] It should be noted that these two variables are very highly correlated; in rural areas there are no enterprises which use electricity but do not experience power-outages, while in urban areas 58% of the manufacturing microenterprises which use electricity suffer from power outages.

due to market fragmentation may be many times higher than the static losses. In addition, the fact that both firms in rural towns and firms in other rural towns do not grow, suggests that the dynamic gains from promoting clustering of economic activity in rural towns might be limited, unless these rural towns are somehow integrated to the economy at large, which may well be less costly than integrating remote areas with the economy at large.

5 Conclusion

This paper uses a rural-urban comparison of non-farm manufacturing firms as a method to investigate the impact of market integration and the investment climate on firm performance. The comparison, which documents novel empirical results, strongly supports the hypothesis that market fragmentation and a weak investment climate are the key obstacles for the rural non-farm sector.

Rural and urban firms were shown to operate in distinctly different business environments: Rural firms sell almost exclusively to local markets, where competition is low, while urban firms serve relatively well-integrated markets, where competition is fierce. The lack of competitive pressure is also reflected in a larger relative dispersion of labor productivity in rural areas. Furthermore, rural firms consider markets, credit and transport as their major constraints, while access to credit, and land, taxes and competition are the most important problems for firms located in urban areas, even though urban firms were shown to have much better access to utilities and better and cheaper access to credit. These findings all point towards fragmentation in rural markets.

Such fragmentation may also help explain the striking differences in size, capital intensity and productivity of non-farm enterprises across space. Rural firms are microscopic, typically employing only one worker, often operating only outside the peak agricultural season. By contrast, urban enterprise activity is acyclical, and average firm size in urban areas is much higher. Urban firms also use much more capital and inputs, both in absolute terms and relative to the number of people they employ, perhaps because they have cheaper access to inputs due to thick market effects. In addition, urban firms produce much more output per worker than rural firms. These differences in factor usage and labor productivity were demonstrated to be strongly correlated with firm size

The rural-urban gap in output per worker does not seem driven by increasing returns to scale or differences in technology, since the technologies adopted by rural and urban manufacturing firms are remarkably similar and the evidence for increasing returns to scale is modest at best. Instead, the differences in output per worker seem to be due to differences in capital intensity and TFP. Firms in urban areas are some 50-60% more productive than firms in remote rural areas. Importantly, firms located in rural towns are almost as efficient as firms located in major urban localities, suggesting that the gains to market integration may be positive but rapidly diminishing. Taken together, our results suggest that scale matters, but not because of increasing returns to scale or technology choice.

Since scale is such a salient correlate of firm-performance, arguably our most important finding is that limited market integration and a weak investment climate severely stunt the growth of rural non-farm enterprises; firms in rural areas simply do not expand employment and very few firms invest. By contrast, urban enterprises exhibit a healthy dynamism. Together with the inequity in the firm size distributions across space, this suggests that location is a very important determinant of the scale at which firms can operate.

Consistent with these inferences is our paradoxical finding that limited local demand as a result of market fragmentation is the most pressing problem for non-farm firms in rural areas, while supply-side constraints are relatively more important in urban areas, even though rural non-farm firms face objectively inferior conditions. This is, of course, not to suggest that supply-side constraints do not matter in rural areas. For example, we find that rural firms located in areas where access to credit is a problem that tends to have much lower TFP. However, it seems that from a policy perspective the returns to alleviating supply-side constraints in rural areas may be limited if demand-side problems persist.

Promoting market towns might help facilitate geographic targeting of supply side interventions, such as investments in roads, and could simultaneously boost local demand. The abysmal dynamic performance of non-farm firms in rural towns reminds us, however, that these towns themselves may need to be better integrated with the economy to enable the dynamic gains to market integration to materialize.

6 References

Ackerberg, D., Benkard, Lanier, C. Berry, S. and Pakes, A. (forthcoming) “Econometric Tools for Analyzing Market Outcomes” *Forthcoming chapter in Handbook of Econometrics*, Vol. 6.

Audretsch, D. (1995) “Innovation, growth and survival” *International Journal of Industrial Organisation* 13:441–457.

Ayyagari, M., Beck, T. and Demirguc-Kunt, A. (2003) "Small and medium enterprises across the globe: a new database" *World Bank Policy Research Working Paper* No. 3127.

Baptist, S. (2008) “Skills and Technology: will South Korea turn into Ghana” *Mimeo, Oxford University*.

Bardasi, E. and Getahun, A. (2007). “Gender and Entrepreneurship in Ethiopia.” *Background paper to the Ethiopia Investment Climate Assessment.* Washington DC: World Bank. Processed.

Barret, C. Reardon, T. and Webb, P. (2001) “Non-farm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics and Policy Implications” *Food Policy* 26(4): 315-331

Bigsten, A. Gebreeyesus, M. and Sőderbom, M. (2008) "Agglomeration effects in Ethiopian manufacturing," *Mimeo.* University of Gothenburg.

Brown, S., Haggblade, S. and Hazell, P. (1989) “Farm-nonfarm linkages in rural Sub-Saharan Africa” *World Development* 7(8):1173-1201

Carlin, W., Schaffer, M. and Seabright, P. (2006) “Where are the Real Bottlenecks? A Lagrangian Approach to Identifying Constraints on Growth from Subjective Survey Data” *Center for Economic Reform and Transformation Discussion Paper* 2006/04.

Carlin, W., Schaffer, M., and Seabright, P. (2006) “Where are the Real Bottlenecks? A Lagrangian Approach to Identifying Constraints on Growth from Subjective Survey Data” *Center for Economic Reform and Transformation Discussion Paper* 2006/04.

Collier, P. and Gunning, J. (1999) "Explaining African Economic Performance" *Journal of Economic Literature* 37(1): 64-111.

Collier , P. and Venables, A. (2008) “ Trade and economic performance: does Africa’s fragmentation matter?” *Paper prepared for the ABCDE conference.*

Cook, P. and Nixson, F. (2000) “Finance and Small and Medium-Sized Enterprise Development” *Finance and Development Research Programme Working Paper Series* No. 14

Dasgupta, P. and Ray, D. (1986) "Inequality as a Determinant of Malnutrition and Unemployment, 1: Theory" *Economic Journal* 96(4): 1011-1034.

ibid. (1987) "Inequality as a Determinant of Malnutrition and Unemployment, 2: Policy." *Economic Journal* 97(1): 177-188.

Deininger, K., Jin, S. and Sur, M. (2007) “Sri Lanka’s Rural Non-Farm Economy: Removing Constraints to Pro-Poor Growth” *World Development* 35(12): 2056-2078.

Deininger, K, and Jin, S. (2008) “Key Constraints for Rural Non-Farm Activity in Tanzania: Combining Investment Climate and Household Surveys” *Journal of African Economies,* 1-43.

Dollar, D. Hallward-Driemeier, M. and Mengistae, T. (2005) "Investment Climate and Firm Performance in Developing Economies" *Economic Development and Cultural Change* 54(1): 1-31.

Dollar, D, Driemeijer, M. and Mengistae, T. (2006) "Investment Climate and International Integration**"** *World Development*, 34(9): 1498-1516

Pages, P., Aterido, R. and Hallward-Driemeier, M.(2007)."Investment Climate and Employment Growth: The Impact of Access to Finance, Corruption and Regulations Across Firms," *RES Working Papers* 1066, Inter-American Development Bank, Research Department.

Eberts, R. W. And McMillen, D.P. (1999) "Agglomeration Externalities and Urban Public Infrastructure" Chapter in *Handbook of Regional and Urban Economics* Edited by E.S. Mills and P. Cheshire: Toronto, Canada: North Holland.

Escribano, A. and Guasch., J.L. (2005) "Assessing the Impact of the Investment Climate on Productivity Using Firm-Level Data: Methodology and the Cases of Guatemala, Honduras, and Nicaragua" *World Bank Policy Research Paper* 3621.

Evans, D.E. (1987), "Tests of alternative theories of firm growth" *Journal of Political Economy* 95**:**657–674.

Fujita, Krugman, P. and Venables, A. (1999) *The Spatial Economy: Cities, Regions and International Trade,* Cambridge, MA, MIT Press.

Fafchamps, M. (2004) "Manufacturing growth and agglomeration effects" *The Centre for the Study of African Economies Working Paper Series* No 233.

Fafchamps, M. and Shilpi, F. (2003) "The spatial division of labour in Nepal" *Journal of Development Studies* 39(6): 23-66.

Gūnther, I. Olapade, M. and Loening, J. (2007) "A Review of the nonfarm sector in rural Ethiopia: Characteristics and Dynamics" *Background paper for the Ethiopia Rural Investment Climate Assessment Washington* DC: World Bank. Processed.

Haggblade, S, Hazell, P. and Reardon, T. (2007) *Transforming the Rural Nonfarm Economy.* Baltimore: Johns Hopkins University Press and International Food Policy Research Institute.

Hymer, S. and Resnick, S. (1969) "A Model of an Agrarian Economy with Nonagricultural Activities," *American Economic Review* 59: 493-506.

Johnston, B. and Mellor, J. (1961) “The Role of Agriculture in Economic Development” *The American Economic Review,* 51:566-593.

Jones, C.I. (2005) “The Shape of Production Functions and the Direction of Technical Change.” *The Quarterly Journal of Economics*, 120(2):517-549.

Jovanovic, B. (1982) “Selection and the Evolution of Industry” *Econometrica* 50(3): 649-670.

Kinda, T. and J. Loening. 2008. “ Small Enterprise Growth and the Rural Investment Climate: Evidence from Tanzania.” *World Bank Policy Research Working Paper* 4675.

Kedir, A. and Girma, S. (2007) "Quadratic Engel Curves with Measurement Error: Evidence from a Budget Survey" *Oxford Bulletin of Economics and Statistics* 69(1): 123-138.

Krugman, P. (1991) "Increasing Returns and Economic Geography" *Journal of Political Economy* 99(3) pp. 483-499.

Krugman, P. (1998) "What.s New about the New Economic Geography" *Oxford Review of Economic Policy* 14(2), pp7-17.

Lanjouw, J. And Lanjouw, P. (2001) “The Rural Non-Farm Sector: Issues and Evidence from Developing Countries” *Agricultural Economics*, 26(1):1-23.

Loening, J., Rijkers, B., and Söderbom, M. (2008) "Non-farm Microenterprises and the Investment Climate: Evidence from Rural Ethiopia" World Bank PolicyResearch Working Paper 4577.

Mead, D. C. and Liedholm, C. (1998) “The dynamics of micro and small enterprises in developing countries” *World Development* 26(1): 61-74.

Mengistae, T. and Honorati, M. (2007) “Constraints to productivity growth and to job creation in the private sector”, *Chapter 2 in Ethiopia Investment Climate Assessment 2007* Washington DC: World Bank. Processed.

Pages, P., Aterido, R. and Hallward-Driemeier, M. (2007)."Investment Climate and Employment Growth: The Impact of Access to Finance, Corruption and Regulations Across Firms," *RES Working Papers* 1066, Inter-American Development Bank, Research Department.

Ranis, G. and Stewart, F. (1993) “Rural nonagricultural activities in development: theory and application” *Journal of Development Economics* 40: 75-101.

Reardon, T., J.E. Taylor, K.Stamoulis, P.Lanjouw and Balisacan, A. (2000) “Effects of Non-Farm Employment on Rural Income Inequality in Developing Countries: An Investment Perspective” *Journal of Agricultural Economics,* 51(2):266-288.

Romer, P. (1987) "Growth Based on Increasing Returns due to Specialization" *American Economic Review* 77: 57-62.

Sleuwaegen, L. and Goedhuys, M. (2002) "Growth of firms in developing countries, evidence from Cote d'Ivoire" *Journal of Development Economics* 68(1): 117-135.

Sőderbom, M. and Teal, F. (2004) "Size and Efficiency in African Manufacturing Firms: Evidence from Firm-Level Panel Data” *Journal of Development Economics* 73: 369-394.

Teal, F. (2007), “A Note on Using Firm Surveys for Policy Analysis in Low Income Countries” *Mimeo.* Oxford University.

Tybout, J.R. (2000) "Manufacturing Firms in Developing Countries: How Well Do They Do, and Why?" *Journal of Economic Literature* 38: 11-44

Venables, A. (2008) “New Economic Geography” in *The New Palgrave Dictionary of Economics,* 2nd Edition.

World Bank (2004) *Sri Lanka: Improving the Rural and Urban Investment Climate* World Bank, Washington DC.

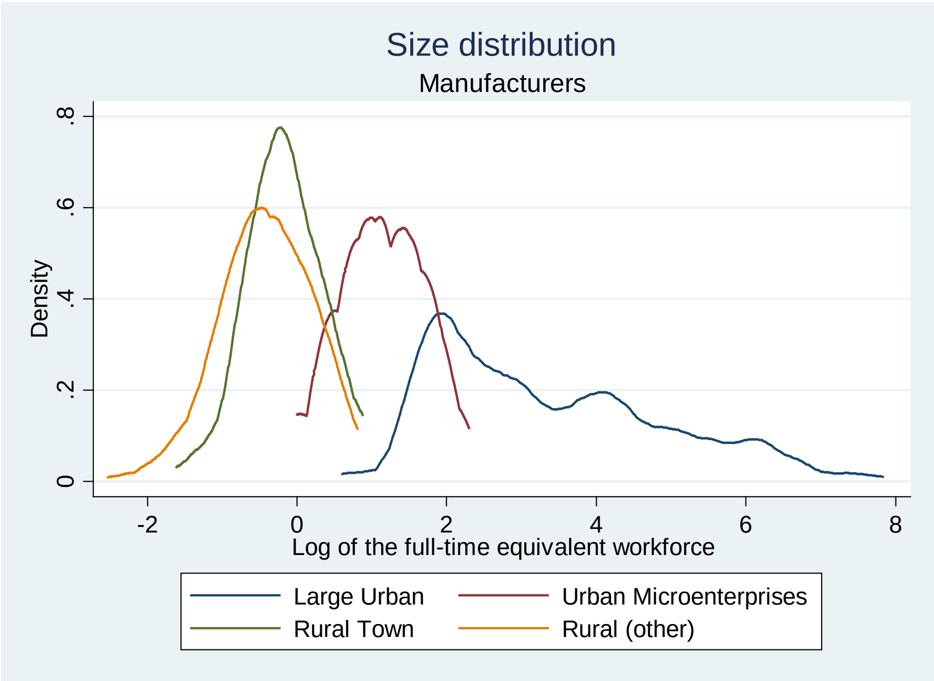
World Bank (2005a) *World Development Report 2005: A Better Investment Climate for Everyone*, Washington D.C.

World Bank (2005b) "The Rural Investment Climate: it Differs and it Matters" Report No 36543-GLB.

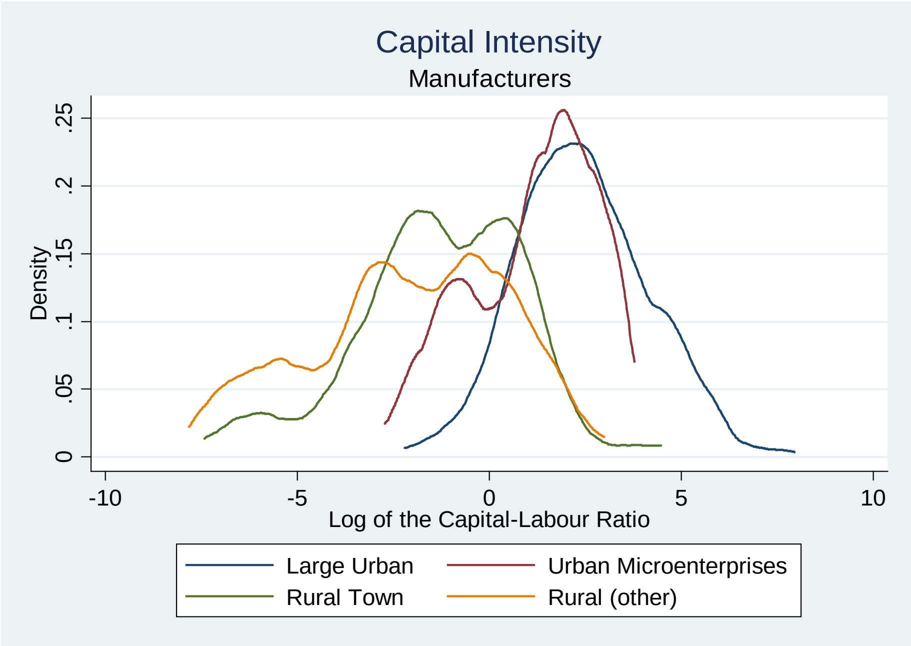
World Bank (2005c) "Well-Being and Poverty in Ethiopia: The Role of Agriculture and Agency" *Report No. 29468-ET*. Poverty Reduction and Economic Management 2 (AFTP2), Country Department for Ethiopia, Africa Region.

World Bank, (2009) *World Development Report 2009: Reshaping Economic Geography*, Washington D.C.

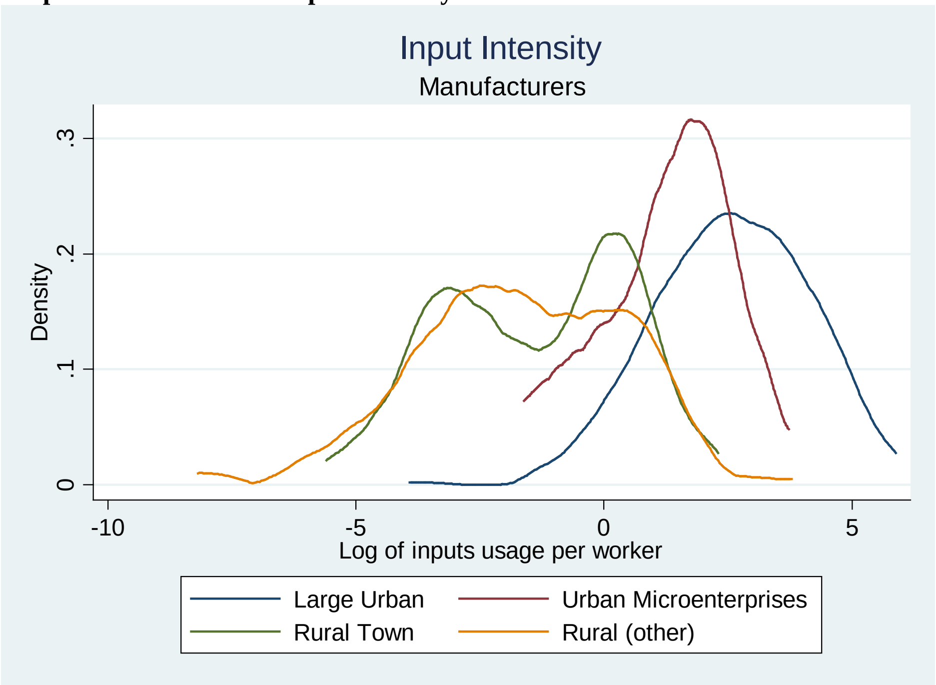
Graph 1: Size distributions



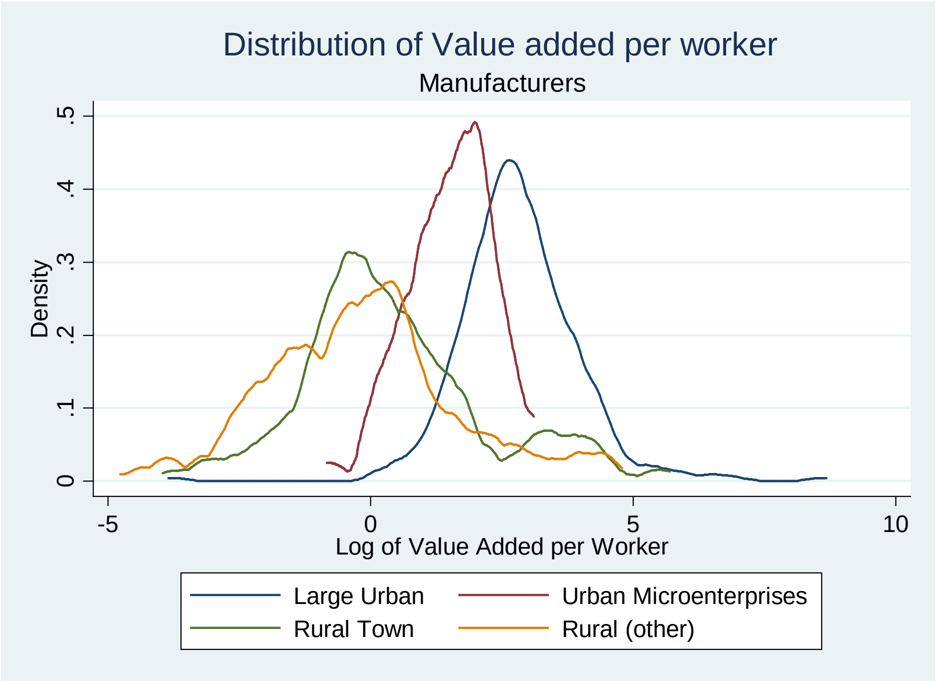
Graph 2: Distributions of Capital Intensity



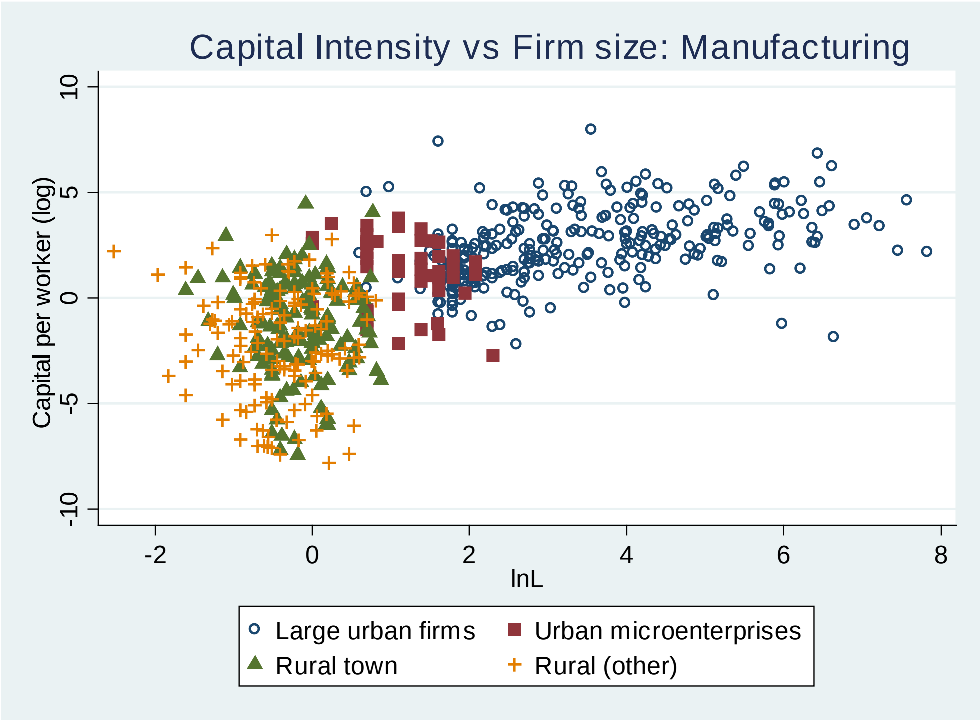
Graph 3: Distribution of Input Intensity



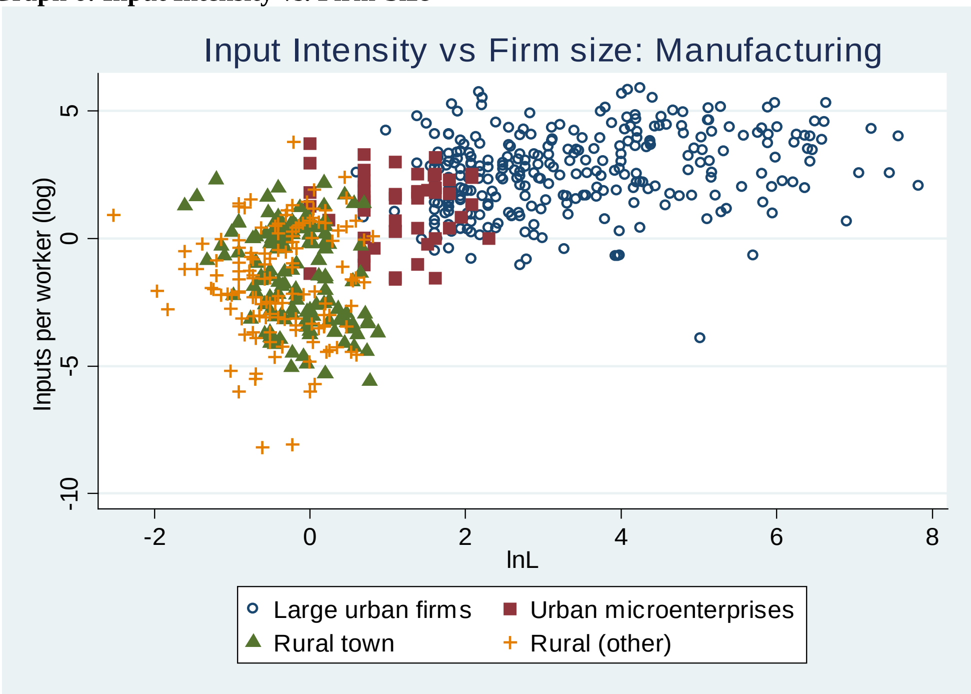
Graph 4: Distributions of Value-added Per Worker



Graph 5: Capital Labour Ratios vs. Firm-size



Graph 6: Input Intensity vs. Firm-Size



Graph 7: Value-added Per Worker vs. Firm-size.

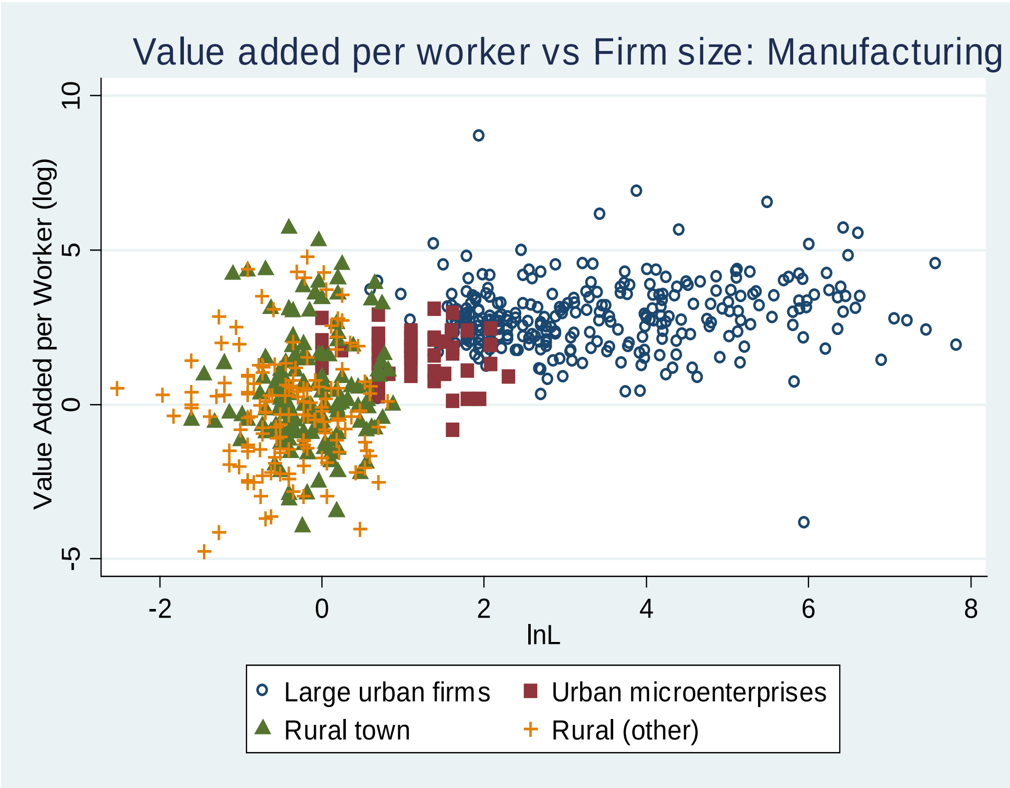


Table 1 : Salient Enterprise Characteristics								
	Large urban manufacturers		Urban manufacturing microenterprises		Manufacturers in rural towns		Manufactures in remote rural areas	
	Mean	**sd**	**Mean**	**sd**	**Mean**	**sd**	**Mean**	**sd**
Output								
LnY	6.85	2.18	3.42	1.04	0.78	1.57	0.01	1.76
Ln Value-added	6.19	2.05	2.65	0.98	0.23	1.86	-0.56	1.95
Factors of Production								
LnL (full-time equivalent)	3.38	1.55	1.12	0.59	-0.17	0.48	-0.41	0.61
Log of permanent workers	3.55	1.53	1.15	0.61	0.14	0.29	0.16	0.30
Share of unpaid labour	na	na	0.11	0.25	0.96	0.18	0.98	0.13
LnK	5.82	2.74	2.26	1.68	-1.47	2.24	-2.52	2.65
LnM	5.94	2.46	2.33	1.47	-1.57	1.82	-2.06	2.23
Characteristics of the								
Female management	0.27	0.44	0.21	0.41	0.75	44	60	49
Years of schooling	11.2	4.13	9.34	3.84	1.67	3.06	82	1.97
Activity								
Food	30%	46%	0%	0%	62%	49%	36%	48%
Garments	33%	47%	36%	48%	33%	47%	47%	50%
Leather	6%	23%	0%	0%	0%	0%	3%	17%
Wood	28%	45%	0%	0%	5%	22%	9%	29%
Other manufacturing	5%	21%	64%	48%	0%	0%	6%	23%
Growth								
Firm-age	18.30	15.26	9.55	8.94	10.32	11.06	11.45	11.37
Average annual growth (log)	0.09	0.15	0.05	0.13	0.00	0.04	0.00	0.03
Permanent Workforce at Start-up (log)	2.49	1.75	0.77	0.67	0.11	0.27	0.13	0.28
Invested	0.50	0.50	0.27	0.45	0.20	0.40	0.20	0.40
Per-worker variants								
Ln (Value-added/L)	2.87	1.18	1.54	0.72	0.40	1.77	-0.14	1.83
Ln(Y/L)	3.47	1.17	2.30	0.90	0.95	1.52	0.43	1.61
Ln(K/L)	2.44	1.69	1.14	1.66	-1.30	2.21	-2.10	2.58
Ln(M/L)	2.57	1.54	1.21	1.35	-1.39	1.91	-1.68	2.14
	Median	**USD**	**Median**	**USD**	**Median**	**USD**	**Median**	**USD**
Value-added per worker	15.23	1673	4.72	518	1.04	114	0.63	69
Capital per worker	10.32	1134	4.40	483	0.32	35	0.22	24
Inputs per worker	13.53	1486	4.80	527	0.83	91	0.36	40
NB Amounts measured in thousands of Birr unless otherwise indicated.								

Table 2: Investment Climate Characteristics								
	Large urban manufacturers		**Urban manufacturing microenterprises**		**Manufacturers in rural towns**		**Manufactures in remote rural areas**	
	mean	**sd**	**mean**	**sd**	**mean**	**sd**	**mean**	**sd**
Markets & Competition								
Exporter	0.08	0.28	0.00	0.00	0.00	0.00	0.00	0.00
Monopolist	0.02	0.15	na	na	0.58	0.50	0.76	0.43
Utilities								
Electricity usage	0.99	0.08	0.87	0.34	0.19	0.39	0.00	0.00
Power outages	0.71	0.45	0.55	0.50	0.19	0.39	0.00	0.00
Owns a landline	na	na	0.43	0.50	0.00	0.00	0.00	0.00
Owns a cell phone	na	na	na	na	0.02	0.14	0.00	0.00
Security								
Hires Security-staff	0.90	0.30	0.70	0.46	na	na	na	na
Credit								
Borrower	0.44	0.50	0.11	0.32	0.26	0.44	0.15	0.36
Interest rate, most recent loan	8.28	2.19	12.57	3.60	58.24	116.41	40.18	41.24
Collateral required for the most recent loan?	0.95	0.23	0.71	0.49	0.31	0.47	0.43	0.51
Source of the most recent loan								
-Bank or government	78.57		0		2.38		0.00	
-Non-bank financial institution (MFI)	5.95		100		23.81		14.29	
-Informal	15.48		0		73.81		85.71	

Note:
- For urban microenterprises, we only have information on formal credit, not on informal credit
- Interest rates are annualised

Table 3: Most important Constraint according to Firm-managers				
Major constraint	**Large urban manufacturers**	**Urban manufacturing microenterprises**	**Manufacturers in rural towns**	**Manufactures in remote rural areas**
(Unfair) Competition	20.27%	1.89%	na	na
Electricity usage	7.64%	0.00%	18.42%	7.04%
Finance	16.61%	41.51%	23.68%	23.62%
Government	6.98%	1.89%	0.00%	0.00%
Labour	4.32%	0.00%	0.00%	0.00%
Land	13.95%	37.74%	0.00%	1.51%
Markets	4.98%	0.00%	37.37	42.21%
Phones & Telecommunication	0.33%	0.00%	0.00%	0.00%
Registration	1.66%	0.00%	0.00%	0.00%
Safety	2.66%	0.00%	0.00%	0.00%
Taxes	18.6%	13.21%	0.53%	0.00%
Technology	0.33%	0.00%	0.53%	1.51%
Transport	1.33%	3.77%	5.26%	16.08%
Water	0.33%	0.00%	13.16%	8.04%

Table 4: Averages of our Investment Climate Proxies				
	Large urban manufacturers	**Urban manufacturing microenterprises**	**Manufacturers in rural towns**	**Manufactures in remote rural areas**
Credit	39.50%	52.86%	58.84%	62.24%
Transport	8.54%	15.98%	50.70%	49.47%
Utilities	15.19%	14.48%	56.49%	58.56%

Table 5: Production Functions – OLS
Regressions on separate samples
Dependent variable: Log of annual value-added in 1000 Birr

Sample Sector Specification	**Large Manufacturing**	**Small urban Manufacturing Baseline**	**Rural Manufacturing Baseline**	**Large urban Manufacturing Baseline + IC**	**Small Urban Manufacturing Baseline + IC**	**Rural Manufacturing Baseline + IC**
	coef/sd	**coef/sd**	**coef/sd**	**coef/sd**	**coef/sd**	**coef/sd**
Factors						
lnK	0.149***	0.096**	0.213***	0.156***	0.087*	0.223***
	(0.047)	(0.048)	(0.054)	(0.047)	(0.051)	(0.053)
LnL	0.761***	0.850***	0.854***	0.749***	0.795***	0.857***
	(0.087)	(0.173)	(0.177)	(0.086)	(0.196)	(0.172)
Activity						
Food and beverages	0.026		-1.038*	0.056		-1.034*
	(0.295)		(0.553)	(0.304)		(0.532)
Garments and	-0.486	0.026	-1.006*	-0.481	0.047	-1.012*
	(0.310)	(0.253)	(0.542)	(0.312)	(0.271)	(0.522)
Leather	0.021		0.980	0.002		1.117
	(0.414)		(0.859)	(0.425)		(0.856)
Wood, furniture &	-0.274		-2.144***	-0.281		-2.144***
	(0.283)		(0.667)	(0.293)		(0.639)
Management						
Female management	-0.008	0.017	-0.588**	0.017	-0.004	-0.466*
	(0.179)	(0.308)	(0.265)	(0.180)	(0.331)	(0.270)
Manager's schooling	-0.089	0.565***	-0.146*	-0.103	0.458*	-0.125
	(0.098)	(0.217)	(0.084)	(0.097)	(0.249)	(0.082)
Manager's schooling^2	0.006	-0.032**	0.013	0.006	-0.025*	0.011
	(0.005)	(0.013)	(0.010)	(0.005)	(0.015)	(0.009)
Major Constraints						
Credit				-1.161**	-0.494	-1.253***
				(0.571)	(0.944)	(0.449)
Transport				0.397	2.525	0.349
				(1.090)	(2.123)	(0.480)
Utilities				-1.112	0.388	-0.261
				(0.912)	(2.113)	(0.380)
Geography						
Rural town			0.544***			0.459**
			(0.211)			(0.213)
Constant	3.166***	-0.527	1.758***	3.836***	-0.350	2.459***
	(0.627)	(0.763)	(0.573)	(0.744)	(0.888)	(0.586)
N	301	53	294	301	53	294
R2	0.732	0.458	0.261	0.743	0.479	0.291
Adjusted R2	0.724	0.388	0.235	0.732	0.370	0.259
Median Solow shares						
lnK	0.10	0.24	na	0.10	0.24	na
lnL	0.90	0.76	na	0.90	0.76	na
Mean Solow shares						
lnK	0.15	0.31	na	0.15	0.31	na
lnL	0.85	0.69	na	0.85	0.69	na

Note:
- .01 - ***; .05 - **; .1 - *;
- Robust standard errors in parentheses
- Solow shares could not be computed for rural firms since most rural firms do not hire workers (relying on household members instead) and because the rural data do not contain information on rental expenditure.

Table 6: Pooled Production Functions –OLS (1 of 2)
Small manufacturing firms
Dependent variable: Log of annual value-added in 1000 Birr

	(1)	(2)	(3)	(4)	(5)	(6)
	coef/sd	**coef/sd**	**coef/sd**	**coef/sd**	**coef/sd**	**coef/sd**
Factors						
lnK	0.183***	0.226***	0.217***	0.215***	0.215***	0.223***
	(0.058)	(0.044)	(0.047)	(0.043)	(0.049)	(0.048)
LnL	0.528**	0.890***	0.785***	0.795***	0.743***	0.748***
	(0.212)	(0.149)	(0.157)	(0.149)	(0.162)	(0.159)
Activities						
Food and beverages	-0.549	-0.494*	-0.634*	-0.591**	-0.604	-0.496
	(0.348)	(0.276)	(0.357)	(0.281)	(0.373)	(0.371)
Garments and textiles	-0.520*	-0.455*	-0.540**	-0.509**	-0.493*	-0.408
	(0.270)	(0.248)	(0.270)	(0.249)	(0.285)	(0.288)
Leather	1.302*	1.338*	1.417*	1.448*	1.424*	1.638**
	(0.745)	(0.749)	(0.766)	(0.764)	(0.785)	(0.791)
Wood, furniture & metal	-1.672***	-1.635***	-1.710***	-1.670***	-1.709***	-1.633***
	(0.523)	(0.519)	(0.507)	(0.502)	(0.511)	(0.492)
Management						
Female management	-0.414*	-0.416*	-0.496**	-0.493**	-0.535**	-0.437*
	(0.227)	(0.221)	(0.217)	(0.215)	(0.222)	(0.225)
Manager's schooling	-0.084	-0.072	-0.105	-0.101	-0.103	-0.086
	(0.066)	(0.065)	(0.066)	(0.065)	(0.066)	(0.068)
Manager's schooling^2	0.007	0.006	0.008*	0.008	0.007	0.006
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Rural town						
Rural Area	-0.475					
	(0.334)					
Rural Area*ln L	0.414					
	(0.277)					
Rural Area*lnK	0.043					
	(0.079)					
Location Dummies						
Addis			0.306		0.197	0.292
			(0.267)		(0.266)	(0.272)
Other city of over 200,000 people			0.313		0.106	-0.120
			(0.310)		(0.314)	(0.332)
Rural town			0.275		0.495	0.461
			(0.421)		(0.463)	(0.496)
Other rural area			-0.257	-0.524**	0.010	0.047
			(0.428)	(0.205)	(0.477)	(0.502)
Utilities usage						
Electricity usage					0.691**	0.675**
					(0.279)	(0.287)
Power outages					-0.349*	-0.420*
					(0.208)	(0.218)
Owns a landline					0.403	0.442
					(0.320)	(0.322)
Owns a cell phone					-0.064	-0.056
					(0.262)	(0.262)

Table continues on the next page.

Table 6: Pooled Production Functions –OLS (1 of 2)
Small manufacturing firms
Dependent variable: Log of annual value-added in 1000 Birr
(continued from the previous page)

Constraints						
Credit						-1.157***
						(0.437)
Transport						0.299
						(0.469)
Utilities						-0.244
						(0.380)
Constant	1.942***	1.398***	1.513***	1.743***	1.218***	1.760***
	(0.361)	(0.282)	(0.367)	(0.297)	(0.380)	(0.409)
N	347	347	347	347	347	347
R2	0.424	0.422	0.434	0.434	0.440	0.460
Adjusted R2	0.403	0.407	0.412	0.417	0.411	0.427

Note:
- .01 - ***; .05 - **; .1 - *;
- Robust standard errors in parentheses
- Rural Area * ln K and Rural Area * ln L not jointly significant

Table 7: Transition matrices

Table 7A: Transition Matrix Rural Manufacturing firms

Rural manufacturing firms: Transition Matrix			
	Current Size		
Size at Start-up	*1 worker*	*2-5 workers*	*Total*
1 worker	316 **98%**	23 **30%**	339 **85%**
2-5 workers	6 **2%**	54 **70%**	60 **15%**
Total	322 **100%**	77 **100%**	399 **100%**

Note:
-Percentages represent the number of firms as a proportion of their number in the size category in the rural manufacturing sample

Table 7B: Transition Matrix Urban Manufacturing firms

Urban manufacturing firms (small and large) : Transition Matrix							
	Current Size						
Size at Start-up	*1 worker*	*2-5 workers*	*5-10 workers*	*10-50 workers*	*50-100 workers*	*> 100 workers*	*Total*
1 worker	8 **67%**	24 **25%**	13 **15%**	0 **0%**	0 **0%**	0 **0%**	45 **11%**
2-5 workers	2 **17%**	66 **69%**	50 **60%**	36 **31%**	4 **11%**	1 **1%**	159 **38%**
5-10 workers	1 **8%**	4 **4%**	18 **21%**	28 **24%**	2 **6%**	1 **1%**	54 **13%**
10-50 workers	1 **8%**	1 **1%**	3 **4%**	50 **43%**	19 **53%**	20 **27%**	94 **23%**
50-100 workers	0 **0%**	0 **0%**	0 **0**	2 **2%**	6 **17%**	8 **11%**	16 **4%**
> 100 workers	0 **0%**	0 **0%**	0 **0**	1 **1%**	5 **14%**	43 **59%**	49 **12%**
Total	12 **100%**	95 **100%**	84 **100%**	117 **100%**	36 **100%**	73 **100%**	417 **100%**

Note:
-Percentages represent the number of firms as a proportion of the number of firms currently in the urban pooled manufacturing sample.
-Warning: Pooling of the samples and sample design create selection problems

Table 8: OLS Growth Regressions
Manufacturing Firms – Separate Samples
Dependent variable: Average annual employment growth (log)

Sample	**Large Urban**	**Small Urban**	**Rural**
	coef/sd	**coef/sd**	**coef/sd**
Initial Conditions & Age			
LnL at start-up	-0.066***	-0.243**	0.008
	(0.011)	(0.091)	(0.081)
LnL at start-up^2	0.002	0.048	-0.028
	(0.002)	(0.035)	(0.072)
Firm's age	-0.012***	-0.014***	-0.000
	(0.002)	(0.004)	(0.001)
Firm's age^2	0.000***	0.000**	0.000
	(0.000)	(0.000)	(0.000)
Firm's age* lnL at start-up	0.001***	0.006**	-0.000
	(0.000)	(0.003)	(0.001)
Activity			
Food and beverages	-0.010	-0.006	0.010**
	(0.019)	(0.019)	(0.005)
Garments and textiles	0.051*	-0.038	0.001
	(0.028)	(0.031)	(0.006)
Leather	0.022		-0.004
	(0.023)		(0.007)
Wood, furniture & metal	0.017		-0.007
	(0.021)		(0.009)
Management			
Female Management	0.021	-0.044*	-0.007
	(0.019)	(0.026)	(0.010)
Manager's schooling	-0.029***	-0.028*	0.002
	(0.011)	(0.016)	(0.003)
Manager's schooling^2	0.002***	0.002*	-0.000
	(0.001)	(0.001)	(0.000)
Geography			
Rural town			-0.001
			(0.005)
Constant	0.376***	0.353***	0.012
	(0.052)	(0.080)	(0.012)
N	347	70	399
R2	0.351	0.448	0.020
Adjusted R2	0.328	0.355	-0.013

Note:
- .01 - ***; .05 - **; .1 - *;
- Robust standard errors in parentheses

Table 9: Pooled Growth Regressions-OLS **Small Manufacturing firms – Separate Samples** Dependent variable: Average annual employment growth (log)						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	coef/sd	**coef/sd**	**coef/sd**	**coef/sd**	**coef/sd**	**coef/sd**
Initial Conditions & Age						
Firm's age	-0.001**	-0.001*	-0.001*	-0.001**	-0.001**	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Firm's age^2	0.000	0.000	0.000	0.000	0.000*	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LnL at start-up				-0.019	-0.026	-0.033
				(0.039)	(0.039)	(0.039)
LnL at start-up^2				-0.035	-0.030	-0.028
				(0.023)	(0.022)	(0.023)
Firm-age* lnL at start-up				0.001	0.001	0.001
				(0.001)	(0.001)	(0.001)
Activities						
Food and beverages	0.009	0.008	0.009	-0.002	-0.002	-0.002
	(0.015)	(0.014)	(0.014)	(0.013)	(0.013)	(0.013)
Garments and textiles	0.001	0.001	0.002	-0.014	-0.013	-0.013
	(0.016)	(0.016)	(0.016)	(0.015)	(0.014)	(0.014)
Leather	-0.005	-0.004	-0.002	-0.021	-0.020	-0.020
	(0.016)	(0.015)	(0.016)	(0.016)	(0.015)	(0.015)
Wood, furniture & metal	-0.012	-0.011	-0.009	-0.024	-0.023	-0.022
	(0.016)	(0.016)	(0.016)	(0.015)	(0.015)	(0.015)
Location Dummies						
Remote rural area	-0.040**	-0.013	-0.023	-0.074***	-0.048***	-0.056**
	(0.020)	(0.019)	(0.023)	(0.020)	(0.017)	(0.022)
Rural town	-0.041*	-0.014	-0.023	-0.073***	-0.049***	-0.057**
	(0.021)	(0.020)	(0.025)	(0.022)	(0.018)	(0.024)
Management						
Female Management	-0.016	-0.015	-0.016	-0.018*	-0.018*	-0.019*
	(0.011)	(0.010)	(0.011)	(0.011)	(0.010)	(0.011)
Manager's schooling		-0.004	-0.004		-0.003	-0.003
		(0.003)	(0.003)		(0.003)	(0.003)
Manager's schooling^2		0.001*	0.001*		0.001*	0.001*
		(0.000)	(0.000)		(0.000)	(0.000)
Utilities						
Electricity usage			-0.038			-0.040*
			(0.025)			(0.023)
Power outages			0.037			0.048**
			(0.024)			(0.021)
Major Problems						
Credit			0.012			0.009
			(0.015)			(0.014)
Transport			-0.014			-0.019*
			(0.011)			(0.011)
Utilities			-0.000			0.005
			(0.009)			(0.009)
Constant	0.064***	0.037*	0.045**	0.118***	0.091***	0.101***
	(0.018)	(0.020)	(0.023)	(0.024)	(0.021)	(0.026)
N	469	469	469	469	469	469
R2	0.071	0.094	0.108	0.162	0.179	0.200
Adjusted R2	0.053	0.072	0.076	0.140	0.154	0.166

Note:
- .01 - ***; .05 - **; .1 - *;
- Robust standard errors in parentheses

9 Data Appendix: Notes on the construction of key explanatory variables

Factors of production

Full-time Equivalent Workers: Rural enterprise activity is highly seasonal. The total number of workers is consequently a misleading indicator of labour inputs into rural enterprise. To compare labour usage of rural and urban firms, the "full-time equivalent" number of employees is computed. For rural firms, the total number of days worked by the entire workforce divided by 300 is the total number of full-time equivalent employees. The equivalent of a full-time employee is thus 300 labour days. Unfortunately, the urban data do not contain information on the number of days employees typically work. The full-time equivalent labour input of urban part-time employees is computed by multiplying the total number of part-time employees by the total number of months they work on average and dividing by 12. The total number of full-time employees is then computed by adding the total number of full-time employees and the full-time equivalent of all part-time employees working for the firm.

Capital: For urban manufacturing firms and rural firms the capital stock is measured as the replacement value of the capital stock. For urban informal firms we impute the capital stock on the basis of rental expenditure using the formula

$$K_{imputed} = r * \frac{1+r}{1+\delta}$$

Where *r* is the rent paid, which we set equal to 0.10, and δ is the depreciation rate, which we assume equal to 0.05.

Characteristics of the manager

Years of schooling of the manager: To obtain comparable measures of schooling across datasets, we impute the years of education, using the following imputations for large urban manufacturing firms:
-Did not complete secondary school: 5 years of schooling
-Secondary school: 10 years of schooling
-Vocational training: 12 years of schooling
-Some university training: 14 years of schooling
-Graduate Degree: BA or BSc: 16 years of schooling
-Masters or MBA (either from an Ethiopian or a foreign university) or other post-graduate degree: 17
-years of schooling.
-Other post-graduate degree: 18 years of schooling

For the rural data, we assume that the grade obtained is equal to the total number of years spent in education. People who have earned a university degree are assumed to have spent 16 years in education, while the few people who indicated that the completion of an adult literacy program, other literacy program, or church or mosque schooling constituted their highest educational attainment were imputed to have spent 6 years in school.

Information on the educational attainment of the manager is missing for small urban firms. However, we have information on the educational attainment of the workforce and use this to impute the educational attainment of the manager.

If the typical worker has between

- 0-3 years of schooling: the manager is assumed to have 3 years of education.
- 4-6 years of schooling: the manager is assumed to have 6 years of education.
- 7-12 years of schooling: the manager is assumed to have 12 years of education.
- More than 13 years of schooling: the manager is assumed to have 15 years of education.

Gender of the manager: A dummy variable which takes the value 1 if the manager is a woman for rural firms and for small urban firms. For large urban firms, it is coded 1 if at least one of the managers is female.[26] For urban firms, the share of female managers is thus likely to be overestimated.

Sectoral Affiliation

In order to classify enterprises as belonging to a certain (sub-) industry, the following classification was adopted:

Table B.1: Sectoral Affiliation			
Industry/Group of Activities	**Activities – "large" manufacturing and services datasets**	**Activities – small/informal dataset**	**Activities- rural data[27]**
Food and Beverages	Food, beverages	Food	Food and beverages, brewing/distilling, grain milling **c**
Textiles and clothing	Polyester button, textiles, garments	Textiles	Manufacture of textiles, of wearing apparel; dressing and dying of fur
Woodwork & Metal	Woodwork, furniture and metalwork, wire and nails		Manufacture of wood and of products of wood and cork, except furniture; Manufacture of fabricated metal products, except machinery and equipment, Manufacture of furniture
Leather	Leather		Tanning and dressing of leather; manufacture of

[26] Since we do not have information on the number of managers per enterprise ,it was not possible to compute the proportion of female managers.

[27] **c** indicates that this category contains a number of sub-activities – listings of which are available upon request.

			luggage, saddlery, harness, footwear
Other Manufacturing	Polyester buttons, tobacco, camping equipment, coffee roasting and grinding, plastic products manufacturing, tannery (sheep, goats), printing, non-metal products (glass, rubber), wire and nails, cement production, PP Bag production, and firms classified as "Others" in the manufacturing survey	Other manufacturing and electronics	Other manufacturing **c**

Constraints

The investment climate surveys ask very detailed questions about constraints. These questions overlap considerably, but not perfectly, across the different surveys. To construct constraints measures that are comparable across rural and urban enterprises, we categorised individual constraints into coarser groups of constraints, documented in the Tables below. A drawback to this procedure is that the different constraints categories do not contain an equal number of items. Moreover, due to imperfect overlap, they may not measure exactly the same constructs across rural and urban areas.

Most important constraint:

Table B.2: Construction of the "Most Important Constraint" Variable

Constraint Category	**"Constituent" Urban Constraints**	**"Constituent" Rural Constraints**
Markets	- Availability of raw materials - Lack of market - Rising of input prices - Shortage of spare parts - Shortage of input - Shortage of capital - Others - Massive inflows of aid food	- Access to inputs - Access to markets (distance and cost)) - Difficulty to obtain information on your product's market - Demand for goods and services produced
Finance	- Access to financing (availability/collateral) - Cost of financing (interest rates, fees) - Access to finance due to religious constraints	-(Im)Possibility of borrowing from family, friends or others - (Im)Possibility of borrowing from formal financial institutions - Interest rates - Complicated bank loan procedures (too many forms) -Fear of not being able to pay loan instalments
Transport	-Transportation	-Road access -Road Quality -Road Cost -Traffic - Facilities to transport goods
Water	-Shortage of water supply	- Water access - Water Quality - Water cost
Government	- Macroeconomic instability	- Corruption

	- Political instability - Implementation of government regulation - Control and regulation	- Uncertain Economic Policy - Restrictive Laws and Regulations
Electricity	- Electricity	-Electricity access -Electricity quality -Electricity cost
Labour	- Inadequately educated workforce - Labour regulations	- Lack of skilled Labour - Difficulties in hiring labour from outside region
Phones/telecom	-Telecommunication	- Fixed phone line access (household phone) - Fixed phone line quality (household phone) - Fixed phone line cost (household phone) - Cellular access - Cellular quality - Cellular cost
Technology	- Lack of critical spare parts and specialized technologies	-Lack of training -Research Costs -Access to Computer -Access to Information and Technology
Taxes	- Tax rates - Tax administration	- High taxes - Complicated procedures - Unofficial levies
Registration	- Customs and trade regulations - Business licensing and permits - Bureaucratic burden	- Government policy & regulations associated with enterprise registration - Government policy & regulations associated with enterprise operating permits
Safety	- Corruption - Street crime, theft and disorder - Functioning of the judiciary	- Criminality, theft and lawlessness - Conflicts and social friction
Land	-Access to land	- Land-use regulations - Obtaining construction permits - Land-use certification
(Unfair) Competition	- Practices of competitors in the informal sector - Practices of competitors in the formal sector - Excessive flooding of illegally imported goods - Competition from imported goods or foreign companies	(Not available)

Major Constraint

The “major constraints” variables document whether a particular type of constraint is a major problem for the enterprise in question. If any constraint listed as a “constituent constraint” is considered a ‘major’ or ‘severe’ problem by the firm, then the dummy variable for that constraint category takes the value 1. If none of the constituent constraints in a particular category are considered problematic, then the dummy variable takes the value 0. Whenever information on one of the constituent constraints is missing, the constraint variable (a dummy variable) is recorded as missing. Notice that some constraints categories - notably, markets, competition and customs - do not overlap across datasets.

Table B.3: Construction of the "Major Constraints" Variables

	"Urban Constraints in this category"	**"Rural Constraint Category"**	**Rural Constraints in these categories:**
Utilities	Electricity Water	Electricity Water	-Electricity access -Electricity quality -Electricity cost -Water-access -Water-quality -Water-costs
Telecommunications	Telecommunications (NB information on this constraint is not available for informal firms)	Telecom	-Fixed phone line access (household phone) -Fixed phone line quality (household phone) -Fixed phone line cost (household phone) -Cellular access -Cellular quality
Transport	Transport	Transport	-Road access -Road quality -Road cost -Traffic -Facilities to transport goods
Credit	Credit-access Cost of finance	Credit	-Possibility of borrowing from family, friends or others -Possibility of borrowing from formal financial institutions -Interest rates -Complicated bank loan procedures (too many forms) -Fear of not being able to pay loan instalments
Registration	Licensing	Registration	-Government policy & regulations associated with enterprise registration - Government policy & regulations associated with enterprise operating permits
Taxation	Tax rates Tax administration	Taxation	-High taxes -Complicated procedures -Unofficial levies
Labour issues	Education of the workforce	Labour issues	- Lack of skilled labour - Difficulties in hiring labour from outside region
Land	Land	Land	-Land-construction permit -Land-certificate
Safety	Judiciary Crime	Safety	-Criminality, theft and lawlessness -Conflicts and social friction

Government	Corruption Macroeconomics Political instability	Government	-Corruption -Uncertain economic policy -Restrictive laws and regulations
"Additional/Non-overlapping categories"			
Competition	Competition from the informal sector	(Not available)	(Not available)
Customs	Customs	(Not available)	(Not available)
Markets	(Not available in any of the urban datasets)	Markets	- Access to inputs - Access to markets (distance and costs) - Difficult to obtain information on your product's market - Demand for goods and services produced
Technology	(Not available in any of the urban datasets)	Technology	-Lack of training -Research costs -Access to computer -Access to information and technology