Nonfarm Microenterprise Performance and the Investment Climate: Evidence from Rural Ethiopia*

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Abstract

We use uniquely matched household, enterprise and community survey data from four major regions in rural Ethiopia to characterize the performance, constraints and opportunities of nonfarm enterprises. The nonfarm enterprise sector is sizeable, particularly important for women, and plays and important role during the low season for agriculture, when alternative job opportunities are limited. Returns to nonfarm enterprise employment are low on average and especially so for female-headed enterprises. Women nevertheless have much higher participation rates than men, which attest to their marginalized position in the labor market. Most enterprises are very small and rely almost exclusively on household members to provide the required labor inputs. Few firms add to their capital stock or increase their labor inputs after startup. Local fluctuations in predicted crop performance affect the performance of nonfarm enterprises, because of the predominant role played by the agricultural sector. Enterprise performance is also affected by the localized nature of sales and limited market integration for nonfarm enterprises. The policy implications of these and other findings are discussed.

Keywords: Nonfarm Enterprise, Rural Investment Climate, Rural Labor Markets, Ethiopia.

JEL Classification: O13, O14, O18.

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1. Introduction

It is often argued that African economies need to become less dependent on agriculture in order for poverty to decrease. Small rural nonfarm enterprises may play an important role in the early stages of diversifying beyond agriculture. However, very little is known about the characteristics, constraints and opportunities of nonfarm enterprises (Lanjouw & Lanjouw, 2001), which makes it difficult to assess how this class of enterprises might contribute to poverty reduction. There is dispute in the literature regarding precisely this issue as evidence in the discussion from Barrett et al. (2001), Davis & Bezemer (2003) and Reardon et al. (2002). One view is that nonfarm activities provide a dynamic pathway out of poverty; a less optimistic view is that nonfarm enterprises are set up by households primarily as a survival strategy, perhaps as a substitute for agriculture for the landless.

Understanding better the opportunities and constraints in Ethiopia's rural nonfarm enterprise sector is the goal of this paper. In Ethiopia the topic is of crucial importance since the economy remains highly dependent (and vulnerable) on the performance of the agricultural sector, while ongoing population growth increases the need for income diversification strategies. Promotion of nonfarm enterprise activity is considered to be a promising catalyst for development by the Ethiopian government, as manifested in the Plan for Accelerated and Sustainable Development to end Poverty (PASDEP).

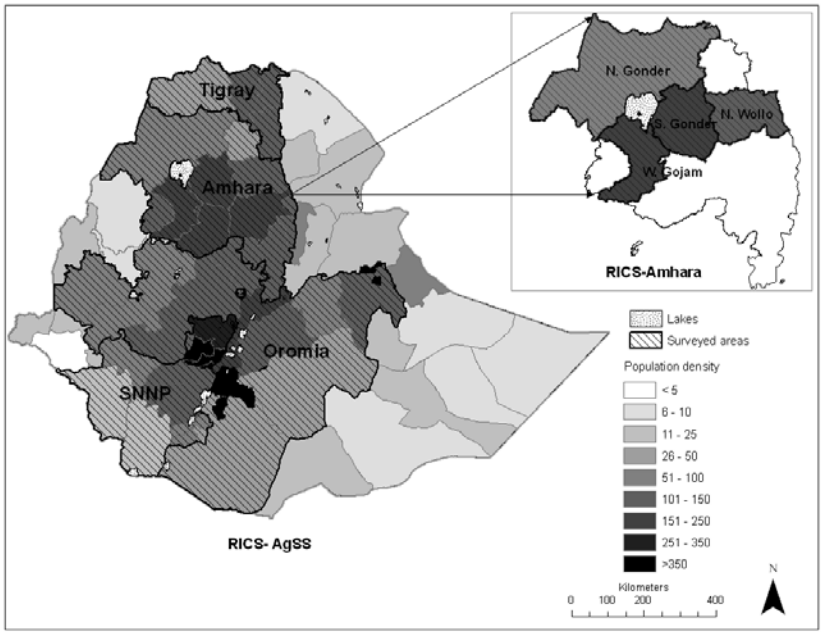
The empirical basis for this paper is the Rural Investment Climate Survey (RICS), fielded in Ethiopia in December 2006 and January 2007 in collaboration with Ethiopia's Central Statistical Agency (CSA). Two complementary surveys were carried out as part of RICS: the *RICS-Amhara* survey, based on which a very detailed dataset has been constructed, containing household, enterprise, and community level information on rural households in the Amhara region; and the *RICS-Annual Agricultural Sample Survey* (RICS-AgSS), which is less detailed than the RICS-Amhara data but, covering the four major regions of Ethiopia, i.e. Tigray, Oromia, Southern Nations, Nationalities, and Peoples (SNNP) and Amhara regions, it has a much broader geographical coverage than RICS-Amhara. The RICS-AgSS is representative of four major regions of the country which cover about 90 percent of Ethiopia's population. RICS-Amhara covers about one half of Amhara's population, both food secure and food insecure areas. Map 1 shows the geographical coverage of these surveys.

In this paper we draw on these two sources of data to produce a comprehensive analysis of the most salient characteristics of the nonfarm enterprise sector in major regions of Ethiopia, assessing the determinants of participation, productivity, growth, entry and exit. Thanks to the detailed nature of these data, we can make a number of contributions to the literature on the performance of nonfarm enterprises. Firstly, the matched data enable us to uniquely assess the effects of the *rural* investment climate and household characteristics on small enterprise performance. To our knowledge only Deininger et al. (2007) for Sri Lanka and World Bank (2007) for Tanzania – with a comparable rural survey – have studied in detail nonfarm enterprise performance and rural investment climate issues. Secondly, our data enable us to examine a wide range of aspects of performance – participation,

productivity and growth – and to assess their interlinkages. For example, the match between household and enterprise data enables us to understand entrepreneurs' characteristics and control for selection bias when estimating production functions. Thirdly, the data enable us to fill an important knowledge gap; as is clear from the survey by Guenther et al. (2007), the available empirical evidence on nonfarm enterprises in Ethiopia is fragmented and sparse. The knowledge of even the most basic quantities relating to the nonfarm enterprise sector is very limited.

The paper is organized as follows. Section 2 documents the size and characteristics of the nonfarm enterprise sector in SNNP, Oromia, Tigray and Amhara using information from the AgSS. Section 3 contains an in-depth study of the Amhara region, starting with an overview of the key characteristics of nonfarm enterprises and enterprise owning households in Amhara, and proceeding to analyze various aspects of firm performance, including investment, growth, productivity and firm dynamics. Section 4 concludes.

Map 1: Coverage of the Rural Investment Climate Surveys, 2006/2007



Source: CSA and World Bank (2008).

2. The Rural Nonfarm Sector in Ethiopia: Evidence from the RICS-AgSS

In this section we analyze the size and economic significance of the rural nonfarm sector in Ethiopia, using information from the Agricultural Sample Survey (RICS-AgSS), which is a survey of 14,646 households covering Ethiopia's four largest regions, Oromia, Tigray, SNNP and Amhara. We begin by documenting the most salient characteristics of the sector and the households linked to it. All summary statistics in this and the following sections are calculated using sampling weights.

2.1 Households and Nonfarm Enterprises

The empirical evidence on the size and economic significance of the Ethiopian nonfarm enterprise sector is very limited, and largely suggests there is little diversification beyond agriculture in rural areas. For a comprehensive overview the reader is referred to Guenther et al. (2007). Little is know about the size of the sector. However, based on a small number of case studies cited by Guenther et al., the current guess has been that some 10 to 35 percent of rural households in Ethiopia may be engaged in nonfarm enterprise activities. If a third or so of the rural households run enterprises, then it could be that the nonfarm sector is more important than traditionally thought. However Guenther et al. conclude that more analysis is required to establish the economic significance of the sector.

Our data reveal that in the regions covered by the RICS-AgSS, 25% of all households participate in the nonfarm enterprise sector (see Table 1). There are nontrivial, but not dramatic, differences in participation rates across regions: the proportion of households participating in the sector ranges from 0.19 in Amhara to 0.36 in the SNNP region. Table 1 further shows that nonfarm enterprise profits on average account for 21% of total income amongst households that participate in the sector. Moreover, less than 2% all households rely *exclusively* on income from the nonfarm enterprise. The majority of nonfarm enterprises are thus run part-time, either in parallel with agriculture or periodically as a substitute for agriculture. We have unusually rich data on the time spent running nonfarm enterprises, and the cyclicality of enterprise activities over the year. We return to these issues below.

Table 2 shows the sectoral composition of the nonfarm enterprise sector across the four regions covered by the survey. In all regions except Amhara, most enterprises are in the trade sector, followed by manufacturing and lastly services. In Amhara, most enterprises are in manufacturing, closely followed by trade.[1] Figure 1 shows that the enterprises in our sample tend to be located in, or close to, the community where the owner lives. It also shows that local consumers or passers-by are the most important customers for 44% of the firms. This confirms that the nonfarm economy is highly localized.

Summary statistics on household characteristics, distinguishing households with and without nonfarm enterprises, are shown in Table 3. Women play an important role in the nonfarm enterprise sector. Nearly half (47%) of all enterprises are owned by households headed by women, yet only about 25% of the households in the sample are headed by women. This implies that almost every second household headed by a woman operates a nonfarm enterprise, while only about 1 in 6 households headed by men would own a nonfarm enterprise. In addition, households which own a nonfarm enterprise tend to be headed by better educated and younger heads, and tend to live closer to markets and roads (of course the direction of causality is ambiguous here, as location decisions are likely to be endogenous to entrepreneurship).

[1] Furthermore, the manufacturing sector is especially sizeable in the zones in Amhara which were visited by the RICS.

We now turn to a more detailed analysis of the correlates of participation in the nonfarm enterprise sector. We use a probit to model the likelihood that a household has an enterprise, as a function of characteristics of the household head, distances from roads and markets, and self-reported constraints to operating an enterprise. We also include wereda dummies in these regressions.[2] Results are presented in Table 4. Owning a nonfarm enterprise is more likely if the household is relatively large, located close to an all weather road or the market, and if the household head is young and female. The latter result is consistent with the analysis by Bardasi and Getahun (2007). In addition, working in a nonfarm enterprise is much more likely to be a primary source of employment for women than for men, which may reflect cultural gender biases against women's engagement in certain activities.

Documenting the role of education for entrepreneurship in the nonfarm sector is of obvious policy interest. Recall from Table 3 that the average number of years of education is somewhat larger than 2, hence there is, of course, an enormous scope for expansion of education in rural Ethiopia. Can we say anything based on the data available regarding the likely effects of such an expansion on nonfarm entrepreneurship? We suspect the effects of education to be nonlinear, and so we include in the regressions education squared, in addition to the levels term. The results, shown in Table 4, suggest the effects are indeed nonlinear: increasing from 0 to about 5 years of education, then decreasing. The effects are highly statistically significant and not quantitatively negligible. For example, the results imply that an expansion in the average years of education from 2 to 5 would increase the proportion of households with a nonfarm enterprise from 0.28 to 0.32, which amounts to an increase in the number of enterprises in the economy by about 15%. The fact that the likelihood of running an enterprise starts to fall as schooling increases beyond 5 years is probably driven by better access to wage jobs, which tend to be better paid. In any case, very few individuals in the sample have more than 5 years of education.

A major objective of the fielded surveys is to document the nature and severity of various constraints associated with running an enterprise. The upper panel of Table 5 summarizes self-reported data on the most severe constraint to enterprise start-up, distinguishing between households with and without an enterprise. Credit, markets and transportation are the most commonly cited constraints for both groups. The lower panel of Table 5 shows a breakdown by region and location of constraints to running – as distinct from starting - an enterprise, as perceived by existing enterprises. The results are very similar to those for startup, with markets, finance and transport being the most frequently cited problems. In general, the use of formal credit is very limited among the enterprises surveyed. Figure 2 shows that income from agriculture constitutes the primary source of finance of enterprise startup, while credit from formal banks and cooperatives was the most important source of

[2] A wereda is an administrative unit comparable to a district. The enterprises in the RICS-AgSS dataset are from 264 different weredas, while the enterprises in the RICS-Amhara dataset are from 45 different weredas. See the appendix for further details.

finance for only 2% of all enterprises. The rankings of constraints do not differ very much across regions, more so across sectors. In particular, firms engaging in trade consider financial services and transportation disproportionately problematic, while they are less likely to consider demand (markets) a problem. As we shall see below, firms in the trading sector perform rather well compared non-traders.

2.2 Enterprise Characteristics and Performance

Size, age and growth

Table 6 shows basic summary statistics for the nonfarm enterprises in the RICS-AgSS sample. The key fact documented here is that most enterprises are young (six years on average) and very small. About 73% of all enterprises are one-person firms while another 26% employ only 2 or 3 workers. Only 1% of all enterprises employ more than 3 workers. In terms of employment within enterprises, there is very little growth: only 8% of firms have expanded their labor force since startup, while about 3% have shed workers. Few enterprises operate on a full-time basis. Furthermore, enterprise activity is highly seasonal and countercyclical with agriculture, as shown in Figure 3. Thus few households appear to specialize in nonfarm enterprise activities. Instead, nonfarm enterprises, it seems, are set up primarily as a complement to agriculture, providing an alternative source of income in periods when the level of activity in agriculture is low.

Profitability

How profitable are nonfarm enterprises? Table 6 shows that the average of the log of profits per day from operating a nonfarm enterprise is 1.72, which is equivalent to 5.6 Birr per day, or less than a dollar per day.[3] Profits are highest in Tigray, where the daily return to working in a nonfarm enterprise is 8.8 Birr, and lowest in Amhara, where the corresponding return is 5.1 Birr, even though the average reported contribution of nonfarm enterprise profits to household income does not vary markedly across these regions. The average log of profits per month is 4.00, which corresponds to 55 Birr, or approximately $6, in levels. Firms operate on average 14 days per active month, thus the monthly data confirm earnings are well below a dollar a day. The average log of profits per year, averaging across inactive and active periods, is 5.83, which corresponds to 340 Birr, or approximately $37, in levels. These numbers indicate that enterprises are dormant over very long periods. For example, comparing profits per day to profits per year suggests the average firm operates for about 60 days a year, on average.[4]

[3] The Birr to the US dollar interbank exchange rate is approximately 9.47 in February 2008.
[4] Exp(5.83-1.72).

We now model the returns to nonfarm enterprise employment, measured by the log of profits per day, as a function of the characteristics of the household head[5], distance from the nearest markets, seasonality, the base of the enterprise, and the age of the firm. We also include controls for type of activity (sub-sector) and wereda. The results, shown in Table 7, indicate that enterprises owned by female headed households are much less profitable than enterprises operated by male-headed enterprises. Recall that female headed households are much *more* likely to run a nonfarm enterprise than male headed ones. These findings thus strongly suggest that the outside option is much worse for female headed households than for male headed ones. Essentially, even though running a certain type of nonfarm enterprise results in very low profits, many women may have no other choice. The situation is different for men, who may have much better access to land, and who will opt for other occupations than running a nonfarm enterprise if the returns to the latter are low.

Table 7 further shows that the relationship between the age of the household head and profitability is inverse u-shaped: young entrepreneurs become more profitable over time, but eventually the age effect flattens out, and beyond 39 years of age profitability falls with age. Enterprise profits do not vary significantly with the education of the household head. The data also indicate that enterprises which are mobile or operate at the market are more profitable than other enterprises, while enterprises located in shops are less profitable than other enterprises.

Enterprise dynamics

The descriptive statistics presented in the previous section indicate that existing enterprises tend not to change their labor force. Yet it seems the nonfarm enterprise sector as a whole has been growing in recent years. Figure 4 shows the evolution of enterprise participation rates from 1998 onwards, using data from the Welfare Monitoring Surveys for the years 1998-2004, and the Rural Investment Climate survey 2006/7.[6] There are clear signs that participation rates have increased over the period from 1998 to 2005. Households mainly engaged in rural nonfarm activities rose from 4.5 percent in 1998 to 9 percent in 2005. Simple participation rates are more volatile, but also tend to show an increasing trend, rising from 23% in 1998 to 34% in 2006.

Table 8 shows gross entry and exit rates for the sample. In 2006 the gross entry rate, defined as the percentage of new firms in the population of firms, is 17%. This is high, indicating that every one in six firms in the sector has been operating for less than a year. Using recall data on entry, it

[5] The RICS-AgSS data do not contain information on the gender of the manager of the enterprise, but instead contain information on the gender of the household head. The RICS-Amhara data suggest that the head of the household is also typically the manager of the nonfarm enterprise.

[6] The rural nonfarm participation rate is defined as the proportion of households in which at least one household member participates in the rural nonfarm sector, therefore including secondary and often marginal activities. The participation rate for "main rural nonfarm activities only" is defined as the proportion of households for whom the main occupation of the household head is not farming *and* for whom the household head only participates in rural nonfarm activities. These definitions are chosen to assure comparability of the different surveys in the absence of reliable household income data. They can be interpreted as upper and lower bounds on overall participation.

appears the entry rate has been stable over the 2004-2006 period. The exit rate in 2006 is 8% while another 17% of enterprises close seasonally; the managers of such enterprises reported they would reopen the enterprise in the future. The total closure rate, defined as the sum of seasonal closure and permanent exit, is thus 25% for 2006, which is very high.[7] There is thus a lot of churning in the sector, which is consistent with the low average of firm age documented above. Unfortunately it is not straightforward to compute net entry rates from these data, due to the ambiguous status of those firms that temporarily suspend operations. Respondents in such enterprises are unlikely to consider re-started enterprises as new enterprises. The gross entry numbers are therefore likely to exclude firms that are re-entering the market, which means the entry rates may be too low.

While entry naturally is closely related to participation, the data generating processes for these two events are not necessarily the same. In particular, participation reflects all past entry and exit decisions. If the objective is to document what types of households and individuals start firms in the current economic environment, it may be better to analyze entry rather than participation. Table 9 shows the results from a probit regression where we model entry in the last three years. We use the same set of explanatory variables as when modeling participation, i.e. age, education, gender of the household head; household size; and various geographical variables. Most of the results for entry are similar to those for participation. The older the head, the less likely the household will start a nonfarm enterprise. Households whose head is better educated are more likely to start an enterprise, though the relationship between the schooling of the household head and entry is concave. Households living further away from markets and roads are less likely to start an enterprise, while households in rural towns are more likely to enter the nonfarm enterprise sector.

Table 10 presents the results from a model of the exit decision as a function of characteristics of the household and the household head, plus a range of enterprise characteristics measured prior to the year of exit. These enterprise variables include sector dummies, firm age, a measure of the economic importance of the enterprise to the household, its size, whether it operates seasonally and its location. There are several interesting results. First, it is clear that household characteristics do not have a significant effect on the likelihood of exiting from the market. A test of the hypothesis that the coefficients on household size, and the age (and its square), education (and its square), and gender of the household head are equal to zero indicates we should not reject the null (the p-value is 0.52). This suggests the exit decision is separable, in the sense that it is independent of household preferences. Enterprise characteristics, however, matter a lot. We allow for quite a flexible, non-linear, relationship between firm age and the likelihood of exit, and find that the propensity to exit increases quite rapidly with firm age, until about 5 years. Beyond 5 years of operation, the likelihood of exiting from the market falls quite rapidly. Unlike the standard results on firm dynamics, firm-size, measured as the number of employees, is not a good predictor of exit. The reason is probably that there is very little

[7] The quality of the recall data does not allow reporting exit rates prior to 2006.

variation in employment across the firms in the sample (recall that most firms are very small). The number of days the enterprise is operating during the year is strongly inversely related to the probability of enterprise exit. To the extent that large firms have more operative days per year than small firms, large enterprises may be less likely to exit than small ones. Enterprises located in rural towns are also significantly less likely to exit.

3. The Rural Nonfarm Enterprise Sector in Amhara: Evidence from RICS-Amhara

After having presented an overview of the nonfarm enterprise sector in Ethiopia's four major regions, we now turn to a more detailed investigation of the nonfarm enterprise sector in Amhara, a region for which we have very detailed information thanks to the extensive RICS-Amhara survey. In particular, these data will enable us to better understand the determinants of participation, and it will also be possible to analyze the determinants of investment, growth and productivity.

Recall from above that the rate of participation in the nonfarm enterprise sector is lower in Amhara than in the other regions, and particularly low in some of the zones of Amhara where the RICS was fielded. Table 11 shows that only 4% of the working population in Amhara is primarily engaged in nonfarm enterprise activities. In total, for about 277,000 individuals, or about 6.4% of the working population, the nonfarm enterprise sector is the primary or secondary occupation. Agriculture remains the primary occupation for 91% of the working population. These statistics clearly confirm the dominant role played by agriculture in rural Amhara and imply that the share of the rural population engaging in nonfarm employment, here defined as either wage employment or self-employment in nonfarm enterprises, in Amhara is somewhat lower than the African average of 10.9% reported in Haggblade et al. (2007). The share of the population employed in the nonfarm enterprise sector is also low compared to the statistics reported in Liedholm's survey of small firms in Africa and Latin America (2002, p.229). The numbers in the table furthermore confirm that nonfarm enterprise activity is often a part-time, secondary, activity.

Table 12 sheds some light on the profitability of nonfarm enterprises in Amhara. For reference, this table also shows daily wages for casual agricultural workers. It should be noted that the profit variable is very noisy and severely skewed. Consequently, the results presented here are best interpreted as being indicative. Rather than reporting the mean of profits, which will be heavily influenced by extreme outliers, we focus on the mean of log profits. For male headed enterprises, the mean of log profits per day is 1.77, which corresponds to 5.9 Birr in levels. For female headed enterprises, the mean of log profits per day is 0.78, which translates into 2.2 Birr per day, in levels. Average profits are lower than average wage rates in agriculture (9 Birr for men, 7.4 Birr for women).

3.1 Households and Nonfarm Enterprises

The RICS-Amhara dataset covers 2,909 households; of these 625 households have at least one nonfarm enterprise. Table 13 shows basic summary statistics of household characteristics,

distinguishing households that do, and don't, own a nonfarm enterprise.[8] Consistent with the results based on RICS-AgSS considered above, households with an enterprise tend to be somewhat smaller compared to households without an enterprise. Heads of households with an enterprise tend to be younger and better educated than heads in non-enterprise households. Note however, that the educational attainment of the enterprise owners is very low: 64% of them never attended school and none have attended college, and very few managers are able to perform basic arithmetic operations.

The proportion of female headed households who own an enterprise is high, consistent with earlier results. Furthermore, enterprise ownership differs depending on geographical characteristics. Households with an enterprise tend to be located in less remote locations, and closer to roads, markets and financial centers, than non-enterprise households. Finally, it is noteworthy that average log annual expenditure (on an adult equivalence scale) is very similar across households with and without enterprises.[9] The average of the log is about 7.3, which corresponds to about 1,500 Birr or about $160 per year. This is a stark reminder of how poor most of the households in the sample are. Figure 5 shows how the ratio of total enterprise profits to household expenditure varies with total household expenditure. For enterprise-households this ratio varies around 0.4, indicating that total profits are less than half of the value of household expenditure on average, consistent with the earlier finding that enterprise-households tend not to rely exclusively on enterprise activities as a source of income. The graph further shows that there is no systematic relationship between the relative importance of enterprise profits and total household expenditure.

Table 14 shows estimates from probit regressions in which we model the likelihood that a household has at least one nonfarm enterprise (columns 1, 2 and 3) and the likelihood that a household has *started* a nonfarm enterprise during the last three years (columns 3, 4 and 5). Columns (1) and (4) include in the set of repressors basic characteristics of the household and the household head, and an indicator of predicted crop performance based on the availability of water during the growing season, in 2006. We consider this variable, known as the Water Requirement Satisfaction Index (WRSI), a proxy for local demand, but are aware that this variable might also be capturing relative price effects or an increase in the availability of inputs.[10] Columns (2), and (5) add to the basic specification geographical variables, a measure of the opportunity cost of labor (proxied as the daily wage for casual agricultural workers in the community), various measures of the quality of the local investment climate, various shocks, and a proxy for the accessibility of credit in the community. As a robustness check, we add wereda dummies to this extended specification in columns (3) and (6). This enables us to investigate to what extent our results are driven by differences across communities and to what extent they are driven by within-community variation.

[8] See the appendix for definitions of variables.
[9] We focus on household expenditure rather than household income, as the latter variable is very difficult to measure in Ethiopia.
[10] We thank Måns Nerman for offering this suggestion.

First consider the results for the models in which participation (i.e. regardless of time of entry) is the dependent variable. The results in columns (1) confirm patterns that are familiar by now: the likelihood of enterprise ownership is relatively high if the household head is young, female and educated. A new result emerging here is that divorced or separated individuals are more likely to own an enterprise than other individuals and that the probability of owning an enterprise is positively related to the number of adult women in the household and negatively associated with the number of children under 5. Predicted crop performance in the community is not significantly associated with higher participation. Results for recent entry into the sector, shown in column (3) are similar, albeit typically a little weaker.

In columns (2) and (4) we add a range of explanatory variables to the baseline specification. Our rainfall indicator is now positive and statistically significant. Following the classification proposed by Andersson et al. (2007), we add dummy variables indicating the location of the household. The results indicate the likelihood of operating an enterprise differs across locations with different geographical characteristics. With semi-remote or semi-urban location as the reference point, the results indicate participation is some 32 percentage points more likely in rural towns, holding all other observed variables constant. When modeling entry, however, rural town location appears to matter much less. There is no strong evidence of additional independent effects of distances to roads, markets or financial institutions on participation or entry.[11]

We include in these regressions a measure of the daily wage for casual workers in agriculture. A priori, the coefficient on this variable is hard to sign, because there may be an income effect as well as a substitution effect. The income effect arises because a higher agricultural wage raises the income of potential customers (farm workers), which may lead to higher demand for nonfarm products or services. This ought to lead to higher returns in the nonfarm sector, and hence higher participation. The substitution effect, on the other hand, arises because the agricultural wage proxies for the opportunity cost of running an enterprise. If this cost is high, individuals that would otherwise run a nonfarm enterprise might choose to take up a wage job instead, leading to lower participation in the nonfarm enterprise sector. As can be seen in Table 14, the estimated coefficient on the agricultural wage is positive, and, in the regression modeling entry, significantly different from zero. This suggests the income effect dominates the substitution effect, perhaps because wage jobs are few and far between. This is wholly consistent with the notion that local demand is an important factor determining outcomes in the nonfarm sector.

Next we consider the effects of adding investment climate measures. In general, the rural investment climate in Ethiopia is not conducive to enterprise success on a broad scale. There is ample evidence in the data that markets for selling nonfarm enterprise outputs and purchasing nonfarm enterprise inputs are localized and often isolated. For example, 77% of firms sell their produce in one

[11] The results should probably not be given a causal interpretation: it may well be that individuals' location decision depends on their (unobserved) 'taste' for running an enterprise, in which case location is endogenous.

location only, which tends to be in the same district, and more than 90% of enterprise owners walk to the market, suggesting that transportation costs may prevent entrepreneurs from selling outside their own locality (see Loening, Rijkers and Söderbom, 2007, for details). This is consistent with lack of markets being the main perceived constraint for these firms. There is variation in the quality of the local investment climate, however, which may result in differences in enterprise performance across locations.

To obtain measures of the investment climate quality we use the data on perceived constraints to the productivity and sales growth by the existing enterprises. We construct dummy variables that are equal to one if a particular constraint (we consider electricity, water supply, technology, financial services, labor issues, telecommunications & postal services, and regulations & policies) is rated as a "a major problem", and zero otherwise. Similar in spirit to the suggestion by Escribano and Guasch (2005), we then compute averages of these variables across all firms in the community, thus generating variables indicating the proportions of firms that perceive a given constraint “a major problem” in the community. Consequently, our investment climate variables are constant across firms and households in each community, which ensures, for example, that two small garment enterprises located next to each other face the same investment climate. Also, as noted by Escribano and Guasch (2005), smoothing the data in this way should have the additional advantage of mitigating endogeneity bias.

As can be seen in Table 14, column (2), most of the coefficients on the investment climate variables are individually insignificant, and some have the ‘wrong’ sign. The only individually significant coefficient is the proportion of firms considering regulations and policies as a major problem, which is inversely related to the likelihood of having a nonfarm enterprise. However, looking across to column 4, where we model the likelihood of having started a firm at some point during the last three years, the results are weaker. On balance, it would seem clear that subjective investment constraints are not strongly correlated with participation or entry, conditional on the other explanatory variables.

Now consider the effects of shocks on participation. The survey contains information on whether the following events have occurred over the last four years: death of household member; illness of household member; loss of job of household member; food shortage; drought; flood; crop damage; and price shock. For each household, we construct shock variables by counting the number of years over the last four years in which each of these events has occurred. That is, each shock variable takes the value 0, 1, 2, 3 or 4. We want to investigate if households respond to shocks (at least in part) by participating, or not participating, in the nonfarm enterprise sector. A priori, this does not seem a far-fetched idea: entry and exit costs are low, and enterprise decisions could be closely linked to household events (see e.g. Mead & Liedholm, 1997). The results, shown in Table 14, however, are weak: the only coefficient on the shock variables that is significantly different from zero is that on price shocks. The sign of the marginal effect is positive, hence there is some evidence a

price shock increases the likelihood of running a firm, perhaps because this is a way of generating some extra cash. It should be noted, however, that we find no such effect when modeling entry (column 4), and so the safest conclusion to draw here is probably to say there is no strong evidence that shocks matter for enterprise participation.

Finally we consider the role played by credit constraints. One common argument in the microeconomic literature on poverty traps is that combinations of high entry costs and poor access to credit prevent people from starting firms that would be have been profitable. Almost a quarter of all firms in our sample attempted, and succeeded, to obtain credit. Micro-finance organizations and friends and relatives are the most important providers of credit. In contrast, the importance of banks is minimal.[12] Our first variables meant to proxy for the financial position of the household is a dummy for whether the household would be able to raise 100 Birr in one week for emergency needs. The idea is that households that are unable to do so would be hard pressed to pay various set-up costs, and so less likely to run an enterprise than households for whom liquidity is less of a problem. Again, however, the results are weak. The partial effect is positive on participation, but small and statistically insignificant. For entry, the estimated marginal effect is very close to zero. Based on this, we would tentatively conclude there is no evidence that the financial position of the household is a strong determinant of the likelihood of setting up a firm. The second variable related to liquidity and credit is a dummy variable for whether land can be used as collateral at the local financial institution.[13] The estimated partial effects are insignificant.

In columns (3) and (6) wereda dummies are included as a robustness check. Overall, the resulting parameter estimates are not affected much, with the notable exception of some of the investment climate variables and our rainfall indicator. Our main conclusion is that the results are not driven exclusively by differences across communities.

3.2 Enterprise Characteristics

Sector composition

Table 15 shows the sectoral composition of enterprises in the data. Most (58 percent) of the nonfarm enterprises in the surveyed regions of Amhara are in the manufacturing sector. Manufacturing of food and beverages is an important sub-sector within the class of manufacturing activities. Within this class, manufacturing of alcoholic beverages is a prominent activity, a common finding for African countries (see Haggblade et al. 2007). In addition, 29 percent of the nonfarm enterprises engage in trade and the remainder is in services, e.g. operating a hotel or restaurant. The composition of the

[12] See Loening, Rijkers and Söderbom (2007) for details.
[13] Collateral was required for about a third of all loans, though requirements vary across different types of lenders. Most credit serves an operational, not an investment, purpose. See Loening, Rijkers and Söderbom (2007) for details.

nonfarm enterprise sector in Amhara is slightly different from that of other regions, where trading activities, which tend to be more profitable, tend to dominate. Of course, the vast majority of firms are very informal. Only 6% of all firms are formally registered with a government office, and most enterprises that are not claim they are not required to be registered.

Enterprise size, capital stock and profits

Table 15 also shows summary statistics for number of workers, sales, value of the capital stock, cost of material inputs, and profits. The average number of workers is 1.6, and further probing of the data (not reported in the table) reveals that 76 percent of all firms are one-person enterprises and another 20 percent employ just two workers. Only 0.5% of all enterprises employ 5 employees or more. Seasonal and paid workers account for less than 3% of all labor, though seasonality is important, as we will discuss shortly. This implies that fluctuations in enterprise activity are largely driven by household labor allocation decisions.

The average log value of the capital stock is 5.23, which corresponds to about 187 Birr, or $20, in levels. Average log profits per year is 6.27, translating into about 530 Birr, or $60, in levels. The low profit numbers may suggest that operating a nonfarm enterprise may be unappealing, but one must bear in mind that the wages in rural Ethiopia are very low in general. For example, as discussed above, the average daily wage of casual workers varies between 7 and 10 Birr, depending on the activity and gender. Well-paid jobs are very scarce, especially outside the main agricultural season, making low-return nonfarm employment worthwhile. Most of the labor in nonfarm enterprises is supplied by household members and consequently unpaid.

In order to compare the returns of operating a nonfarm enterprise with wages in other occupations, we calculate profits per day worked and find them to be around 4 Birr. While these numbers are strikingly low, they are not implausible, certainly when one considers that enterprises might be operated on a part-time basis (i.e. employees do not spend their entire day working for the enterprise).[14] Moreover, the median daily wages of paid workers, varying between 4 and 8 Birr, are in line with profits and value added per day. Of course, there is a lot of heterogeneity across firms: some perform much better than the average, others much worse. Most firms in the sample are young, but some have been around for a long time. Average firm age is 8.7 years.

Similar to the other major regions in the country, nonfarm enterprise activity in Amhara is highly seasonal and countercyclical. This indicates that nonfarm enterprise employment is worthwhile when the opportunity cost of labor is low, i.e. in the agricultural low season. Recall that the fluctuation in enterprise activity reflects seasonal differences in the household allocation of labor supply. The overwhelming majority of firms does not operate year-round and experience high fluctuations in sales. Figure 6 displays how nonfarm enterprise activity, as measured by sales-

[14] We do not have data on hours worked by household members and employees.

intensity, varies across the year. Enterprise activity is clearly highest in the dry season, which runs from December to March, while it is lowest in the two harvest seasons, which run from July to August (the so-called *belg* season), and from October to December (the so-called *meher* and main harvest season).

Investment and labor growth

Very few firms in the sample invest in equipment or machinery. Table 15 shows that only 19% of all firms have made any investment since start-up. Moreover, the firms that do invest, typically invest only very small amounts. Only 14% of all firms that invest (less than 3% of all enterprises) have invested more than 100 Birr of capital in the last year, while 61.20% of all firms invested less than 100 Birr if they invested at all. The average of the log of investment for firms which invested is 4.73, corresponding to about 113 Birr. It is important to keep in mind, however, that the capital stocks of most enterprises are very low; the average of the log of the value of machinery and tools is 5.23, corresponding to 187 Birr. For firms which invested, the median ratio of investment to the total value of machinery and tools is 0.12, suggesting that investment may be small in absolute terms but not negligible in relative terms. For the overwhelming majority of enterprises, the most important source of investment finance are own non-agricultural sales, see Figure 7. Agricultural sales are also an important source of investment funding. Funds from financial institutions, however, are not.

Descriptive statistics on labor growth are presented in Table 15. These show that enterprises typically start very small. When they start, 84% employ one permanent worker only, and 99% employed 2 workers or less. None of the enterprises employed more than 4 permanent workers at start-up. Further, status quo is the norm: 90% of all enterprises have neither expanded nor contracted their workforce, measured as the total number of permanent and seasonal workers, since start-up; 2% have reduced their workforce; 7% increased their labor force with one worker and less than 1% of all firms increased the number of workers in the firm by two persons or more. Only 3 firms in our sample (0.14% of the firm population) grew out of the size class of micro-enterprises.[15]

The absence of variation in growth of the workforce suggests that it may be better to measure enterprise growth in terms of days worked by all individuals in the enterprise, rather than in terms of the total number of workers. The data on days worked confirm, however, that most firms do not grow and the ones which are growing do so at a slow rate. For 50% of all enterprises the number of labor days at the time of the survey was the same as at the time of start-up. Further, 27.5% use fewer days and 22.2% use more days of labor. The average annual change in the number of labor days is 7, and almost all of the expansion of labor usage is accounted for by unpaid household labor.

[15] Microenterprises are defined to be firms with fewer than 10 employees.

3.3 The Determinants of Firm Performance: Sales, Profits, Investment and Growth

In this section we report results from regressions in which we model various dimensions of firm performance. We begin by documenting the results for models of sales and profits, where factor inputs have been implicitly substituted for their determinants (proxies for demand and costs, for example). These are thus interpretable as reduced form regressions (of course it could be that some variables in these 'reduced form' regressions are in fact endogenous, but there is little we can do about this). We then consider regressions modeling investment and labor growth, and end by analyzing results from production functions.

Sales and profits

Table 16 shows regression results for log sales (columns 1, 2 and 3) and log profits (columns 4, 5 and 6). We consider a parsimonious specification (columns 1 and 4) and an extended one (columns 2, 3, 5 and 6). In the parsimonious specification the set of explanatory variables include household head characteristics, firm age, sector, and WRSI, the latter being our proxy for local demand. In the extended specifications we add to the set of explanatory variables measures of competition, the daily wage rate for casual agricultural workers, a variable measuring access to electricity, geographical variables, variables proxying for shocks, various investment climate variables, and a variable measuring the household ability to raise cash. As a robustness check, we estimate these specifications both without (columns 2 and 5) and with wereda-dummies (columns 4 and 6) which enable us to control for community-level differences. This enables us to judge to what extent our results are driven by differences across communities. While the additional explanatory power of such dummies is substantial, our results are generally robust to inclusion of such dummies.

The parsimonious specifications in columns (1) and (4) yield similar results for both sales and profits. Sales and profits are much higher in enterprises with a male manager than in firms headed by a female. Quantitatively, the effect is very large: sales are on average 123% higher in male-headed enterprises compared to female-headed ones, everything else held constant.[16] The corresponding gender gap for profits is about 100%.[17] This result squares with the findings obtained using the larger dataset, with wider geographical coverage (cf. Table 7). One interpretation of these results is that the outside option is much worse for female headed households than for male headed ones. Other characteristics of the household head appear not to matter, however. Firm age has a positive and statistically significant coefficient, indicating that profitability grows over time, perhaps because of learning or because of market selection. In addition, sales and profits vary across industries, with the returns to trading being the highest and the returns to manufacturing activities the lowest. Finally, the coefficient on our proxy for local demand, WRSI in 2006, is positive and significant. In other words, if the rainfall is such that a good crop is predicted in the agricultural sector, sales and profits in the

[16] Exp(0.8)-1=1.23.
[17] Exp(0.7)-1=1.01.

nonfarm enterprise sectors increase. Variations in demand would thus appear an important factor driving fluctuations in enterprise performance.

In the extended specifications, several new results emerge. Starting with the geographical variables, it is clear that profits and sales are significantly higher amongst enterprises located in rural towns, compared to firms in semi-remote and remote areas.

Turning to the investment climate variables, we obtain no strong results for the variables measuring the availability of electricity (see Section 3.1 for details on how this variable was constructed). We construct dummy variables proxying for the level of competition faced by each enterprise. Overall, only a third of firms in the sample report facing competition, entirely consistent with the localized nature of the nonfarm economy. We treat no competition as the baseline, and add dummies for whether the enterprise has 1-5 competitors; or more than 5 competitors. The coefficient on the 'more than 5 competitors' dummy is positive and significant at the 5% level or better, in both regressions. Thus competition appears positively correlated with both sales and profits. One possible reason is that large firms simply have more competitors for rather obvious reasons: they need to market their products more widely. Arguably, documenting the effect of competition on productivity is more interesting, and we return to this issue in Section 3.3.3.

Regarding the role of shocks, there is strong evidence that droughts reduce sales and profits in the nonfarm enterprise sector. In addition, households which experienced a death of a household member have significantly higher levels of sales, but not profits. Interestingly, no other shock variable has a significant coefficient in these regressions. The drought result is economically rather substantial, indicating that one additional drought-year reduces sales by about 24%, and profits by 30%. Taken together with the positive effect of rainfall alluded to above, this finding really reinforces the notion that the performance of the agricultural sector impacts strongly on the performance of the nonfarm enterprise sector.

Finally, we consider the variables meant to proxy for credit availability and the household's financial capacity to deal with shocks. Column 2 in Table 16 shows that the level of sales in enterprises linked to households that are able to raise 100 Birr in one week for emergency needs is about 30% higher than sales of other enterprises. The coefficient is significant at the 10% level, but not at the 5% level. This result could suggest enterprises linked to households in a relatively strong financial position have a lower cost of capital (i.e. less likely to be unable to finance investment), though it is also possible the result is driven by reverse causation (i.e. high sales strengthens the financial position). Indeed, the coefficient on the financial capacity dummy is totally insignificant in the profit regression, and so overall, at this point, its impact will have to be considered quite weak. As we shall see below, further probing of the effects of this variable in the context of modeling investment will prove quite informative. The variables proxying for the availability of credit are all insignificant, both individually and jointly, though most of them have the expected positive signs.

In columns 4 and 6 wereda-dummies are added to the specifications. Inclusion of such dummies increases the explanatory power of our models, but does not affect the qualitative pattern of results, with a few exceptions; the rainfall variable is no longer a strong predictor of sales and profits. In addition, the daily wage for casual workers in agriculture is no longer significant and its coefficient drops. The fact that these variables lose significance once wereda-dummies are controlled for is probably related to the fact that they are community-level variables. In contrast, the proportion of firms complaining about the lack of availability of electricity now has a significantly negative impact on profit, while the dummy for location in a rural town becomes much more positive after inclusion of wereda-dummies. Yet, the most striking finding is that the qualitative pattern of results is not affected by controlling for wereda-level variation in sales and profits, which suggest that the patterns we observe are not driven entirely by variation across communities.

Investment and labor growth

We now turn to investment and labor growth. Table 17 shows results from probit regressions modeling the likelihood of buying equipment (investment), and growth regressions where the dependent variable is the change in labor days worked per year since startup. As regards the model specifications, we adopt the same strategy as for sales and profits, i.e. we consider both a parsimonious and an extended specification. The explanatory variables are the same as before, except we have added controls for initial conditions with respect to capital and labor. Adding these latter variables is natural, given that we are now modeling aspects of firm growth.

The initial capital stock of the enterprise is strongly positively associated with the probability of investment, indicating that larger firms are more likely to invest. Similarly, the age of the firm is positively associated with the probability of investing (the effect is statistically significant from zero at the 5% level in the parsimonious specification and at the 10% level in the extended one). This could be because, as time goes, upgrading the capital stock becomes more important. Alternatively, it could be that young firms are faced with higher uncertainty regarding the prospects of the enterprise, which may lead to caution on in the investment side. Local demand, proxied by the WRSI variable, plays a role, though it appears the effect possibly operates with a one-year lag: good rainfall in 2005 is positively associated with investment in 2006. Further, there is strong evidence that enterprises linked to households that can raise 100 Birr in a week to deal with an emergency, invest more. Thus enterprises linked to poor households are not likely to invest. There is no evidence that investment behavior differs across managers with different characteristics, or across firms in different types of locations. There is also no evidence investment depends on the level of competition faced by the enterprise, or the measured quality of the local investment climate.

Of course, the investment climate variables are fairly crude measures of the true concept, and we would not argue that investment is unresponsive to the quality of the investment climate more generally. Household shocks are not generally associated with investment spending, though there is

weak evidence that households who experienced the death of a household member invest more, while those who experience a disease shock invest less. The coefficients on the credit variables are either insignificant or, in one case, significant with the 'wrong' sign. Inclusion of wereda dummies increases the importance of being able to raise 100 Birr a week as a repressor and the measure of access to electricity now becomes significantly negative. More surprising, perhaps, is the finding that inclusion of the wereda-dummies renders the indicator of current rainfall a positive predictor of investment. Last year's rainfall is still positively related to investment, but no longer statistically significant.[18]

Now consider the regressions modeling the growth of the labor force and labor demand. The data at our disposal are of course cross-sectional, but as noted above contain some recall questions on the size of the enterprise at start-up, measured in terms of usage of labor, thus enabling us to construct growth rates. Of course, recall data have their problems and the results presented below should therefore be interpreted with caution. OLS results are shown in columns (4), (5) and (6) of Table 17. For reasons already discussed, we consider labor days used, rather than number of workers, as our measure of labor input. The explanatory variables are the same as in the investment regressions.

The first finding here is that average annual growth of labor is negatively related to labor usage at start-up, hence initially small firms tend to record higher subsequent growth rates than initially large ones. This coefficient on initial log labor days is -0.28 in the parsimonious specification (and only marginally different in the extended one), which translates into an AR(1) coefficient equal to 0.72 for log labor, thus indicating moderate but not substantial persistence in the variable. Of course, measurement errors in the labor variable would yield spurious reversion towards the mean, and so the true degree of persistence is probably a bit higher (in other words, the difference in growth rates between small and large enterprises is probably exaggerated). Moreover, firms that start with a lot of capital tend to grow faster than firms that do not. There is weak evidence that crop shocks and the death of a household member have an adverse impact on firm growth. Interestingly, nearly all other variables included in these regressions appear irrelevant for labor growth. That is, there is no strong evidence that labor growth varies with firm age, local demand, geography, investment climate, competition, or credit. Perhaps this is not a big surprise, given the non-dynamic nature of these enterprises, with regards to their use of labor. That is, the main result emerging from our analysis of firm growth is that there is very little of it, hence there is very little variation in the data to explain. This may be an important reason as to why most coefficients in the labor growth regressions are insignificant.

Productivity

We have already reported basic summary statistics on value-added productivity, and concluded that this is low. In order to describe and explain productivity differentials across different types of

[18] These effects are not driven by multicollinearity.

enterprises and localities, we now report results from simple Cobb-Douglas production functions estimated by means of OLS. A common argument in the literature is that if you estimate production functions by OLS, the resulting parameter estimates will be biased since the residual will be correlated with inputs. In principle, one might be able to solve this problem using instrumental variables, provided good instruments are available. Unfortunately, in our dataset good instruments are not available. However, a large set of control variables may go a long way towards controlling for unobserved productivity. Furthermore, in the rural context where there is limited economic integration, it would seem plausible to assume that factor prices vary quite a lot across villages, which would generate exogenous variation in the factor inputs. For these reasons, OLS estimates may not be all that bad. Indeed, including a measure of local rainfall to serve as a proxy for local demand does not affect the estimated parameter estimates on inputs, which suggest that the impact of endogeneity of inputs is likely to be quite limited.

Another endogeneity problem with OLS production functions that has received less attention in the literature is that they may be affected by selection bias (see e.g. Ackerberg et al., forthcoming). In this context, we have to be on guard for the possibility that those running a nonfarm enterprise are those who are best at it, causing our estimates of the production function to be biased. To mitigate this selection problem, we use the Heckman method to correct for selectivity bias.

Results from the production function regressions are shown in Table 18. Column 1 presents our baseline specification, using factors of production, firm age, characteristics of the manager, local demand, and sub-sector dummies, as explanatory variables, while in columns 2 more explanatory variables similar to the procedure adopted above. In column 3 we add wereda-dummies, while columns 4, 5 and 6 include a Heckman selection term based on the model presented in column 1 of table 14. First of all, we note that the models shown in Table 18 explain a substantial part of the variation in sales, as judged by R2s exceeding 0.4. All factors of production – labor days, capital and materials - are significant, and constant returns to scale cannot be rejected. The estimated coefficient on labor is equal to 0.55, which is in line with the literature on microenterprises (see e.g. World Bank 2007 for comparable estimates for Tanzanian microenterprises). The coefficients on capital and inputs are rather modest. Turning to characteristics of the manager, male operated enterprises are much more productive than enterprises managed by females. In addition, there seems to be a convex relationship between enterprise profitability and the education of the manager. The positive and significant coefficient on WRSI implies that prospect of a good crop raises productivity amongst nonfarm enterprises, probably because of higher local demand. The coefficients on the industry dummies suggest that manufacturing activities are amongst the least productive activities while trading activities, such as wholesale and retail, are very productive. The high “productivity” of trading activities could reflect arbitrage opportunities due to limited economic integration. Once we condition on wereda dummies, traders are no longer the most productive sector.

Adding explanatory variables to the parsimonious specification has quite small effects on the results already established. There is evidence here that enterprises in rural towns are more productive than enterprises elsewhere. Surprisingly, however, we also find weak evidence that enterprises located further away from all weather roads are more productive. None of the other additional explanatory variables have statistically significant effects on productivity, which is rather striking. Moreover, once we include wereda dummies, these coefficients become insignificant.

Finally, sample selection bias does not appear to be a serious problem. While the Inverse Mills Ratios are significant in each specification, the magnitude of the bias seems modest; individual coefficient estimates seem rather robust and the coefficient on the inverse Mills ratio is small.

4. Conclusions

This paper uses matched household, enterprise and community data from rural Ethiopia to analyze the performance and constraints of nonfarm enterprises in the country. Ethiopia is an interesting case study for several reasons. The agricultural sector is very large and has performed poorly over a long period, and far-reaching income diversification is often referred to as a promising way of reducing poverty in the country. Indeed, private initiatives and income diversification among rural households are acknowledged by the Ethiopian government as central mechanisms for alleviating poverty, as evidenced by the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP). Yet very little is known about the basic characteristics, the constraints and the performance of the rural nonfarm enterprise sector in Ethiopia. One important contribution of this paper is to fill this information gap.

While the rural economy remains dominated by agriculture, the nonfarm enterprise sector in Ethiopia is economically important, particularly for women and especially in the low season for agriculture. Returns to nonfarm employment are typically very low, however, significantly less than a dollar a day. In fact, profits per day are lower, on average, than the daily wage rate for casual agricultural workers. Yet participation in the sector is quite high, at least during the agricultural low season, because other job opportunities are very limited. Profits per day tend to be much lower in enterprises headed by women, yet women have much higher participation rates than men. The reason appears to be that women have much less favorable occupation options than men. The nonfarm enterprises in our samples are small, and rely on household members providing labor input. In most cases, operating a nonfarm activity is a part-time job. Our data indicate that few enterprises add to their capital stock after startup, and very few increase their labor input. Nevertheless, there is some evidence the sector has grown over the last decade, due to net entry into the sector. The most successful enterprises tend to be in the trading sector, which may be because the rural economy remains fragmented, so that traders can relatively easily find arbitrage opportunities.

Documenting the role of the investment climate is central to our research. It is often argued that Africa's poor investment climate implies high costs for certain services important to private

entrepreneurs, e.g. transport, telecom, water, electricity, land and buildings, marketing, accounting, security, bribes, etc. In the empirical analysis we find some evidence that such problems hamper enterprise performance, however the results are not very strong. In contrast, we find rather strong evidence that local demand is a major factor affecting the performance of nonfarm enterprises. Investment climate constraints operate primarily on the supply-side, and it is possible supply-side constraints do not "bite" - in the sense that removing the constraints would improve performance - if demand is low.

For the foreseeable future, agriculture will remain the dominant sector in rural Ethiopia. Our research indicates the performance of the nonfarm enterprise sector depends crucially on the performance of the agricultural sector, because of the local demand effects. Policy options should be worked out accordingly. Attempting to target the nonfarm enterprise sector may not have significant effects on performance in the sector if the agricultural sector remains underdeveloped and static. For example, in terms of poverty reduction, the payoff to devoting substantial resources to relaxing investment climate constraints that at the moment do not appear to bite (e.g. credit constraints, power provision, telephone provision, etc.) may be rather limited. Instead, it may be that policy reforms across the board, benefiting the agricultural sector as well as other sectors in the rural economy, will be more effective.

Of course, this argument is really only one side of the coin, as we know little about the costs of implementing the various policy reforms. It will obviously be the case that if investment climate constraints can be relaxed at relatively low cost, while strengthening the agricultural sector is very costly, then a basic cost-benefit analysis might dictate policies should aim at removing supply side constraints. Policy makers adopting such strategy should be aware, however, the effects on the performance of the nonfarm sector are likely to be very limited if agriculture is left behind. The fact that markets are localized is important in this context. Localized markets imply that local shocks to agricultural outcomes will affect the performance of nonfarm enterprises. Policies facilitating the integration of markets would make nonfarm enterprises less dependent on the local rural economy, which may help these enterprises develop beyond supplying a small and volatile local market with low value-added products.

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TABLES BASED ON THE RICS-AgSS DATA

Table 1: Participation Rates & Contributions to Household Income, by Region

	Tigray	Amhara	Oromia	SNNP	Total
% of households owning a nonfarm enterprise	22%	20%	23%	37%	25%
Average ratio of enterprise profits to household income	0.26	0.24	0.23	0.15	0.20
% of households relying exclusively on the non farm enterprise	1.0%	1.5%	2.2%	1.3%	1.7%
% of male headed households owning a nonfarm enterprise	18%	12%	13%	25%	15%
% of female headed households owning a nonfarm enterprise	29%	35%	42%	52%	41%

Table 2: Sector Composition of the Nonfarm Enterprise Sector

	Tigray	Amhara	Oromia	SNNP	Total
Manufacturing	***30%***	***43%***	***35%***	***32%***	***36%***
Manufacturing (excl: grain milling, food and beverages, distilling, wearing apparel)	13%	22%	12%	14%	15%
Food and beverages, brewing/distilling	13%	20%	23%	17%	19%
Grain milling	3%	1%	1%	1%	1%
Trade	***56%***	***41%***	***52%***	***58%***	***51%***
Whole sale trade	10%	4%	4%	8%	6%
Retail trade via stalls and markets	19%	22%	25%	31%	26%
Retail (not stalls/mkts)	28%	15%	23%	19%	20%
Services	14%	16%	13%	11%	13%
Services (services, m	7%	9%	8%	4%	7%
Transport services	0%	1%	1%	0%	1%
Hotels and restaurants	7%	6%	5%	6%	6%
Others (specialized services)	0%	0%	0%	0%	0%

Note: The table shows percentages of enterprises belonging to each sector.

Table 3: Household Characteristics by Enterprise Ownership

	Enterprise Owners		Non-Enterprise Owners	
	Mean	**Sd**	**Mean**	**SD**
Household Size	4.97	2.26	4.94	2.27
Characteristics of the Household Head				
Age of the Head	35.76	12.73	43.80	16.30
Male	0.53	0.49	0.80	0.38
Years of schooling	2.69	2.81	2.11	2.42
Distances (log kilometers)				
- to all weather road	1.65	1.16	1.96	1.06
- to the market	1.70	0.81	1.99	0.69

Table 4: Participation in the Nonfarm Enterprise Sector: Probit Results

	Marginal effects (standard error)
Household size	0.012***
	(0.002)
Household head	
Age	0.000
	(0.001)
Age2	-0.048***
	(0.015)
Female	0.209***
	(0.009)
Years of schooling	0.053***
	(0.005)
Years of schooling squared	-4.718***
	(0.476)
Rural Town	
Rural town	0.275***
	(0.036)
Distances	
Distance to all weather road	-0.009
	(0.005)
Distance to the market (road)	-0.041***
	(0.007)
Number of observations	11,873
Pseudo R2	0.226

Source: Authors' calculations based on RICS-AgSS.
Note: An intercept is included in the regression. Wereda dummies are included but coefficient estimates are not presented. Standard errors are clustered by enumeration area. Significance at the 10%, 5%, and 1% level is indicated by *, ** and ***, respectively.

Table 5: Perceived Main Constraints

	Markets	Finance	Infrastructure & Transport[1]	Technology	Government	Labor
Perceived main constraints to running an enterprise across regions and sectors						
All	39%	38%	16%	2%	4%	2%
Sector						
manufacturing	47%	30%	15%	4%	2%	3%
trade	31%	45%	16%	1%	5%	1%
services	39%	38%	16%	2%	4%	2%
Region						
Tigray	42%	29%	21%	3%	6%	1%
Amhara	44%	28%	17%	3%	6%	2%
Oromia	41%	36%	16%	3%	3%	2%
SNNP	33%	49%	13%	0%	2%	2%
Perceived main constraints to enterprise startup across regions						
All	29%	49%	11%	4%	3%	5%
Enterprise Owners	23%	47%	10%	8%	2%	11%
Non-Enterprise Owners	24%	47%	10%	7%	2%	10%

[1] Including electricity, phones, water, postal services.

Table 6: Key Enterprise Characteristics by RegionRICS-AgSS

	All		Tigray		Amhara		Oromia		SNNP	
	Mean	**Sd**	**Mean**	**Sd**	**Mean**	**Sd**	**Mean**	**Sd**	**Mean**	**Sd**
Firm age	6.12	7.35	6.29	8.22	7.35	8.30	5.76	6.95	5.57	6.74
Workers	1.40	1.31	1.67	3.31	1.33	1.49	1.36	0.73	1.46	0.92
1 employee	0.73	0.45	0.71	0.45	0.77	0.42	0.73	0.45	0.69	0.46
2 or 3 employees	0.26	0.44	0.26	0.44	0.22	0.42	0.26	0.44	0.29	0.45
4-9 employees	0.01	0.11	0.03	0.16	0.00	0.05	0.01	0.09	0.02	0.14
10+ employees	0.00	0.03	0.00	0.06	0.00	0.04	0.00	0.03	0.00	0.00
Growth										
Expanded workforce since startup?	0.08	0.27	0.09	0.28	0.07	0.25	0.07	0.27	0.08	0.27
Decreased workforce since startup?	0.03	0.16	0.03	0.17	0.02	0.14	0.02	0.19	0.03	0.15
Growth of workforce since startup	0.08	1.00	0.17	1.03	0.06	1.70	0.09	0.54	0.07	0.56
Seasonality										
months	7.82	3.70	8.02	3.57	8.16	3.72	7.96	3.57	7.38	3.80
days	14.42	8.09	12.62	8.66	14.75	7.88	13.11	7.97	15.94	7.98
seasonality	0.44	0.50	0.39	0.49	0.41	0.49	0.49	0.50	0.42	0.49
Sales & Profits[(1)]										
Profits per day (log)	1.72	1.11	2.17	1.19	1.62	1.08	1.80	1.18	1.62	0.99
Monthly Sales (log)	5.01	1.39	5.10	1.45	4.76	1.33	4.99	1.38	5.20	1.39
Monthly Profits (log)	4.00	1.45	4.48	1.37	3.87	1.44	3.96	1.59	4.04	1.27
Annual Profits (log)	5.83	1.71	6.36	1.54	5.73	1.78	5.81	1.84	5.83	1.51
Cost share	51.53	29.29	37.29	29.00	47.12	29.03	49.03	30.57	60.06	25.68
Geography										
Distance to all weather road (log)	1.64	1.15	1.60	1.28	1.89	1.18	1.48	1.12	1.64	1.11
Distance to nearest market (log)	1.70	0.81	1.70	0.95	1.62	0.95	1.92	0.66	1.51	0.75

[(1)] The cost share is the share of operating costs as a percentage of total sales. It is the answer to the question "During the most recent year, what percent of total monthly sales were total monthly operating costs?" Profits are computed as sales*(1-share of operating cost as a percentage of total sales)

Table 7: Modeling Profits in the Nonfarm Enterprise Sector

	coef	sd
Household size	-0.001	0.009
Age of household head	0.021***	0.007
Age of household head^2 /1000	-0.266***	0.078
Household head is a male	0.502***	0.051
Schooling of household head	0.038	0.027
Schooling of household head^2 /1000	-3.311	2.602
Location		
Rural town	-0.155	0.114
Distances		
Distance to all weather road	0.070**	0.032
Distance to the food market	-0.062	0.038
Seasonality		
Activities seasonal?	-0.048	0.044
Activities		
-Hotels and restaurants	0.103	0.095
-Retail trade via stalls and markets	0.064	0.090
-Services (services, manufac. apparel/tailoring, rental, rec)	-0.308***	0.086
-Whole sale trade	0.518***	0.129
-Transport services	0.066	0.204
-Manufacturing (excl: grain milling, food and beverages, distilling,	-0.238***	0.060
-Grain milling	-0.055	0.220
-Others (specialized services)	-0.095	0.928
-Retail (not stalls/mkts)	0.133	0.084
Base of operation		
-home	-0.134	0.145
-market	0.360**	0.149
-shop	-0.383*	0.211
-road	-0.108	0.181
-mobile	0.384**	0.155
Constant	2.531***	0.350
Wereda Dummies	Yes	
R2	0.445	
Adjusted R2	0.385	
Number of observations	2,715	

Note: Standard errors are clustered by enumeration area. Significance at the 10%, 5%, and 1% level is indicated by *, ** and ***, respectively. The omitted reference category for base of operation is ‘other’.

Table 8: Entry and Exit Rates

	Entry 2005	Entry 2004	Entry 2006	Total Closure (Permanent Exit & Seasonal Closure) 2006	Permanent Exit 2006	Seasonal Closure 2006
All	15%	13%	17%	25%	8%	17%
Sector						
Manufacturing	12%	14%	16%	20%	7%	13%
Trade	19%	15%	20%	30%	9%	21%
Services	19%	12%	23%	17%	8%	9%
Region						
Tigray	14%	15%	15%	31%	15%	16%
Amhara	14%	11%	16%	22%	9%	13%
Oromia	19%	13%	21%	27%	8%	18%
SNNP	15%	16%	17%	23%	6%	17%

Source: Authors' calculations based on RICS-AgSS.

Table 9: Determinants of Entry into the Nonfarm Enterprise Sector

	Marginal effects (standard error)
Household size	0.004***
	(0.001)
Household head	
Age	-0.004***
	(0.001)
Age squared	0.012
	(0.010)
Female	0.088***
	(0.006)
Years of schooling	0.026***
	(0.003)
Years of schooling squared	-2.231***
	(0.283)
Rural Town	
Rural town	0.060***
	(0.023)
Distances	
Distance to all weather road	-0.004
	(0.004)
Distance to the market (road)	-0.018***
	(0.005)
Wereda-dummies	Yes
Number of observations	11,673
Pseudo R2	0.196

Source: Authors' calculations based on RICS-AgSS.
Note: An intercept is included in the regression. Standard errors are clustered by enumeration area. Significance at the 10%, 5% and 1% level is indicated by *, ** and ***, respectively.

Table 10. Determinants of Exit from the Nonfarm Enterprise Sector: Probit Results

	Marginal effect	Standard error
Household Size		
Household size	-0.005	0.005
Characteristics of the Manager		
Managers' age	0.005	0.004
Managers' age Squared/1000	-0.048	0.047
Manager's Gender	0.025	0.026
Managers' Schooling	-0.014	0.014
Managers' Schooling Squared/1000	1.071	1.329
Location		
Rural town	-0.180***	0.027
Distances		
Distance to all weather road	-0.015	0.014
Distance to the food market	0.062***	0.018
Firm Size		
Workers(log)	0.001	0.040
Days per year (log)	-0.085***	0.011
Activity		
-Hotels and restaurants	-0.072*	0.042
-Retail trade via stalls and markets	-0.049	0.039
-Services (services, manufac. apparel/tailoring, rental, rec)	-0.121***	0.029
-Whole sale trade	-0.093**	0.039
-Transport services	-0.206***	0.011
-Manufacturing (excl: grain milling, food and beverages, distilling,	-0.118***	0.027
-Grain milling	-0.111*	0.062
-Retail (not stalls/mkts)	-0.077**	0.033
Firm age		
Firm age (log)	0.156***	0.046
Firm age Squared	-0.049***	0.013
Contribution to hh income		
% enterprise sales of total household income	-0.001**	0.000
Region		
Tigray	-0.007	0.257
Amhara	-0.106	0.290
SNNP	-0.039	0.293
Location		
- in this community	-0.019	0.030

(continues)

Base		
-home, inside residence	0.075*	0.045
-traditional market	0.085	0.055
-mobile	0.163**	0.068
-roadside	-0.064	0.066
-shop in commercial area	0.016	0.089
-others	0.213**	0.097
Wereda dummies	Yes	
Number of observations	2,280	
Pseudo R2	0.205	

Note: Standard errors are clustered by enumeration area. Significance at the 10%, 5%, and 1% level is indicated by *,** and ***, respectively.

TABLES BASED ON THE RICS-AMHARA DATA

Table 11: Share of the Population in Different Occupations in Amhara

	Self employed, agriculture	Self employed, nonfarm enterprise	Wage employed	Other (public works and casual labor)	Total
Primary Employment					
Proportion of working population	0.91	0.04	0.04	0.01	1.00
Head count	3,913,554	165,108	164,452	54,149	4,297,262
Secondary Employment					
Proportion of all secondary employment	0.15	0.30	0.04	0.50	1.00
Head count	55,992	112,053	15,605	18,4635	368,286

Note: The proportions in these tables are calculated from the information on primary and secondary occupation in the household questionnaire, using household weights to account for differential probabilities of being included in the sample. The head count numbers are derived from the estimated proportions combined with population data.

Table 12: Profits in Nonfarm Enterprises and Wage Rates in Agriculture

	Mean	Sd	Median	N
Log of Profit per day in NFE, male headed	1.77	2.05	1.56	315
Log of Profit per day in NFE, female headed	0.78	1.95	0.86	282
Casual male agricultural worker:				
- Daily wage	9.00	4.11	8	175
- Percentage increase in wage 2003-06	75.5%	72.0%	60%	175
Casual female agricultural worker:				
- Daily wage	7.35	3.46	7	160
- Percentage increase in wage 2003-06	68.0%	67.2%	60%	158
Observations				

Note: Means and standard deviation are calculated using sampling weights, medians are not. About 17% of the observations on profits in are negative, and are not used in the computations above. The information on the daily wage of casual laborers in agriculture was taken from the community questionnaire.

Table 13: Household Characteristics by Enterprise Ownership

	Household owning enterprise		Households without enterprise	
	Mean	**SD**	**Mean**	**Sd**
Characteristics of the household head				
Age of the Head	42.41	13.32	44.07	16.02
Gender (1=male)	0.59		0.80	
Years of schooling	1.56	2.64	1.28	2.78
Married	0.77		0.59	
Divorced or separated	0.07		0.25	
Widowed	0.12		0.13	
Household Composition				
Household size	4.28	2.24	4.58	2.11
Adult men	1.20	1.03	1.42	1.04
Adult women	1.50	0.86	1.40	0.82
Children (<5 years)	0.56	0.71	0.71	0.76
Elderly (>65 years)	0.11	0.33	0.15	0.38
Distances				
Distance to all weather road	2.09	1.27	2.417	1.09
Distance to nearest market	1.52	0.98	2.12	0.74
Distance to nearest financial centre	2.57	1.30	2.82	0.89
Access to Credit				
Financial centre in the village	0.09		0.13	
Collateral not required	0.34		0.31	
Land can be used as collateral	0.13		0.13	
Co-signer not required	0.19		0.20	
Urbanity				
Remote location?	0.45		0.75	
Semi-remote location?	0.24		0.11	
Semi-urban location?	0.09		0.10	
Location in rural town?	0.22		0.04	
Plough Ownership				
Owns plow	.41	.49	.78	.41
Expenditure				
Log annual expenditure per adult	7.31	0.59	7.28	0.59
Observations	625		2,284	

Table 14: Participation in the Nonfarm Enterprise Sector: Probit Results (marginal effects)

	Participation			Entry		
	(1)	(2)	(3)	(4)	(5)	(6)
Characteristics of the Household Head						
Age	-0.003**	-0.001	-0.001	-0.001**	-0.001**	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Years of schooling	0.007**	-0.009**	-0.008*	0.004*	0.001	-0.000
	(0.004)	(0.004)	(0.005)	(0.002)	(0.001)	(0.001)
Male	-0.213***	-0.114**	-0.115**	-0.024	0.000	0.000
	(0.052)	(0.051)	(0.051)	(0.030)	(0.019)	(0.015)
Married	0.216***	0.208***	0.203***	0.043	0.031	0.023
	(0.068)	(0.065)	(0.065)	(0.032)	(0.024)	(0.020)
Divorced or separated	0.380***	0.422***	0.407***	0.089	0.068	0.046
	(0.098)	(0.099)	(0.100)	(0.080)	(0.065)	(0.048)
Widowed	0.148	0.168	0.152	0.061	0.042	0.018
	(0.111)	(0.115)	(0.112)	(0.073)	(0.056)	(0.040)
Household demographics						
Number of adult men	-0.002	-0.010	-0.012	-0.006	-0.007	-0.006
	(0.012)	(0.012)	(0.013)	(0.007)	(0.006)	(0.005)
Number of adult women	0.069***	0.068***	0.072***	0.012*	0.011*	0.010**
	(0.016)	(0.016)	(0.016)	(0.007)	(0.006)	(0.005)
Number of children aged 5 or less	-0.038**	-0.014	-0.016	0.004	0.005	0.004
	(0.018)	(0.018)	(0.018)	(0.012)	(0.009)	(0.007)
Number of elderly	0.035	-0.004	0.013	0.030	0.022	0.022
	(0.048)	(0.047)	(0.049)	(0.025)	(0.018)	(0.016)
Local demand						
meanwrsi2006	0.006	0.011**	-0.001	0.003	0.006***	0.023*
	(0.007)	(0.006)	(0.027)	(0.002)	(0.002)	(0.012)
Geography						
Remote location		-0.058	-0.051		-0.015	-0.008
		(0.044)	(0.042)		(0.020)	(0.019)
Location in rural town		0.332***	0.315***		0.052	0.032
		(0.066)	(0.061)		(0.038)	(0.028)
Distance to nearest financial institution		-0.003	-0.010		0.016	0.016*
		(0.022)	(0.022)		(0.010)	(0.009)
Distance to nearest all weather road		0.014	0.003		-0.015*	-0.013
		(0.016)	(0.017)		(0.007)	(0.008)
Distance to nearest market		-0.033	-0.024		-0.001	-0.007
		(0.035)	(0.029)		(0.014)	(0.012)
Opportunity Cost of Labor						
Daily Wage casual worker in agriculture (log)		0.026	0.021		0.033*	0.051***
		(0.045)	(0.040)		(0.019)	(0.018)
Investment climate services						
Proportion of firms in community saying		-0.019	0.057		-0.056	0.028
electricity is a major problem		(0.083)	(0.525)		(0.039)	(0.189)

Proportion of firms in community saying *water supply* is a major problem		-0.020	-0.109		-0.024	0.207
		(0.088)	(0.459)		(0.036)	(0.242)
Proportion of firms in community saying *technology* is a major problem		-0.086	-0.100		-0.016	-0.180
		(0.078)	(0.419)		(0.025)	(0.174)
Proportion of firms in community saying *financial services* is a major problem		0.077	-0.683**		-0.004	-0.385**
		(0.072)	(0.334)		(0.028)	(0.160)
Proportion of firms in community saying *labor Issues* are a major problem		-0.339	0.015		0.079	-0.415
		(0.219)	(0.689)		(0.085)	(0.489)
Proportion of firms in community saying *telecom & postal services* is a major problem		0.222	1.251		-0.108	-0.348
		(0.177)	(0.817)		(0.074)	(0.284)
Proportion of firms saying *regulations & policies* are a major problem		-0.113*	0.273		0.021	1.014***
		(0.065)	(0.218)		(0.045)	(0.370)
Shocks & Coping Mechanisms						
Illness of household member		0.014	0.007		-0.005	-0.005
		(0.012)	(0.012)		(0.005)	(0.004)
Loss of job of household member		0.016	0.008		0.013	0.011
		(0.029)	(0.031)		(0.010)	(0.008)
Price shock		0.057**	0.054**		-0.008	-0.006
		(0.025)	(0.025)		(0.010)	(0.008)
Drought		-0.013	-0.013		-0.004	-0.003
		(0.014)	(0.014)		(0.007)	(0.005)
Flood		-0.019	-0.018		0.011	0.014
		(0.026)	(0.026)		(0.011)	(0.008)
Food shortage		0.018	0.019		0.005	0.008
		(0.024)	(0.025)		(0.011)	(0.008)
Crop damage		-0.022	-0.016		-0.015*	-0.016**
		(0.016)	(0.017)		(0.008)	(0.006)
Death of household member		0.002	0.007		0.011	0.010
		(0.031)	(0.031)		(0.009)	(0.007)
Household able to raise 100 birr in one week for emergency needs?		0.030	0.019		-0.008	-0.006
		(0.027)	(0.027)		(0.011)	(0.010)
Access to Credit						
Financial Institution		0.052	0.042		0.013	0.010
		(0.039)	(0.042)		(0.016)	(0.015)
Land can be used as collateral		0.002	0.030		-0.013	-0.022**
		(0.044)	(0.054)		(0.014)	(0.011)
Wereda-Dummies	No	No	Yes	No	No	Yes
Number of observations	2,082	2,082	2,082	1,741	1,741	1,741
Pseudo R2	0.074	0.188	0.223	0.040	0.134	0.192

Note: Marginal effects and clustered standard errors (in parentheses) shown in the table. Standard errors are clustered by enumeration area. Significance at the 1%, 5%, 10% level is indicated by ***, **, *, respectively.

Table 15: Enterprise Characteristics

	Mean	Sd
Firm age	8.72	9.28
Sales & Profits		
Annual sales (log)	7.25	1.93
Annual profits (log)	6.27	2.29
Factors of production		
Annual value of material inputs (log)	5.56	2.88
Capital (log)	5.23	2.38
Labor days per year	250.57	365.95
Workers	1.63	5.04
Share of hh members	0.97	0.17
Share of paid workers	0.02	0.14
Labor costs (logs)	0.39	1.51
Investment		
Any investment	19%	
Investment>100 Birr (% of investing firms)	45%	
log investment (if invested)	4.76	1.76
Seasonality		
Seasonality	0.44	0.24
Proportion of firms operating year-round	0.39	0.49
- No sales (months)	2.74	3.10
- Low sales (months)	3.10	2.43
- Average sales (months)	3.11	2.30
- High sales (months)	3.05	2.11
Growth		
Days: Average growth per year	6.7	
Average change in number of workers	0.29	
Growth since start-up: number of workers		
Proportion: Decline	2%	
Proportion: No change	90%	
Proportion: Plus 1	6%	
Proportion: Plus 2 or more	1%	
Growth since start-up: number of labor days		
Proportion: Decline	28%	
Proportion: No change	50%	
Proportion: Increase	22%	
Sectoral Composition		
Manufacturing	58%	
Manufacturing (excl: grain milling, food and beverages, distilling, wearing apparel)	33%	
Food and beverages, brewing/distilling	23%	
Grain milling	2%	
Trade	29%	
Whole sale trade	7%	
Retail trade via stalls and markets	4%	
Retail (not stalls/mkts)	19%	
Services	14%	
Services	6%	
Transport services	2%	
Hotels and restaurants	6%	
Others (specialized services)	0%	

Table 16. Sales and Profits: Reduced Form Regressions

	Sales			Profits		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Activity & Age						
Firm age (years)	0.024***	0.022***	0.018**	0.020**	0.018**	0.015
	(0.008)	(0.007)	(0.007)	(0.008)	(0.008)	(0.009)
-Food and beverages, brewing/distilling	-0.671***	-0.777***	-0.820***	0.376	0.165	-0.165
	(0.247)	(0.245)	(0.243)	(0.463)	(0.407)	(0.394)
-Grain milling	-0.831	-0.694	-0.829	1.766**	1.932**	1.063
	(0.735)	(0.784)	(0.668)	(0.820)	(0.953)	(0.775)
-Hotels and restaurants	-0.459	-0.617**	-0.541	0.642	0.411	0.370
	(0.335)	(0.294)	(0.373)	(0.468)	(0.388)	(0.460)
-Retail trade via stalls and markets	-0.418	-0.524*	-0.748**	0.214	-0.146	-0.634
	(0.322)	(0.306)	(0.349)	(0.442)	(0.420)	(0.387)
-Services	-2.124***	-2.013***	-2.060***	-0.614	-0.764	-0.905
	(0.434)	(0.389)	(0.401)	(0.631)	(0.584)	(0.596)
-Whole sale trade	0.967*	1.046**	1.168***	0.581	0.641	0.662
	(0.519)	(0.409)	(0.382)	(1.000)	(0.906)	(0.818)
-Transport services	-1.443***	-1.528***	-1.665***	-0.064	-0.237	-0.531
	(0.448)	(0.539)	(0.506)	(0.609)	(0.714)	(0.771)
-Manufacturing (excl: grain milling, food and	-1.921***	-1.608***	-1.606***	-0.665	-0.447	-0.655*
beverages, distilling)	(0.250)	(0.233)	(0.233)	(0.406)	(0.320)	(0.342)
Characteristics of household head						
Manager's Age	-0.045*	-0.031	-0.024	-0.037	-0.002	-0.009
	(0.023)	(0.024)	(0.024)	(0.041)	(0.037)	(0.038)
Manager's Age Squared/1000	0.361	0.228	0.184	0.206	-0.128	-0.020
	(0.222)	(0.225)	(0.227)	(0.419)	(0.370)	(0.373)
Manager is a male	0.803***	0.748***	0.785***	0.687***	0.814***	0.770***
	(0.184)	(0.161)	(0.165)	(0.242)	(0.231)	(0.235)
Years of schooling	-0.067	-0.107	-0.122	0.066	0.069	0.065
	(0.109)	(0.105)	(0.109)	(0.125)	(0.121)	(0.114)
Years of schooling squared / 1000	10.671	12.051	14.741	-6.287	-10.778	-7.595
	(13.467)	(13.510)	(13.537)	(15.526)	(16.335)	(14.328)
Local Demand						
WRSI- 2006	0.077**	0.080***	0.050	0.073*	0.096***	-0.000
	(0.031)	(0.026)	(0.097)	(0.042)	(0.036)	(0.139)
Geography						
Remote location		0.105	0.060		0.567	0.640
		(0.364)	(0.371)		(0.447)	(0.425)
Location in rural town		0.673**	0.669**		1.463***	1.271***
		(0.325)	(0.329)		(0.482)	(0.485)
Distance to nearest financial institution		-0.127	-0.181		0.073	-0.014
		(0.145)	(0.130)		(0.172)	(0.162)
Distance to nearest all weather road		0.096	0.133		0.087	0.113
		(0.125)	(0.110)		(0.161)	(0.147)
Distance to nearest market		-0.159	-0.060		-0.223	-0.172

		(0.207)	(0.219)		(0.252)	(0.267)
Financial institution		-0.144	-0.195		-0.482	-0.393
		(0.286)	(0.367)		(0.401)	(0.452)
Availability of Electricity						
proportion of firms excl firm i who do not use electricity because it is unavailable		-0.210	-0.878		-0.665	-1.781*
		(0.352)	(0.602)		(0.546)	(0.913)
Opportunity Cost of Labor						
Daily Wage casual worker in agriculture (log)		0.454*	0.221		0.846**	0.390
		(0.246)	(0.318)		(0.338)	(0.398)
Competition						
Between 1 and 5 competitors (dummy)		0.081	0.094		0.048	0.088
		(0.256)	(0.307)		(0.372)	(0.419)
More than 5 competitors (dummy)		0.423**	0.449*		0.578*	0.673*
		(0.196)	(0.229)		(0.306)	(0.350)
Shocks						
illness		0.013	-0.016		0.118	0.065
		(0.092)	(0.083)		(0.121)	(0.096)
-job loss		0.212	0.231		-0.168	-0.243
		(0.223)	(0.219)		(0.416)	(0.357)
-price		-0.061	-0.123		0.085	0.085
		(0.111)	(0.108)		(0.151)	(0.144)
-drought		-0.251**	-0.293**		-0.328**	-0.381**
		(0.111)	(0.123)		(0.162)	(0.183)
-flood		-0.207	-0.141		-0.265	-0.177
		(0.166)	(0.183)		(0.215)	(0.234)
-food		0.063	0.050		0.055	0.060
		(0.145)	(0.174)		(0.187)	(0.226)
-crop		0.093	0.071		-0.034	-0.096
		(0.112)	(0.121)		(0.146)	(0.155)
-death		0.309*	0.334**		0.207	0.293
		(0.178)	(0.166)		(0.203)	(0.188)
Household able to raise 100 birr in one week for		0.350**	0.297*		0.072	-0.030
emergency needs?		(0.152)	(0.152)		(0.241)	(0.242)
Access to Credit						
Collateral not required		-0.020	-0.165		0.456	0.175
		(0.193)	(0.262)		(0.287)	(0.354)
Co-signer not required		0.351	0.562		0.100	0.299
		(0.279)	(0.365)		(0.429)	(0.500)
Land can be used as collateral		0.320	0.366		0.494	0.453
		(0.318)	(0.336)		(0.481)	(0.496)
Wereda-Dummies	No	No	Yes	No	No	Yes
Constant	1.239	-0.692	2.896	-0.098	-5.764	5.475
	(3.036)	(2.799)	(9.732)	(4.154)	(4.054)	(14.148)
R2	0.263	0.373	0.420	0.093	0.231	0.316
Adjusted R2	0.244	0.331	0.350	0.065	0.169	0.214
Observations	593	593	593	496	496	496

Note: Standard errors (in parentheses) are clustered by enumeration area. Significance at the 1%, 5%, 10% level is indicated by ***, **, *, respectively.

Table 17: Investment and Labor Growth

	Investment			Labor Growth		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Initial conditions						
log initial capital	0.210**	0.209***	0.230***	0.042**	0.037*	0.039**
	(0.050)	(0.052)	(0.061)	(0.018)	(0.019)	(0.018)
log labor days at startup	0.083	0.038	0.040	-	-	-
	(0.069)	(0.065)	(0.077)	(0.064)	(0.067)	(0.072)
Age of the firm in years	0.021**	0.019**	0.013	-0.000	0.000	0.001
	(0.009)	(0.008)	(0.009)	(0.003)	(0.003)	(0.003)
-Food and beverages,	0.150	0.261	0.151	0.161*	0.136	0.166
	(0.279)	(0.236)	(0.251)	(0.093)	(0.103)	(0.105)
-Grain milling	0.458	0.503	1.083	0.037	0.068	0.080
	(0.676)	(0.677)	(0.673)	(0.141)	(0.147)	(0.171)
-Hotels and restaurants	0.693**	0.738**	0.852**	0.231	0.210	0.251*
	(0.343)	(0.309)	(0.340)	(0.140)	(0.148)	(0.135)
-Retail trade via stalls and	0.470	0.559	0.821*	0.028	-0.010	0.032
	(0.411)	(0.458)	(0.489)	(0.111)	(0.114)	(0.136)
-Services	0.247	0.384	0.424	0.014	0.009	0.031
	(0.394)	(0.405)	(0.466)	(0.079)	(0.088)	(0.082)
-Whole sale trade	-0.440	-0.593	-0.495	-0.042	-0.035	-0.039
	(0.383)	(0.373)	(0.378)	(0.097)	(0.102)	(0.121)
-Transport services	0.054	-0.107	-0.202	-0.244**	-0.202*	-0.143
	(0.528)	(0.612)	(0.532)	(0.121)	(0.122)	(0.133)
-Manufacturing (excl: grain	0.243	0.552*	0.539*	0.186	0.192	0.230*
	(0.305)	(0.303)	(0.327)	(0.115)	(0.123)	(0.119)
Characteristics of household						
Manager's Age	0.028	0.028	0.031	0.008	0.012	0.011
	(0.027)	(0.030)	(0.034)	(0.007)	(0.007)	(0.008)
Manager's Age Squared/1000	-0.306	-0.304	-0.326	-0.078	-0.120	-0.112
	(0.288)	(0.316)	(0.349)	(0.072)	(0.077)	(0.085)
Manager is a male	0.123	0.039	-0.013	-0.080	-0.074	-0.077
	(0.200)	(0.212)	(0.229)	(0.058)	(0.065)	(0.057)
Years of schooling	0.019	-0.063	-0.033	0.031	0.029	0.025
	(0.082)	(0.083)	(0.109)	(0.031)	(0.030)	(0.028)
Years of schooling squared /	3.434	12.506	8.289	-0.784	-1.171	-0.776
	(10.495)	(10.671)	(14.308)	(3.387)	(3.396)	(3.306)
Local Demand						
WRSI- 2006	-0.027	-0.043	1.515***	0.008	0.009	0.025
	(0.037)	(0.035)	(0.359)	(0.008)	(0.008)	(0.027)
WRSI- 2005	0.085**	0.111***	0.257	-0.001	-0.001	0.004
	(0.023)	(0.026)	(0.372)	(0.003)	(0.003)	(0.004)
Geography						
Remote location		-0.047	-0.159		0.050	0.022
		(0.344)	(0.442)		(0.083)	(0.089)
Location in rural town		-0.012	0.050		0.108	0.087
		(0.361)	(0.439)		(0.082)	(0.091)
Distance to nearest financial		-0.107	-0.173		0.018	0.038
		(0.124)	(0.148)		(0.036)	(0.045)
Distance to nearest all weather		-0.089	0.008		-0.021	-0.046
		(0.111)	(0.110)		(0.031)	(0.039)

Distance to nearest market		0.126	0.167		-0.025	-0.003
		(0.197)	(0.258)		(0.043)	(0.051)
Financial institution		-0.218	-0.589		0.055	0.072
		(0.299)	(0.400)		(0.077)	(0.093)
Availability of power and						
Proportion of firms in		-0.412	-3.619***		0.026	-0.154
electricity because it is		(0.385)	(1.055)		(0.093)	(0.163)
Opportunity Cost of Labor						
Daily Wage casual worker in		-0.138	-0.130		0.002	0.078
		(0.276)	(0.332)		(0.067)	(0.066)
Competition						
Between 1 and 5 competitors		-0.052	0.288		-0.036	-0.047
		(0.244)	(0.322)		(0.073)	(0.080)
More than 5 competitors		0.236*	0.279		-0.027	-0.023
		(0.143)	(0.225)		(0.060)	(0.065)
Shocks						
illness		0.033	-0.141*		0.017	0.023
		(0.072)	(0.078)		(0.027)	(0.030)
-job loss		0.080	0.106		0.008	0.010
		(0.216)	(0.228)		(0.054)	(0.060)
-price		0.046	-0.048		0.013	0.029
		(0.099)	(0.125)		(0.025)	(0.027)
-drought		-0.128	-0.160		0.001	-0.005
		(0.149)	(0.151)		(0.028)	(0.031)
-flood		0.045	-0.161		0.052	0.087
		(0.215)	(0.260)		(0.047)	(0.057)
-food		-0.172	-0.071		-0.028	-0.028
		(0.253)	(0.254)		(0.043)	(0.044)
-crop		-0.167	-0.235		-0.032	-0.057**
		(0.165)	(0.202)		(0.020)	(0.025)
-death		0.275*	0.307*		-0.049	-0.079*
		(0.151)	(0.172)		(0.041)	(0.043)
Household able to raise 100 birr		0.515***	0.819***		0.013	0.030
emergency needs?		(0.171)	(0.225)		(0.041)	(0.048)
Access to Credit						
Collateral not required		-0.276	-0.190		-0.006	-0.049
		(0.295)	(0.335)		(0.064)	(0.076)
Co-signer not required		-0.776**	0.391		0.033	0.052
		(0.385)	(0.400)		(0.081)	(0.086)
Land can be used as collateral		-0.197	0.275		-0.027	-0.067
		(0.416)	(0.456)		(0.070)	(0.114)
Constant				0.265	-0.034	-2.044
				(0.816)	(0.846)	(2.541)
R2				0.238	0.255	0.287
Adjusted R2				0.214	0.201	0.195
Pseudo R2	0.156	0.232	0.341			
N	570	570	570	591	591	591

Note: Standard errors are robust and clustered by enumeration area. Significance at the 1%, 5%, 10% level is indicated by ***, **,*, respectively.

(1) The omitted category for the activity dummy is a catchall category "other".

(2) Excludes grain milling, food and beverages, and distilling.

Table 18. Cobb-Douglas Production Functions

	(1)	(2)	(3)	(4)	(5)	(6)
Factors						
Labor (log of days worked)	0.557***	0.529***	0.529***	0.577***	0.547***	0.557***
	(0.120)	(0.120)	(0.146)	(0.115)	(0.115)	(0.141)
Capital (log)	0.110**	0.106**	0.082	0.104*	0.103**	0.084
	(0.052)	(0.052)	(0.051)	(0.052)	(0.052)	(0.052)
Material Inputs (log)	0.280***	0.280***	0.318***	0.278***	0.279***	0.312***
	(0.059)	(0.055)	(0.072)	(0.060)	(0.056)	(0.073)
Share of Paid Labor	-0.112	-0.159	-0.106	-0.090	-0.146	-0.115
	(0.262)	(0.264)	(0.228)	(0.257)	(0.259)	(0.233)
Share of female-labor	-0.551**	-0.623***	-0.479*	-0.550**	-0.619***	-0.487*
	(0.243)	(0.231)	(0.263)	(0.246)	(0.233)	(0.262)
Activity[(1)]						
-Manufacturing[(2)]	-0.741**	-0.692**	-0.684**	-0.798***	-0.751**	-0.742**
	(0.296)	(0.288)	(0.307)	(0.298)	(0.289)	(0.308)
-Food and beverages, brewing/distilling	-0.277	-0.309	-0.200	-0.328	-0.357	-0.259
	(0.286)	(0.291)	(0.301)	(0.292)	(0.293)	(0.303)
-Grain milling	-1.126	-0.974	-0.776	-1.183	-1.053	-0.913
	(1.118)	(1.153)	(1.465)	(1.099)	(1.133)	(1.439)
-Hotels and restaurants	-0.036	-0.132	-0.061	-0.116	-0.214	-0.140
	(0.368)	(0.356)	(0.369)	(0.369)	(0.362)	(0.380)
-Retail trade via stalls and markets	0.608*	0.450	0.007	0.557	0.423	-0.014
	(0.344)	(0.361)	(0.404)	(0.348)	(0.367)	(0.414)
-Services	-0.435	-0.449	-0.113	-0.479	-0.488	-0.170
	(0.436)	(0.449)	(0.525)	(0.439)	(0.450)	(0.525)
-Whole sale trade	0.418	0.438	0.672**	0.396	0.422	0.613*
	(0.353)	(0.342)	(0.306)	(0.350)	(0.340)	(0.312)
-Transport services	0.012	0.160	0.423	0.017	0.145	0.382
	(0.647)	(0.826)	(1.134)	(0.654)	(0.837)	(1.137)
Characteristics of the manager						
Manager's age	-0.020	-0.017	-0.018	-0.021	-0.018	-0.020
	(0.025)	(0.024)	(0.025)	(0.025)	(0.023)	(0.025)
Manager's age squared/1000	0.124	0.087	0.076	0.135	0.089	0.085
	(0.242)	(0.225)	(0.239)	(0.236)	(0.224)	(0.238)
Manager's sex (1=male)	0.365*	0.363*	0.419**	0.382*	0.380*	0.421**
	(0.208)	(0.214)	(0.197)	(0.207)	(0.214)	(0.194)
Manager's schooling	-0.187*	-0.173*	-0.143	-0.200**	-0.186**	-0.157*
	(0.095)	(0.094)	(0.092)	(0.093)	(0.091)	(0.090)
Manager's schooling squared/1000	23.248*	18.614	14.208	24.490*	19.948	15.345
	(12.652)	(12.466)	(11.664)	(12.624)	(12.377)	(11.800)
Local Demand						
Mean WRSI 2006	0.099***	0.098***	0.163***	0.097***	0.097***	0.160***
	(0.031)	(0.032)	(0.051)	(0.030)	(0.032)	(0.050)
Geography						
Remote		-0.063	0.146		-0.054	0.163
		(0.363)	(0.467)		(0.364)	(0.466)

Location in rural town		0.638**	0.303		0.614**	0.290
		(0.277)	(0.335)		(0.273)	(0.332)
Distance to financial institution (log)		-0.097	-0.189		-0.108	-0.194
		(0.120)	(0.125)		(0.120)	(0.123)
Distance to all weather road log)		0.186*	0.144		0.192*	0.164
		(0.102)	(0.120)		(0.103)	(0.119)
Distance to market (log)		0.071	-0.089		0.068	-0.116
		(0.196)	(0.230)		(0.197)	(0.229)
Financial institution in the community		0.150	0.142		0.176	0.180
		(0.217)	(0.318)		(0.216)	(0.317)
Investment Climate Constraints						
Proportion of firms in community who do not use electricity because it is unavailable		-0.347	0.975		-0.347	1.049*
		(0.294)	(0.632)		(0.295)	(0.621)
Opportunity cost of labor						
Daily wage male casual worker in agriculture (log)		0.210	0.042		0.225	0.081
		(0.229)	(0.359)		(0.232)	(0.360)
Competition						
Between 1 and 5 competitors		-0.290	-0.035		-0.248	-0.003
		(0.266)	(0.303)		(0.271)	(0.313)
More than 5 competitors		0.122	0.306		0.089	0.308
		(0.181)	(0.242)		(0.182)	(0.242)
Selection Correction						
Inverse Mills Ratio				0.022**	0.020**	0.019*
				(0.010)	(0.009)	(0.010)
Wereda-Dummies	No	No	Yes	No	No	Yes
Constant	-6.319*	-6.902*	-13.155**	-6.141*	-6.824*	-13.044**
	(3.441)	(3.838)	(5.318)	(3.393)	(3.812)	(5.217)
R2	0.444	0.480	0.550	0.449	0.484	0.553
Adjusted R2	0.415	0.437	0.459	0.419	0.440	0.462
Observations	382	382	382	382	382	382

Note: Standard errors are robust and clustered by enumeration area. Significance at the 1%, 5%, 10% level is indicated by ***, **,*, respectively.

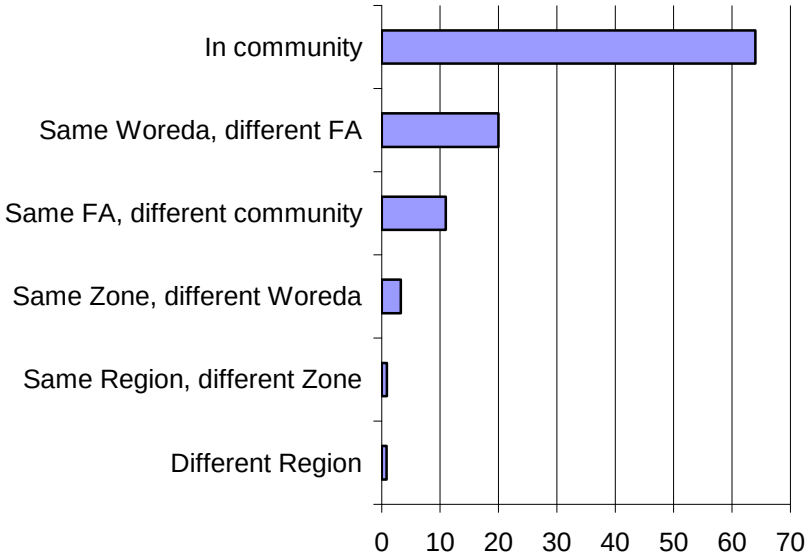
(1) The omitted category for the activity dummy is a catchall category "other".

(2) Excludes grain milling, food and beverages, and distilling.

GRAPHS & FIGURES BASED ON THE RICS-AGSS DATA

Figure 1: Localized Activities

a) Where is your enterprise located?



b) Who are your most important customers?

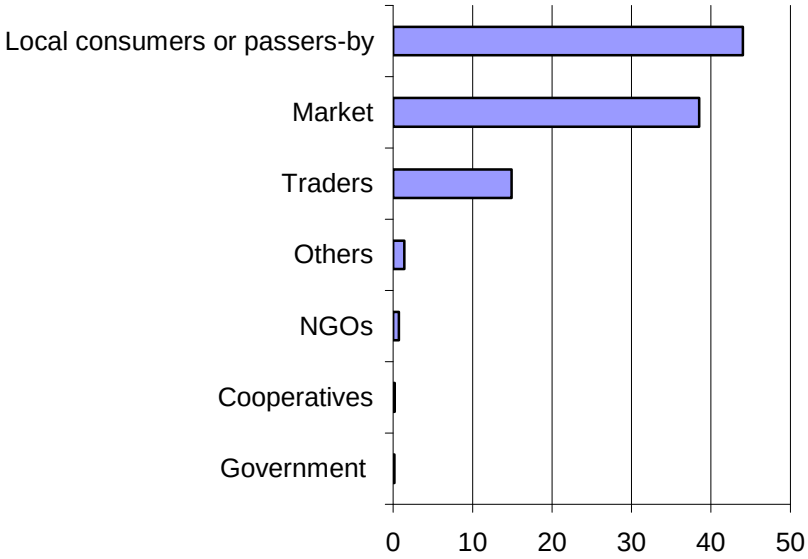
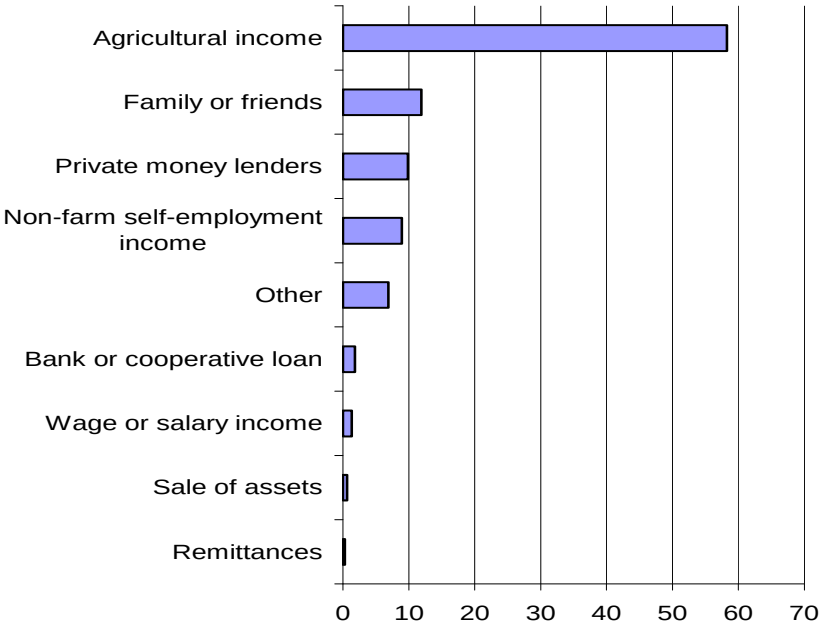


Figure 2: The primary source of startup capital (percentages)



Note: The figure shows percentages of households for whom the stated source of startup capital is the main one.

Figure 3: Seasonality in Sales

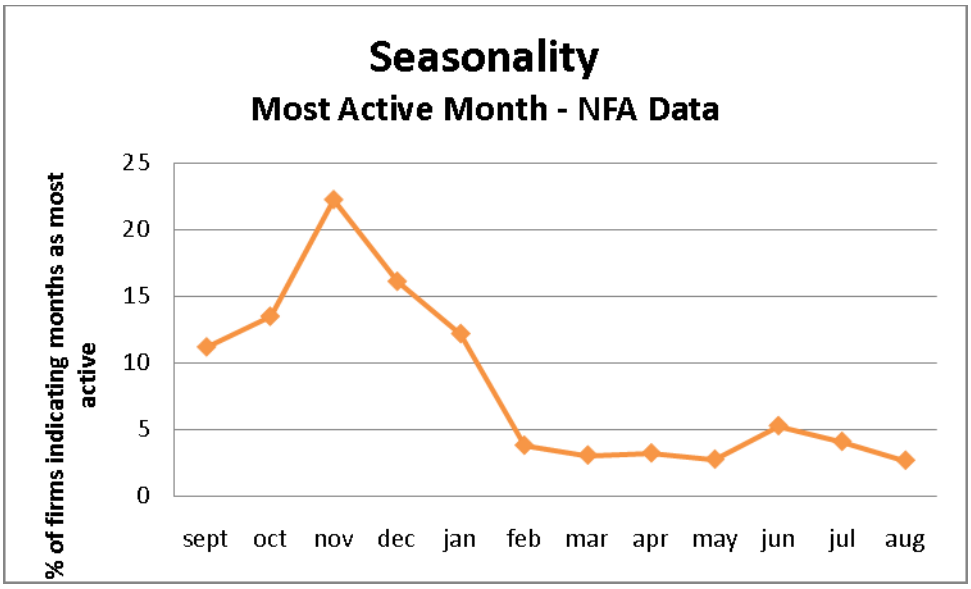
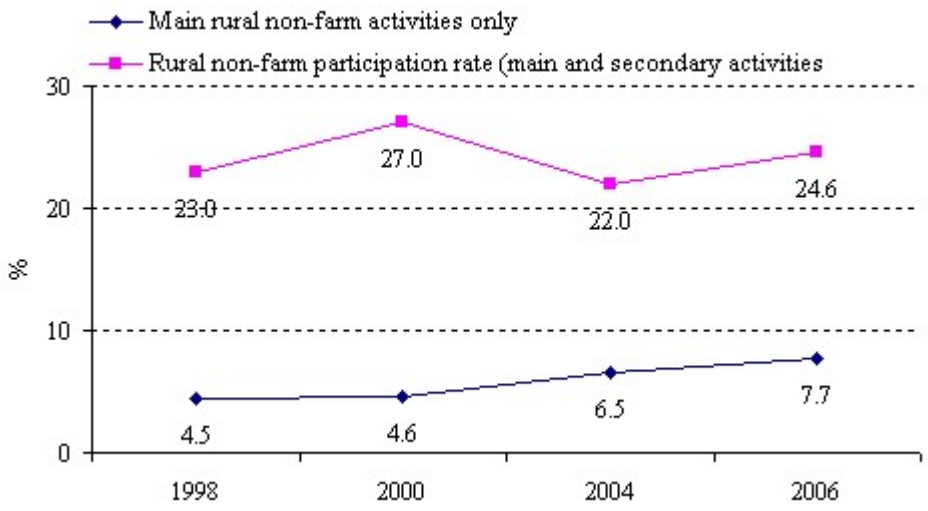


Figure 4. Dynamics of Household Rural Nonfarm Participation, 1998-2006



Source: CSA and World Bank (2008).

GRAPHS & FIGURES BASED ON THE RICS-AMHARA DATA

Figure 5: Ratio of Enterprise Profits to Total Household Expenditure

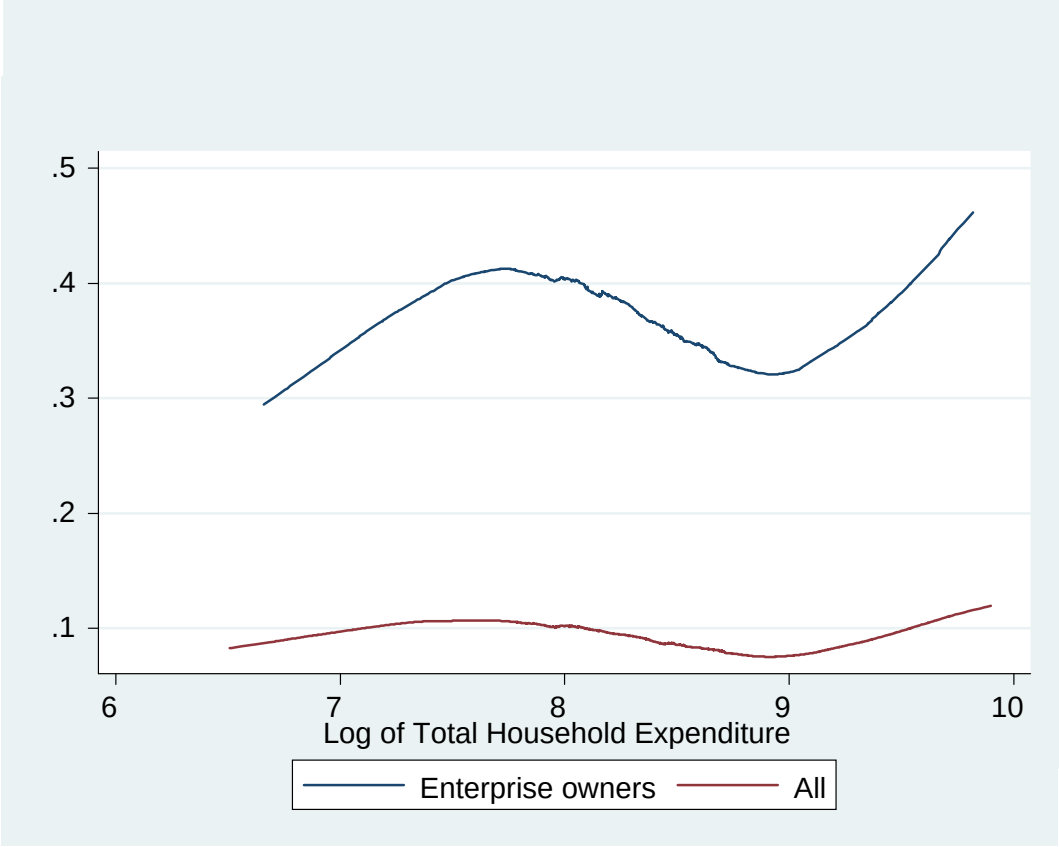


Figure 6: Seasonality in Sales

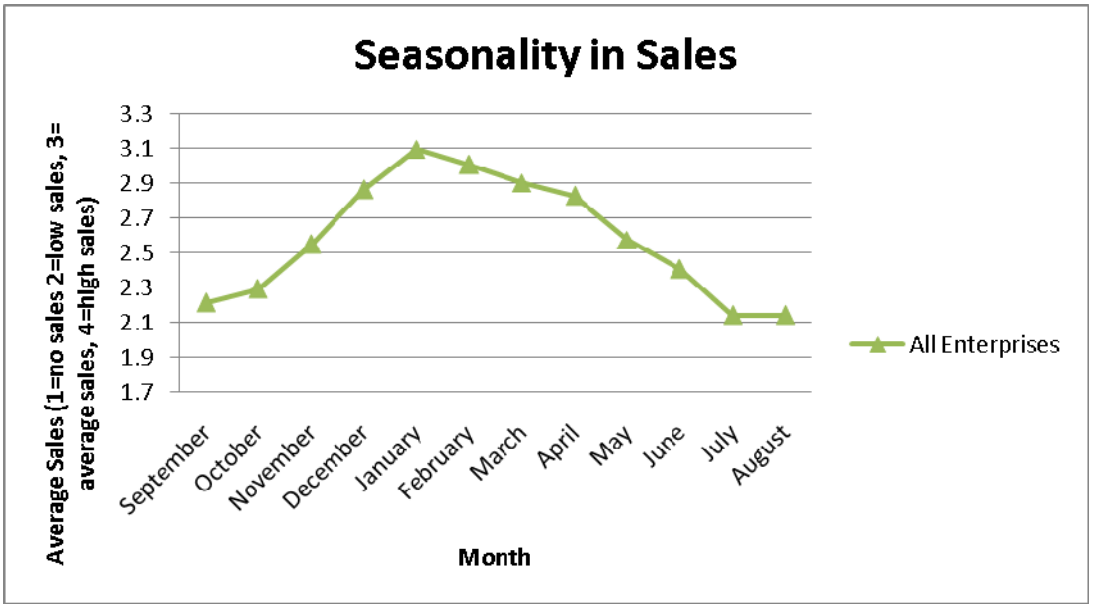
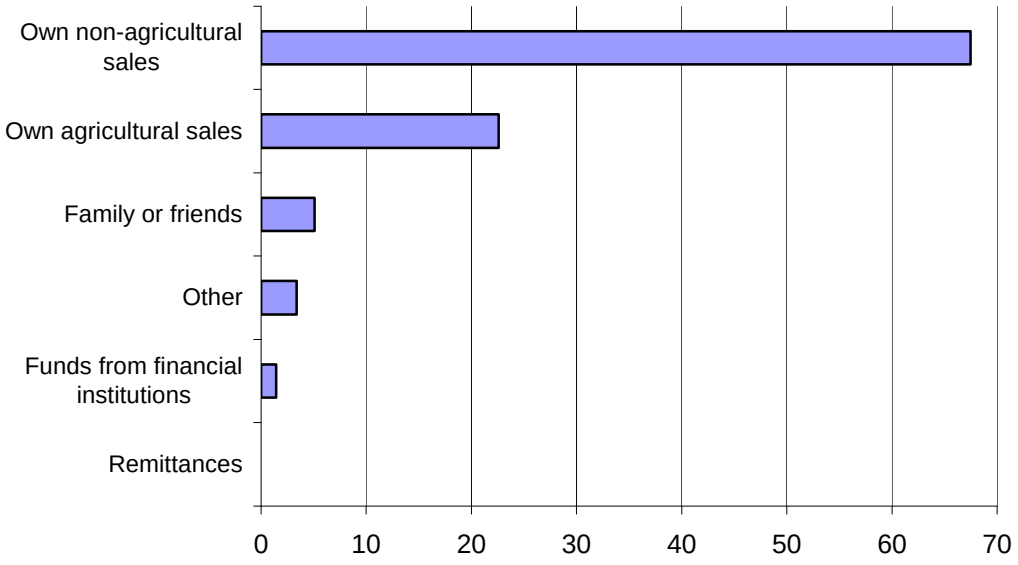


Figure 7. Most Important Source of Investment Finance



APPENDIX 1A: DEFINITION OF SELECTED VARIABLES RICS-AMHARA

Factors of Production

Sales: Sales are computed as the product of all sold units times the average selling price of each unit.

Value added: Value added is calculated as the difference between sales and material inputs costs. In regressions where the log of value added is the dependent variable, observations for which value added is negative are excluded from consideration.

Profits: Profits are defined as sales minus the costs of material inputs and paid labor.

Profits per day: Profits per day are computed by dividing the total amount of profits by the total number of days worked by the workforce of the nonfarm enterprise.

Labor (days worked): Our measure of labor is the total number of days worked by employees of the enterprise, including the firm manager. This means that it is in theory possible for enterprises with two workers to work less than a one-person enterprise, for example if the former enterprise operates four months of the year, while the latter operates year round.

Capital: the capital variable used here is the sum of the replacement cost of all tools and machinery used by the firm. The value of vehicles and buildings has not been taken into account. Observations for whom information on the replacement value of machinery and tools is missing, but for whom data on the value of vehicles and buildings is available, are excluded from consideration.

Material inputs: material inputs are the sum of total expenditure on items to be resold and product of the number of material inputs bought times and the average price of each material input unit.

Firm Characteristics

Firm age: the age of the firm measured in years

Manager's Characteristics

Years of schooling of the manager: The number of years of schooling a manager has gone to school is derived from her highest educational attainment under the assumption that people do not skip or duplicate grades. While it was typically straightforward to compute years of schooling, some arbitrary assumptions were made to categorize all types of education; it was assumed that completing a university degree would require 16 years of schooling. The few people who indicated that completing 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.

Household Composition

Children: The number of household members between the age of 5 and 10. Information on household members younger than 5 years is not collected in the data and could thus not be included.

Elderly: The number of household members older than 65 years of age.

Community Characteristics

Rural Area: This is a dummy variable which takes the value one if households do not live in a rural town or city, but instead in a truly rural community.

Daily wage of a male agricultural laborer in the community: The going wage rate to hire a male agricultural laborer for one day (from the community questionnaire)

People migrate from the community to search for work: This is a dummy which takes the value one if the question "Do people in this community leave temporarily during certain times of the year to look for work elsewhere?" in the community questionnaire is answered affirmatively.

People migrate to the community to search for work: This is a dummy which takes the value one if the question "Do people come to this community temporarily during certain times of the year to look for work?" in the community questionnaire is answered affirmatively.

Start-up Capital: This variable measures the amount of initial capital that was required to set up the firm.

Distances

Distance to the nearest financial institution & distance to the nearest food market: These variables measure the distance to these places in kilometers. Respondents were given the opportunity to answer the distance question in terms of distance covered or travelling time; fortunately, virtually all respondents who answered these questions in terms of travelling time indicated that their typical mode of transportation was walking, enabling us to impute distance by assuming that people on average work 6 kilometers an hour.

Constraints

Access to markets is a problem: The answer to the question "Is access to markets a constraint to productivity and sales growth for this enterprise?" where 1=not a problem, 2=a minor problem, 3=somewhat a problem, 4=A major problem.

Seasonality

Seasonality: The seasonality variable captures the standard deviation of the firm-specific variation in monthly sales, where no sales are assigned a value of 0, low sales a value of 0.5, average sales a value of 1 and high sales a value of 1.5.

No sales: The number of months the enterprise did not make any sales.

Low sales: The number of months the enterprise documented making below average sales in 2005/2006.

High sales: The number of months the enterprise reported making high sales in 2005/2006.

Wereda Dummies

Ethiopia is divided into different regions. A region is composed of zones, which in turn consists of weredas, which cover a number of kebeles, the smallest administrative unit in Ethiopia. A wereda is an administrative unit comparable to a district. The enterprises in the RICS-AgSS dataset are from 4 different regions, 50 different zones, 264 different weredas and 480 different kebeles, in total. The enterprises in the RICS-Amhara dataset are from 4 different zones, 45 different weredas and 175 different kebeles, in total.

APPENDIX 1B: DEFINITION OF SELECTED VARIABLES RICS-AGSS

Annual profits: annual profits are calculated by multiplying monthly profits with the number of months the firm was functioning in the previous years.

Annual costs: annual costs are calculated by multiplying monthly costs by the number of months the firms was functioning in the previous year.

Costs: costs are calculated by multiplying the share of operating costs in sales with the level of sales.

Profits: Profits are computed as sales*(1-share of cost in sales)

Profits per day: profits per day were computed by dividing monthly profits by the number of days the enterprise had been open in the past month multiplied by the number of employees.

Annual profits: annual profits are calculated by multiplying monthly profits with the number of months the firm was functioning in the previous years.

Annual costs: annual costs are calculated by multiplying monthly costs by the number of months the firms was functioning in the previous year.

Seasonality: A dummy variable which is coded 1 if enterprise managers answered ‘yes’ to the question – “Are the enterprise activities seasonal?”