WORKING PAPERS

ENTRY, SURVIVAL AND GROWTH OF MANUFACTURING FIRMS IN ETHIOPIA

Admasu Shiferaw

May 2006

Working Paper Series No. 425

Institute of Social Studies

ENTRY, SURVIVAL AND GROWTH OF MANUFACTURING FIRMS IN ETHIOPIA

Admasu Shiferaw

May 2006

Working Paper Series No. 425

Comments are welcome and should be addressed to the author:

c/o ORPAS - Institute of Social Studies - P.O. Box 29776
2502LT The Hague - The Netherlands

workingpapers@iss.nl

The Institute of Social Studies is Europe’s longest-established centre of higher education and research in development studies. Post-graduate teaching programmes range from six-week diploma courses to the PhD programme. Research at ISS is fundamental in the sense of laying a scientific basis for the formulation of appropriate development policies. The academic work of ISS is disseminated in the form of books, journal articles, teaching texts, monographs and working papers. The Working Paper series provides a forum for work in progress which seeks to elicit comments and generate discussion. The series includes the research of staff, PhD participants and visiting fellows, and outstanding research papers by graduate students.
For a list of available Working Papers and how to order see the last page of this Working Paper.
Some of the latest Working Papers are published full text (or abstract and content page) on the website: www.iss.nl (Publications / Working Papers Series).

For further information contact:
ORPAS - **Institute of Social Studies** - P.O. Box 29776
2502 LT The Hague - The Netherlands - FAX: +31 70 4260799
E-mail: **workingpapers@iss.nl**

ISSN 0921-0210

ABSTRACT

The paper examines firm dynamics in terms of entry, survival and growth using panel data of manufacturing firms in Ethiopia. Entry and exit are closely correlated processes that are predominantly observed among small firms. The evidence shows that entry does not seem to be a major problem in Ethiopia manufacturing. However, survival is very difficult particularly for small firms as the risk of failure is higher among them. A non-parametric analysis shows that the hazard of failure increases during the first three to four years of entry and exhibits negative duration dependence afterwards. The hazard of exit is also negatively related with efficiency although efficiency does not determine subsequent growth. Small firms grow faster than large enterprises even after controlling for sample attrition – a finding in favor of an underlying process of market selection while rejecting Gibrat's Law of proportional growth. There is also evidence that competition from imports tends to slowdown firm growth although it does not increase the hazard of business failure. For large firms growth is positively associated with the presence of foreign capital and firm effort at product differentiation.

Keywords: Entry, Exit, Survival, Firm Growth, Proportional Hazard, Sample Attrition, Market Selection, Ethiopian Manufacturing.

CONTENT

ABSTRACT

CONTENT

1 INTRODUCTION 1

2 THE DATA.. 2

3 FIRM ENTRY 3

4 FIRM SURVIVAL... 6

4.1 The literature on survival 6

4.2 Estimation Method... 8

4.3 Model Specification 10

4.4 Discussion Results 11

4.4.1 Non-parametric analysis 11

4.4.2 Results of Cox Proportional Hazard Model.. 13

5 FIRM GROWTH 18

5.1 Empirical Approach 18

5.2 Results of Firm Growth Regression... 22

6 CONCLUSION.. 27

REFERENCES 28

1 INTRODUCTION

Dysfunctional markets resulting from historical circumstances as well as bad government policies are thought to be a source of ailment for African economies. This has created an environment that stifles entry and growth of small enterprises while tolerating inefficient incumbents (Collier and Gunning, 1999). The outcome has been twofold: i) a growing informalization of manufacturing due to entry barriers to the formal sector, and ii) inefficiency in the formal sector because of diseconomies of scale among small entrants and weak innovative activity among incumbents (Tybout, 2000).

Understanding firm dynamics in terms of entry, survival and growth would thus go a long way in explaining the evolution and competitiveness of manufacturing industries. Since each aspect of firm dynamics reflects a decision making process, it is very important that we understand key elements of the information set driving these processes. Some of these factors would operate at the firm level while others are industry wide effects.

The literature on firm dynamics documents important stylised facts for manufacturing industries in advanced countries. See Geroski(1995) for a review of the stylized facts. There is however scant empirical evidence on these processes in the developing world and particularly so in Sub-Saharan Africa where there is only limited number of studies. This paper makes a contribution by examining the nature and determinants of firm entry, survival and growth in Ethiopian manufacturing over the period 1996-2002. The Ethiopian case provides a very interesting policy environment to study these processes. On the one hand the economy has progressively been deregulated and liberalized allowing private sector entry and foreign competition into a number of production and service sectors. The macroeconomic environment has also been fairly stable. On the other hand there seem to be a growing uncertainty and lack of trust between government and the private sector especially since the mid 1990s. Although more concrete evidence should be sought based on surveys, the high cost of land for investors, the introduction of VAT, Bank Foreclosure and Tax Foreclosure Laws seem to have sent a non-cooperative if not hostile signal for the business sector. A quick way to assess the investment climate is perhaps to examine investment itself. In this regard, about 50% of manufacturing firms in Ethiopia did not invest at all during the period 1996–2002. While this might not be off the mark compared to other Sub-Saharan African countries, its persistence is a cause for concern.In terms of firm size, the share of small firms with non-zero investment has decline from about 55% in 1999 to 33% in 2002 while for medium size firms the share of investing firms has decline from 68% to 52% during the same time. Similarly, even among firms with positive investment, the average level of investment has tended to decline particularly among small firms. The latter trend is not observed among medium and large firms.

It is with this background that this paper analyses firm dynamics in Ethiopian manufacturing. Apart from being comprehensive (i.e. addressing all three aspects of firm dynamics), the paper provides the first hazard estimates for a Sub-Saharan African country using census based panel data. Frazer (2005) has estimated a probit model by treating exit and survival as discrete choice variables. However, the question whether a firm exits a market or not (as analysed in porbit models) is different from what determines survival time in business (an issue analyzed by survival models).

The organization of paper is as follows. Section two describes the data followed by a discussion of the process of entry in section three. In section four the survival/exit decision is examined using the Cox proportional hazard model. Section five discusses firm growth conditional on survival and tests whether sample selection drives some of the observed relationships. By dealing with post entry performance, the materials covered in sections four and five serve as formal tests of the implications of market selection models. Section six concludes the paper.

2 THE DATA

The paper uses establishment level panel data from Ethiopia manufacturing covering all establishments that employ at least 10 persons. Each establishment is identified by a unique identification code and followed over the period 1996-2002. A firm is considered as an entrant if it is observed for the first time in the census. However, because of the size threshold in the census, entry does not distinguish between firms that crossed the 10 persons employment threshold from those firms new to the market. Exiters are those firms which do not reappear in the census once they exit. In those limited cases where a firm disappears from the census at some point and reappears after a year or so, it is considered as a continuing firm. The data also does not distinguish between exiting firms which are dead from those firms that slip below the 10 person threshold or those which switched to another industry within manufacturing or to other sectors outside manufacturing. Turnover rates may therefore be overestimated and the results in this paper should be interpreted with these limitations in mind.

3 FIRM ENTRY

A key aspect of market selection is reflected in the process of entry. Entry propagates the diversity of producers and the range of products in terms of design, quality and prices. In as much as competition spurs efficiency gain, a steady flow of entrants remains to be important particularly in economies where a number of modern industries are either at an incipient stage or simply nonexistent. Entry could however be restrained both by the actions of incumbents and government policies that influence access to land and capital, licensing procedures, and other administrative red tape. At the macro level entry also depends on the dynamics of aggregate demand.

Figure 1

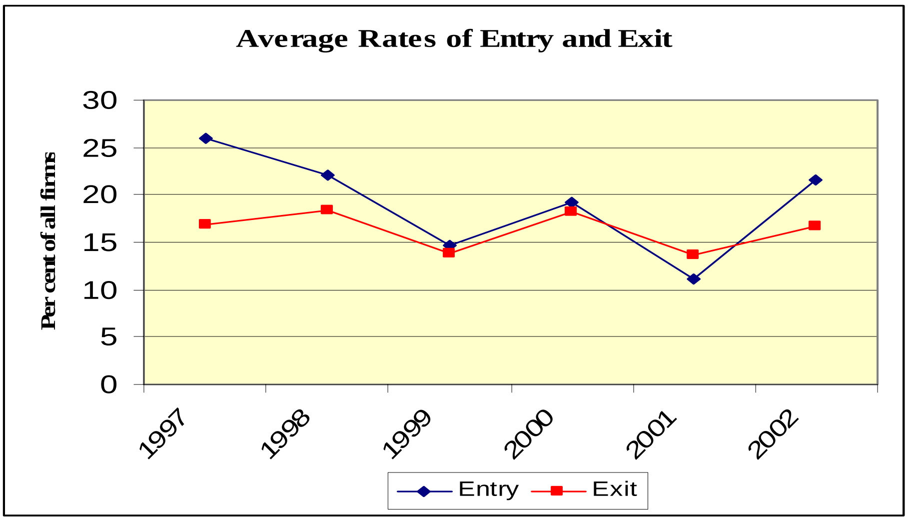
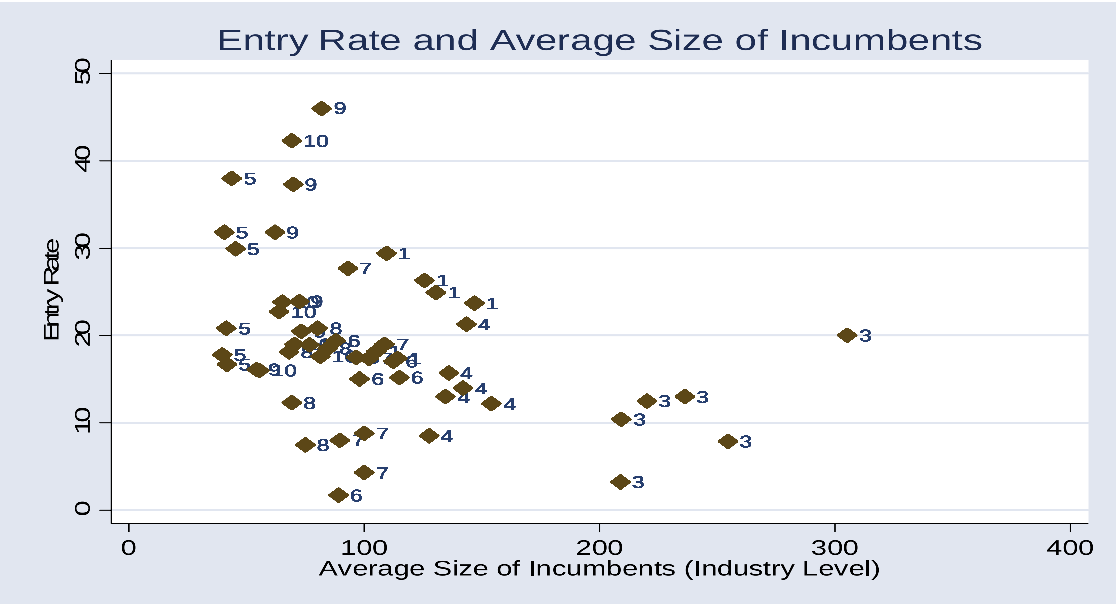


Figure 1 shows that entry and exit rates are positively correlated with the degree of correlation becoming stronger (with a correlation coefficient of 0.6) when exit and entry rates are weighted by employment.[1] Figure 1 also shows that entry is on average

[1] The rate of entry is defined as the ratio of entrants to the total number of firms in an industry in a given period of time. Similarly, the rate of exit is the share of exiting firms in the total number of firms.

slightly higher than the exit rate leading to a net increase in the number of producers. It appears that new firms tend to replace each other as most exiters are themselves young small firms. If high rates of entry are accompanied by rapid exit, then the net effect of producer turnover on incumbents in terms of competition for market share and profits would rather be limited. This phenomenon is consistent with what has been observed in a number of studies for developed countries (Geroski and Schwalbach eds, 1991). The role of entry could thus be more of maintaining market contestability, i.e., posing potential threat for incumbents. Figure 1 also shows a gently declining trend in entry rate which perhaps reflects the trend in the share of investing firms discussed above.

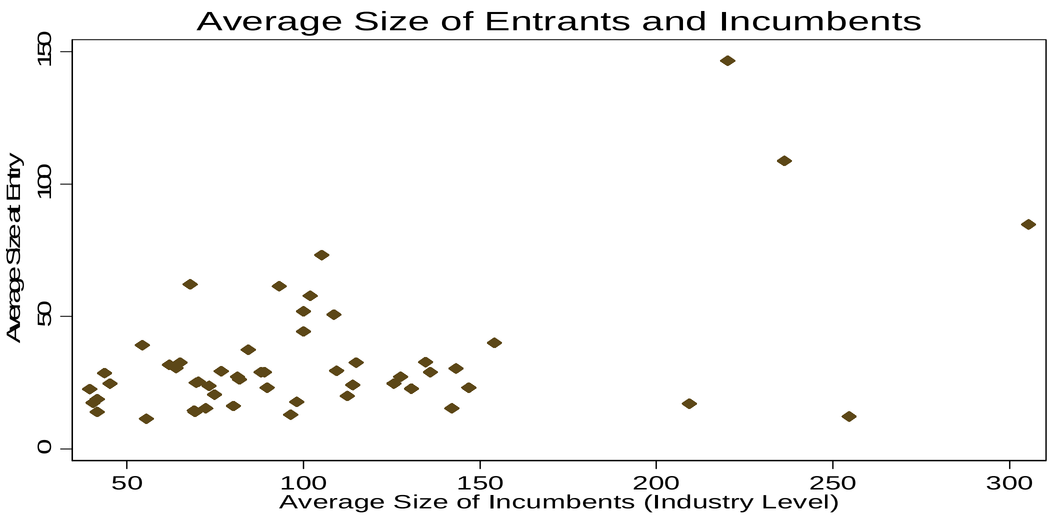
Figure 2



On the other hand, entry rate declines with the average firm size in an industry. Figure 2 shows that industries dominated by large enterprises (hence higher mean firm size) tend to have lower entry rates. This suggests that scale economies and market concentration tend to act as entry barriers protecting incumbents. There are also important inter-industry differences in entry rate as shown by the clustering of industries in figure 2. Entry rates in excess of 30% are recorded in the wood and furniture (code 5), and metal industries (code 9) where the average firm size is about 50 employees. Most industries have average firm size close to 100 employees and entry rates of about 20 % per annum. These include the non-metal (code 8), printing and paper (code 6) and light machinery (code 10) industries. At the other extreme is the textile industry with average firm size of more than 500 employees and an average entry rate of about 10% (the average firm size for the textile industry in the figure is scaled down by half for visual purposes). As would be expected, capital intensity appears to play a role in driving inter industry differences in entry rates. Wood and furniture is the least capital intensive industry and it has one of the highest entry rates, while the lowest entry rates are observed in the chemical industry which is highly capital intensive. But this does not seem tell the whole story: the food and beverage (code 1) industry is for instance twice as capital intensive as the leather and footwear industry (code 4) but the former has a relatively higher entry rate than the latter.

Another observation is that industries with relatively higher average firm size also tend to attract fewer but relatively larger entrants. Figure 3 shows that the average size of entrants tends to increase with the average size of incumbents which explains part of the reason why entry in the latter is relatively low.

Figure 3



To conclude the preceding discussion, it can be said that despite a mild tendency to decline, the observed rate of entry in Ethiopian manufacturing lies within the 15 – 20 % rate.[2] This is close to the average entry rate of about 20% reported for other developing countries (World Bank, 2005). Although this does not mean that there are no entry barriers for small firms, it shows that entry is not a major problem or entry barriers are not too restrictive in Ethiopia as compared to other countries. The real

[2] An exploratory regression was attempted to understand the determinants of entry. However it did not perform very well because of limited number of observations - entry rate is calculated for nine two-digit industries over five years giving only 45 observations.

issue is therefore what happens to post-entry performance in terms of survival and growth – issues that will be addressed in the following two sections.

4 FIRM SURVIVAL

4.1 The literature on survival

Once in the market, firms face varying levels of exit risk. Theoretical models of industrial evolution like the passive learning model of Jovanovic (1982) and active learning model of Ericson and Pakes (1995) predict that small firms die more often than their large counterparts in the same industry. On the other hand, as time goes by, firms would acquire competitive skills and the risk of failure begins to decline. From these models we understand that initial size and age are important predictors of firm survival. On the other hand, the business strategy literature suggests that small firms do not need to grow in size in order to survive. The argument is that small firms have the advantage of being flexible and the ability to specialize in niche markets giving them strategic advantages to overcome business failure (Porter, 1979; Porter and Caves 1977). Most empirical studies however find significantly positive age and size effects on firm survival supporting the view of market selection (see Geroski 1995 for a review of such studies). On the other hand, estimates of production functions for developing country manufacturing firms did not find any significant (or only very mild) scale economies in production, suggesting that small firms do not seem to be particularly at a disadvantage in most industries (Biggs et al.,1995; Mazmudar and Page; and Tybout, 2000). Similarly, for micro and small enterprises in Africa, McPherson (1995) found no significant size effect on survival. The survival-size relationship therefore remains inconclusive both in the theoretical and empirical bodies of literature.

Underlying the previous discussion is the role of productivity in determining firm survival. If markets work properly, competition would purge industries off inefficient producers. While this might be generally the case, efficiency does not seem to explain the entire survival story. For a group of five African countries, quite a large proportion of exiters closed down for non-business reasons such as death of the owner or opening up of better opportunities (Liedholm et al., 1994). This evidence is however based on micro and small enterprises only. Similarly, for Ethiopian manufacturing firms, although firm exit occurs predominantly at the lower tail of the productivity distribution, about 10 percent of exiting firms between 1996 to 2002 were in the most efficient quintile in 1996 (Shiferaw, 2005).

Foreign investment is another important element in explaining survival time. While foreign capital is often expected to enhance efficiency, one would expect foreign firms to be more footloose and inclined to exit the market whenever they sense trouble in the domestic economy or find better business opportunities elsewhere. The effect of FDI on firm survival is therefore an empirical question. Standard trade theory predicts that capital intensive industries in economies abundantly endowed with labour would contract/disappear unless protected from international competition. On the other hand, more capital per person could enhance labour productivity and reduce the hazard of failure. The latter is a view supported by the theories of industrial evolution which relate firm survival and growth to investment in productivity enhancing activities (Olley and Pakes, 1996; Ericson and Pakes, 1995).

Researchers have also been interested in understanding the link between export and productivity. While there is evidence that efficient producers are selected into export markets, they also learn from exporting and improve their productivity. However, there are only few studies that relate firm survival with export performance. Exporters in US manufacturing for instance are not only more productive but also face lower risk of failure (Bernard et al., 2002). One wonders whether the link between export and survival would persist once productivity is taken into account – an issue existing studies have not dealt with (Frazer, 2005). Similarly, in countries with low international reserves, dependence on imported inputs may be a source of instability and higher risk of failure. On the other hand using imported inputs may provide a competitive edge if it has technological advantages, making it difficult to determine its effect a priori. An empirical model is therefore required to control for these covariates and find out their effect on firm survival. Following some of the empirical literature on survival, this paper also looks at the importance of product differentiation as a firm strategy to secure market position and prolong survival.

Other covariates for survival are industry specific such as industry growth, and competition from imports. Entrants would stand better chance of survival if the industry they joined is already expanding. On the other hand, industries which are exposed to more competition from imports may face higher risk of exit than protected industries.

4.2 Estimation Method

The analysis of survival time has a long tradition in biometrics and material science. Its application in economics is rather recent and started with the analysis of spells of unemployment conditional on personal and labour market characteristics. Its application for firm demographics is even more recent and started in the works of Troske (1989) and Audretsch and Mahmood (1994). The subject of analysis is the population distribution of time under risk – in our case the risk of firm exit. The cumulative density function (cdf) of time under risk or survival time (*T)* is given by:

$$F(t) = P(T \le t), \quad t \ge 0 \tag{1}$$

Where *t* is a specific value of *T*.

The survivor function (S) is defined as the probability of surviving past time t:

$$S(t) \equiv 1 - F(t) = P(T > t) \tag{2}$$

In most econometric analyses however the prime interest is on the hazard function which expresses the probability of failure in a short time interval Δt conditional on surviving until t. The hazard function $\lambda(t)$ is expressed as follows:

$$\lambda(t) = \lim_{\Delta t \to 0} \frac{P(t \le T < t + \Delta t | T \ge t)}{\Delta t} \tag{3}$$

It is interesting to note that the hazard and survivor functions are closely related as in the following expression.

$$\lambda(t) = \lim_{\Delta t \to 0} \frac{F(t + \Delta t) - F(t)}{\Delta t} * \frac{1}{1 - F(t)} = \frac{f(t)}{S(t)} \tag{4}$$

Where $f(t)$ is the density of *T*.

The shape of the hazard function conveys an important message about the underlying distribution of survival time. In cases where the derivative of the hazard function with respect to time is positive, i.e., $d\lambda(t)/dt > 0$, there is a positive duration dependence – meaning that the risk of failure increases with time. If the derivative is less than zero there is negative duration dependence and agents will be more likely to survive as time goes by. The event being studied is said to be 'memoryless' if the derivative of the hazard is equal to zero.

Depending on the expected shape of the hazard function (or the distribution of survival time), different methods can be used to estimate a conditional hazard function. The Weibull function is the most popular one which can assume memoryless, positive and negative duration dependence functions depending on the values of the parameters of the Weibul distribution.[3]

A conditional hazard function is an expression of the risk of failure conditional on some explanatory variables:

$$\lambda(t;x) = \frac{f(t|x)}{1 - F(t|x)} = \frac{f(t|x)}{S(t|x)} \tag{5}$$

Where x is a vector of explanatory variables and $f(.|x)$ is the density of T given x. Our interest here is on the partial effects of the explanatory variables on the hazard function (Wooldridge, 2002). Unlike the case of machine lifetime where the risk of failure is known to follow positive duration dependence, there is no definite a priori expectation about the shape of the hazard function when it comes to firm exit. There is however a class of models which allow the analysis of shifts in the hazard function conditional on time invariant explanatory variables. These are proportional hazard models of which the most popular one is the one provided by Cox (1972). The extended Cox model imposes the hazard proportionality condition which makes it possible to estimate coefficients of covariates without having to specify the underlying hazard function. It starts by defining a baseline hazard function $\lambda_0(t)$ which is common to all sub samples and not affected by any covariate. The hazard of

---

[3] A Weibull distribution for duration time takes the form: $F(t) = 1 - \exp(-\gamma t^{\alpha})$ where α and γ are non negative parameters. The hazard function from this distribution will be $\lambda(t) = \gamma\alpha t^{\alpha-1}$. When $\alpha = 1$ the Weibull reduces to a memory-less function, while $\alpha > 1$ $(\alpha < 1)$ shows positive (negative) duration dependence.

each sub sample $\lambda_i(t)$ is assumed to be a certain proportion of the baseline hazard and this proportionality is expressed as a function of covariates.

$$\frac{\lambda_i(t)}{\lambda_0(t)} = \exp(\beta' x_i) \qquad (6)$$

Equation (6) is the proportional hazard model and its logarithmic expression gives us a linear model which can be estimated by maximum likelihood method.

$$\log \lambda_i(t) = \log \lambda_0(t) + \beta' x_i \qquad (7)$$

The coefficients in (7) can be expressed as hazard ratios in which case a value of $\beta = 1$ represents a covariate that does not affect the hazard ratio. A coefficient greater than one implies that the variable increases the risk of exit while a value less than one reduces the hazard of failure or prolongs survival time. In applications where the actual coefficients are reported, a covariate with a negative (positive) coefficient reduces(increases) the risk of exit.

4.3 Model Specification

The hazard model to be estimated is guided by the discussion in section 4.1. Initial size is an important factor and its effect will be captured through dummy variables that distinguish small, medium and large enterprises. Small enterprises are those firms that have 10 to 29 employees while medium size firms employ 30 to 99 persons. Firms that employ at least 100 persons are considered to be large. In all models, small firms are the reference group. Similarly, the age effect is captured through dummies representing age groups.

The firm productivity indicator is a residual from a production function that controls for the simultaneity between input levels and productivity shocks based on the model suggested by Levinsohn and Petrin (2003). The simultaneity problem is addressed by using variation in intermediate inputs as a proxy for unobserved effects. The paper follows two approaches to testing the effect of productivity on survival. The first is to use the firm level productivity directly in the model. This is done in Specifications 1 through 6. The other approach is to use quintile dummies where quintile 1 is the most productive quintile. Specifications 7 and 8 are based on the latter approach.

The model includes a dummy variable that identifies firms with foreign ownership. The dummy variable takes the value 1 if there is a positive amount of foreign capital and zero otherwise. Similarly, the investment dummy identifies firms with non-zero investment. The model also includes a dummy that distinguishes between public and private enterprises. In the same way product differentiation is proxied by a dummy variable that distinguishes firms that advertise their products from those who do not. Firm participation in export markets is also captured by an export dummy which takes the value 1 for exporting firms and zero for those that serve only domestic markets. The degree of exposure to international competition will be captured by the import penetration ratio. Firms with import penetration ratio in excess of 50% are considered to be high competition industries compared to those with import penetration rates of less that 50%. Capital intensity is simply capital per person employed while import intensity measures the proportion of imports in the total value of inputs. Industry growth is measured in terms of output growth.

The survival model is estimated over two different samples. The first sample includes firms with entry dates not more than three years before 1996. The three year lag allows for delays in firms' appearance in the annual manufacturing census after their establishment, and it is assumed that their initial conditions do not change dramatically in a three year period. This sample restricts the analysis to firms whose entry/initial conditions are observed as required in a proportional hazard model. The other group of estimates are based on the entire sample that also includes old firms whose initial conditions are not reported in the data. For these firms the 1996 data is regarded as their initial values for the analysis.

4.4 Discussion Results

4.4.1 Non-parametric analysis

Figures 5 and 6 provide a preliminary insight into the hazard and survivor functions from the Ethiopian data. Figure 4 reveals that in general the hazard of exit increases during the first few years after entry and starts to decline afterwards. Considering all firms (panel d), the risk of failure reaches its peak at about four years. The tipping point is a little longer for small enterprises and a little shorter for medium and large enterprises. That is, for medium and large enterprises, the risk of failure begins to decline once they pass the three and half years threshold while for small enterprise the hazard rate keeps on rising until four and half years of age. The observed pattern is consistent with theoretical expectations and empirical findings for other countries.

Figure 5 on the other hand compares the survivor function for small, medium and large enterprises. The figure shows that survival rate increases with firm size: the top pair of lines show survival probability for large firms while the bottom pair of line show that of small firms. Although the survivor function is another side of the hazard function, Figure 5 serves the additional purpose of testing the hazard proportionality assumption. The graph shows that the predicted curves from the Cox regression (the doted straight lines) are similar to the descriptive graphs based on the Kaplan-Meier estimates (the staircase lines). This similarity together with the nearly parallel nature the Cox curves for the three size categories shows that the assumption of hazard proportionality is not violated for this variable. Notice that survival among small firms is far lower than both medium and large firms, a fact also reflected in figure 4.

Figure 4

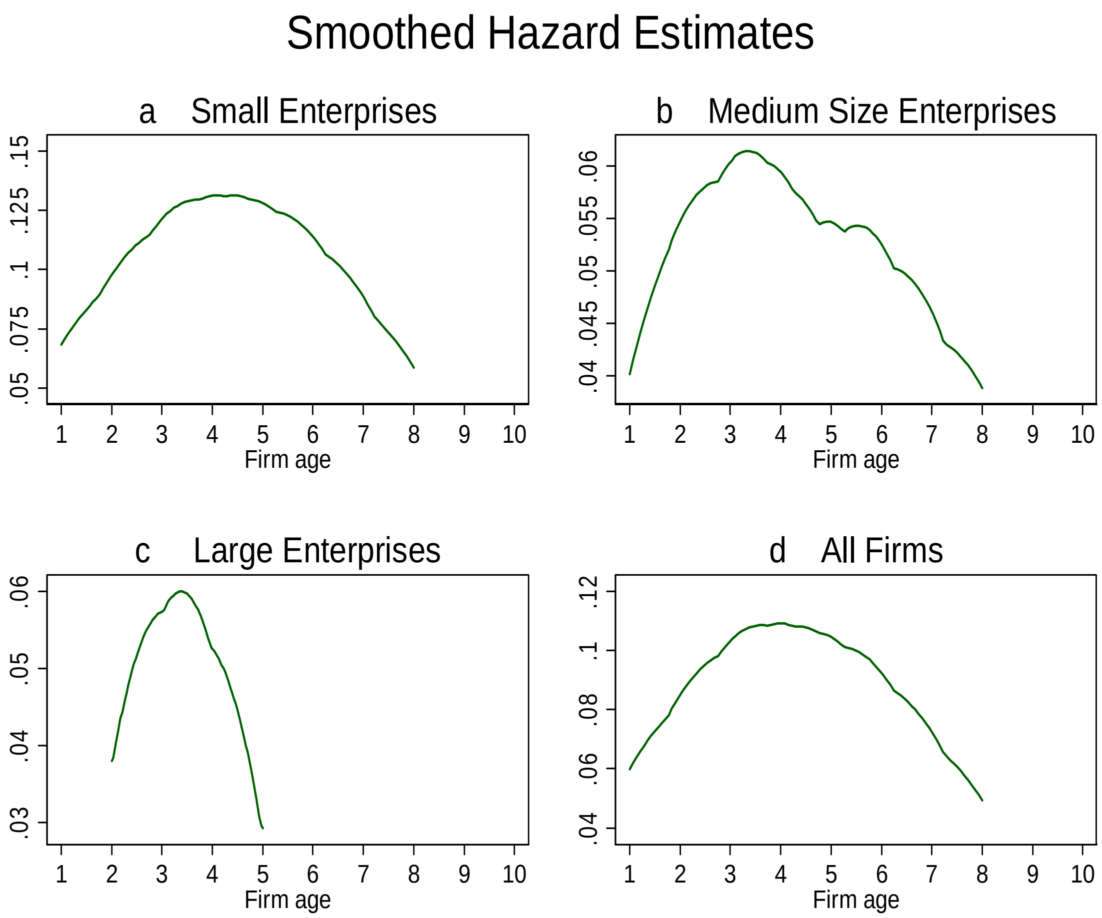
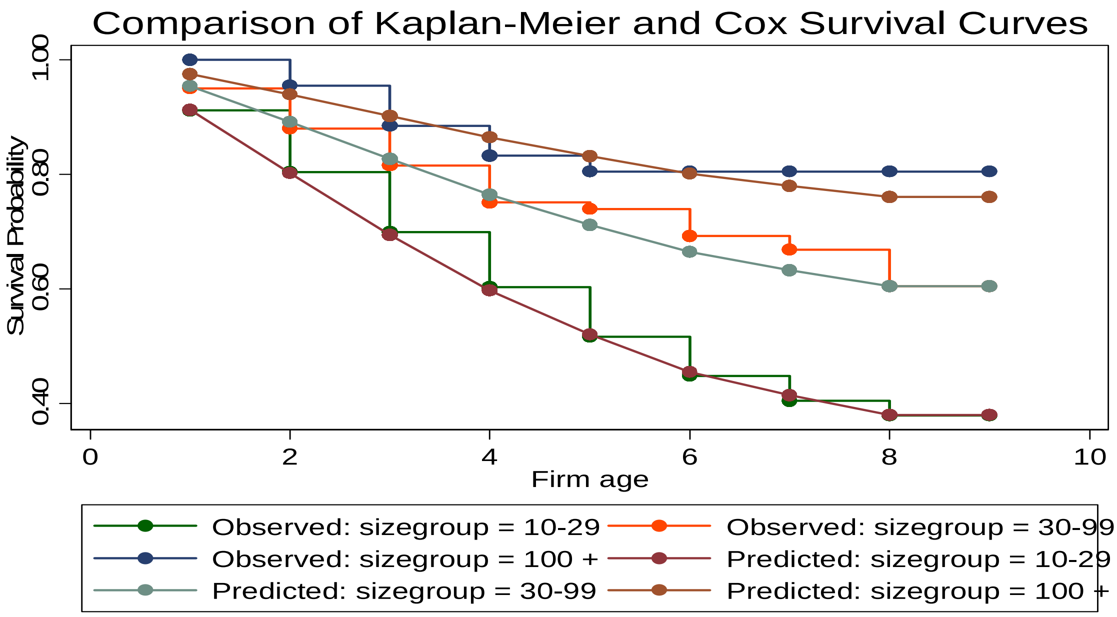


Figure 5



4.4.2 Results of Cox Proportional Hazard Model

The following discussion refers to the results in table 1 which includes firms that are less than 10 year old by the year 2002. For regression results based on all firms regardless of age, please refer to table 2. While columns 1-6 include the firm level productivity index, columns 7 and 8 report regression results based on ranking of productivity in quintiles. The results in column 8 are stratified by region and industry, while the other models (1-7) are stratified by region only.

Consistent with theoretical models and other empirical studies, size turned out to be an important determinant of firm survival. The risk of exit among medium size firms is nearly 40% to 50% less than that of small enterprises while being large reduces the hazard to about a quarter to one-third. The difference with McPherson (1995) where there is no size effect for a group of African countries has more to do with the sample being restricted to micro and small enterprises. Table 1 also shows that passing the 4 year threshold reduces the hazard of exit by about 70 percent which is consistent with the observation in figure 4. After controlling for the effects of firm size and age, productivity has a statistically significant effect in reducing the exit hazard. This is particularly true in the regression results in table 2 that includes firms of all age groups. For firms that entered since 1993, the results in specifications 7 and

8 of table 1 show that firms in the bottom quintile have significantly higher risk of failure as compared to the most efficient quintile. The hazard is also higher in the other quintiles but the hazard ration is not significantly greater than one. In general, the sign and significance of the coefficients on size and productivity are in conformity with theories of market selection showing that markets do select efficient firms.

Although there are only a few firms with non-zero foreign investment in Ethiopia, i.e. about 4%, the probability of exit among them is considerably lower than firms fully owned by the locals. Similarly, the risk of exit among public enterprises is lower than private enterprises. This indicates that although the public enterprises reform carried out since 1992 claims to have put state owned enterprises on the same footing as private enterprises (in terms of resource allocation), they still seem to enjoy more secure business environment even after controlling for the size effect.

Firms that undertake investment during the study period were able to prolong their survival time compared to non-investing firms regardless of the magnitude of investment. It is interesting to note that the proportion of firms that undertake non-zero level of investment have been declining particularly among small and medium size firms during the period and the results of the Cox regression suggest that reversing this trend could improve survival rates. However, the capital intensity of firms does not have significant impact on the risk of failure. It seems that firms can freely choose their factor intensities without any implication on chances of survival. What matters is perhaps whether they have sufficient demand for their products.

On the other hand, product differentiation plays a critical role in reducing the hazard of exit as captured by the coefficient of the advertisement dummy. It seems that firms that invest in strategic advantages and make their cutting edges known to consumers stand better chances of survival. Related to this, the risk of failure tends to decline with market share. This is interesting because it indicates that firm growth does not necessarily translate into increases in market share, especially if the industry is expanding, unless firms make extra-effort to secure/expand market share though such activities as advertising. On the other hand, differences in price-cost margin do not appear to have strong implications on firm survival.

Exporting firms in Ethiopian manufacturing do not face any better or worse chance of survival compared to non-exporters. This is unlike the US where exporting firms stood better chance of survival (Bernard et al., 2002). This has perhaps to do with the fact that leather and footwear is the only industry with significant exports in

Ethiopia. The expected learning through exporting in this industry is likely to be limited as the basis for export lies in the country's abundant livestock resources and the natural attributes of its leather. Similarly, dependence on imported inputs does not appear to expose domestic firms to any higher risk of failure. This might be explained by the improved access to foreign reserves since the introduction of the economic reform program in 1991.

Turning to industry specific factors, it turns out that firms which belong to industries that face higher competition from imports have a better chance of survival but this effect is not statistically significant. This suggests that the wildly held expectation of developing country firms going out of business following trade liberalization does not have strong empirical support in the case of Ethiopia. At least for some industries, there is an indication that imports and domestic firms aim at different segments of the market. In the wood and furniture industry, for instance, imports serve the upper-end of the market which is predominantly quality oriented while domestic firms target the basic demand from households, schools and health facilities. Although this industry faces high import penetration rate, it is hard to say that the two are competing for the same market. It is therefore not surprising to see that some of the major producers are also importers of furniture. However, as would be discussed in section 5, competition from imports tends to slow down firm growth. Another industry specific variable considered in this study is output growth. Surprisingly, industry growth is positively associated with the risk of business failure. Such an outcome could be possible if a decline in industry level output is accompanied by reshuffling of market share without an increase in exit rate. Another possibility is that growing industries attract more small entrants which will soon exit the market hence increasing the exit rate. The discussion in section two lends some support to the latter claim.

Table 1
Results of Cox Regression for Ethiopian Firms (Coefficients are Hazard Ratios)
For a Sample of Entrants Since 1993

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Medium	0.461*** (0.081)	0.486*** (0.086)	0.586*** (0.106)	0.598*** (0.110)	0.565*** (0.113)	0.563*** (0.113)	0.573*** (0.115)	0.608** (0.127)
Large	0.230*** (0.083)	0.253*** (0.092)	0.319*** (0.122)	0.341*** (0.133)	0.367** (0.150)	0.374** (0.154)	0.364** (0.150)	0.355** (0.158)
Age 5–10	0.356*** (0.067)	0.356*** (0.067)	0.278*** (0.053)	0.273*** (0.052)	0.276*** (0.053)	0.287*** (0.055)	0.291*** (0.056)	0.281*** (0.060)
Productivity		0.894** (0.046)	0.923 (0.048)	0.928 (0.049)	0.932 (0.051)	0.936 (0.050)		
Public enterprise			0.645 (0.486)	0.662 (0.497)	0.702 (0.532)	0.688 (0.523)	0.698 (0.531)	1.238 (0.972)
Foreign capital			0.535 (0.243)	0.534 (0.242)	0.533 (0.243)	0.412* (0.192)	0.400** (0.187)	0.448* (0.218)
Investment			0.413** (0.050)	0.410*** (0.050)	0.404*** (0.051)	0.399*** (0.050)	0.410*** (0.052)	0.432*** (0.058)
Capital intensity				1.000 (0.000)	1.000 (0.000)	1.000* (0.000)	1.000* (0.000)	1.000*** (0.000)
Advertising				0.908 (0.135)	0.903 (0.138)	0.931 (0.143)	0.938 (0.144)	0.913 (0.152)
Market Share					0.949 (0.083)	0.947 (0.082)	0.956 (0.082)	0.941 (0.069)
Export					1.303 (0.629)	1.003 (0.496)	0.933 (0.462)	1.121 (0.611)
Import intensity					1.001 (0.002)	1.005 (0.004)	1.005 (0.004)	1.029* (0.015)
Import competing						0.720 (0.182)	0.713 (0.180)	1.000
Industry growth						1.008*** (0.002)	1.008*** (0.002)	1.011*** (0.003)
Productivity ranking								
2nd Quintile							1.375 (0.392)	1.496 (0.443)
3rd Quintile							1.535 (0.413)	1.526 (0.436)
4th Quintile							1.115 (0.301)	1.286 (0.364)
5th Quintile							1.586* (0.415)	1.789** (0.493)
Log Likelihood	-1444.0	-1442.0	-1413.0	-1412.0	-1364.0	-1354.0	-1351.0	-834.2
LR (*p value*)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Subjects	741	741	741	741	732	732	732	732
Observations	2022	2022	2022	2022	1991	1991	1991	1991

Note: *** significant at 1%, ** significant at 5%, * significant at 10%, standard errors in parenthesis. All regression models are stratified by region except column 8 which is stratified by region and industry.

Table 2
Results of Cox Regression for Ethiopian Firms (Hazard Ratios)
Entire Sample

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Medium (30-99)	0.452*** (0.058)	0.491*** (0.063)	0.616*** (0.082)	0.656*** (0.091)	0.662*** (0.092)	0.661*** (0.092)	0.658*** (0.092)	0.714** (0.106)
Large (100 +)	0.136*** (0.031)	0.153*** (0.035)	0.238*** (0.065)	0.339*** (0.096)	0.337*** (0.098)	0.320*** (0.093)	0.313*** (0.091)	0.314*** (0.101)
Age 5-9	0.397*** (0.046)	0.395*** (0.045)	0.319*** (0.038)	0.312*** (0.037)	0.311*** (0.037)	0.307*** (0.037)	0.306*** (0.037)	0.312*** (0.041)
10-19	0.052*** (0.011)	0.051*** (0.011)	0.039*** (0.008)	0.035*** (0.008)	0.035*** (0.008)	0.034*** (0.008)	0.034*** (0.008)	0.023*** (0.006)
20-29	0.006*** (0.002)	0.007*** (0.002)	0.005*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.002*** (0.001)
30+	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000*** (0.000)
Productivity Index		0.853*** (0.030)	0.884*** (0.032)	0.908*** (0.034)	0.911** (0.035)	0.904*** (0.034)		
Public Enterprise			0.687 (0.171)	0.755 (0.188)	0.746 (0.188)	0.770 (0.195)	0.776 (0.196)	0.848 (0.248)
Foreign Capital			0.543** (0.163)	0.643 (0.193)	0.637 (0.192)	0.610 (0.184)	0.618* (0.187)	0.557* (0.182)
Investment			0.422*** (0.037)	0.441*** (0.039)	0.438*** (0.039)	0.430*** (0.038)	0.432*** (0.038)	0.453*** (0.043)
Capital Intensity				1.000** (0.000)	1.000* (0.000)	1.000*** (0.000)	1.000*** (0.000)	1.000*** (0.000)
Advertisement				0.733*** (0.084)	0.714*** (0.083)	0.730*** (0.085)	0.733*** (0.086)	0.717*** (0.091)
Market Share				0.870** (0.066)	0.867* (0.068)	0.882* (0.066)	0.892 (0.066)	0.898 (0.065)
Export					1.011 (0.404)	0.952 (0.383)	0.933 (0.376)	0.874 (0.389)
Import Intensity					1.002 (0.001)	1.006** (0.003)	1.006** (0.003)	1.037*** (0.010)
Import Competition						0.667** (0.107)	0.682** (0.109)	1.000
Industry Growth						1.005*** (0.001)	1.005*** (0.001)	1.005*** (0.002)
Productivity Rank								
2nd Quintile							1.453** (0.255)	1.402* (0.264)
3rd Quintile							1.602*** (0.272)	1.465** (0.269)
4th Quintile							1.313 (0.227)	1.326 (0.245)
5th Quintile							1.746*** (0.294)	1.699*** (0.309)
Log Likelihood	-2886	-2876	-2822	-2740	-2728	-2718	-2715	-1630
LR (*p value*)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
No. Subjects	1439	1439	1439	1421	1420	1420	1420	1420
No. Observations	4829	4829	4828	4753	4747	4747	4747	4747

Note: *** significant at 1% , ** significant at 5%, * significant at 10%.

5 FIRM GROWTH

The rate of growth of surviving firms has long been investigated with great interest. Firm growth is not only an important indicator of post entry performance, it also plays crucial role in determining the structure and degree of competition of an industry along with entry and exit. For instance, concentration is unlikely to rise or may even decline if the rate of entry increases and small surviving firms grow faster than larger ones. On the other hand concentration tends to rise faster (and competition to decline) if large firms grow faster than small ones and the latter exit more often than the former (Dunne and Hughes, 1994).

Earlier empirical models postulated that firm growth is a random process that is independent of firm size. Gibrat's Law of Proportional Effect states that the expected value of the increase in firm size is proportional to the current size of the firm (Sutton, 1997). Gibrat and others have shown that this stochastic growth process generates a size distribution of firms which is approximately lognormal. Early tests on stochastic growth models therefore relied on investigating the shape of the size distribution of firms. This approach was deemed to be weak as it does not test the growth-size relationship directly (Hall, 1987).

Studies during the 1950s and 1960s examined the firm growth-size relationship directly using panel data and the results raised serious doubts about Gibrat's Law as most of them run against it. Those studies themselves however suffered from important econometric problems like sample selection bias and heteroscedasticity. The empirical studies since the 1980s (Evans, 1987; Hall, 1987) therefore focused on correcting these empirical problems. In effect the latest studies investigate whether the rejection of Gibrat's Law was the result of sample selection bias as pointed out by Mansfield (1962). The results from such studies confirmed that firm growth rate conditional on survival is decreasing in size and this outcome is not an artefact of selection bias. However, the failure of Gibrat's Law seems to attenuate for samples restricted to large firms.

5.1 Empirical Approach

This section investigates growth of manufacturing firms in Ethiopia conditional on initial size and age. The growth equation is given as follows:

$$\ln\left[S_t / S_{t'}\right] / \left[t - t'\right] = \beta' X_i + u_i \qquad (8)$$

Where S_t is current size, $S_{t'}$ is initial size, $t-t'$ is the number of years between the two periods, and X_i is a vector of explanatory variables including initial age and size, β' is a vector of regression coefficients, and u_i is a zero mean, constant variance disturbance term.

The problem with equation (8) is that the dependent variable is observable only for firms that existed in both period t and t'. For firms that exited between these two dates, growth rate is not observable. Estimating the regression coefficients under this condition would not have been a problem if firm exit was a random process or the rate of exit is empirically insignificant. Figure 2 shows that exit rate is about 15% which is not an insignificant amount. Studies for other countries also show that slow growing small firms are most likely to exit the market than slow growing large firms. Such non-random attrition effect introduces a selection bias in the sample even before starting the analysis.

Heckman's (1973) two-step estimation method has been widely used to correct for sample selection bias. It starts by first estimating a selection model using the probit estimator. Let's rewrite the growth regression again:

$$G_i = \frac{[\ln S_t - \ln S_{t'}]}{[t-t']} = \beta' X_i + u_i \tag{9}$$

As already indicated a survival model underlies this growth model which can be represented as follows:

$$Y_i = \alpha' Z_i + v_i \tag{10}$$

Where Z_i is a vector of explanatory variables, α_i' is a vector of coefficients, $u_i \sim N(0,\sigma)$, $v_i \sim N(0,1)$ and $corr(u_i, v_i) = \rho$. Notice that Z_i may include X_i.

The growth rate G_i is observable if $Y_i > 0$. Hechman's model therefore estimates the expectation of growth conditional on survival.

$$E\left[G_i \middle| Y_i > 0\right] = E\left[G \middle| v_i > -\alpha' Z_i\right] \tag{11}$$

$$= \beta' X_i + E\left[u_i \middle| v_i > -\alpha' Z_i\right] \tag{12}$$

$$= \beta' X_i + \rho\sigma_v \lambda_i \left(\frac{-\alpha' Z_i}{\sigma_u} \right) \tag{13}$$

$$= \beta' X_i + \beta_\lambda \lambda_i \left(\frac{-\alpha' Z_i}{\sigma_u} \right) + w_i \tag{14}$$

Where $\lambda_i(.)$ represents the inverse Mills ratio $\frac{\phi\left(\alpha' Z_i / \sigma_u\right)}{\Phi\left(\alpha' Z_i / \sigma_u\right)}$, $\phi(.)$ and $\Phi(.)$ represent the normal density and the cumulative density function, respectively.

Equation (14) therefore transforms what was a sample selection bias into an omitted variable bias, the omitted variable being $\lambda_i \left(\frac{-\alpha' Z_i}{\sigma_u} \right)$. Notice that a positive correlation between the stochastic disturbances in equations (8) and (10) will lead to an upward bias in firm growth. A zero correlation ($\rho = 0$) would mean that there is no selection bias although initial size and age may be significant in both the growth and survival equations

Ideally one would have a variable that identifies the selection correction term to solve the selectivity bias. In this paper I do not have such a variable that affects survival but does not influence firm growth. Identification is therefore based on differences in functional forms although it is obvious that this is a week basis for identification. Instead I include in the firm growth regression variables that feature in the survival model and explore the effect on the selection correction term. To this effect three models have been tested as shown in table 4 and for each model OLS estimates are juxtaposed with estimates from a Heckman selection correction model. The first model (Model I) includes only initial age and size as well as their quadratic terms to control for potential non-linearity in the relationship. This has been the model tested in several firm growth regression models in the literature. The second model (Model II) expands the basic model by including a productivity term and market share; two continuous variables which feature in the survival model. The third model (Model III) includes dummy variables indicating whether a firm exports, faces high import competition, has some foreign capital, is a public enterprise, has made investment, and advertises its product. Apart from this, all models control for industry and region effects.

Before we look at the regression results it is useful to see some descriptive statistic on firm growth in terms of employment. Figure 6 shows that total manufacturing employment in Ethiopia has been declining during the study period and the decline is confined to large enterprises that employ at least 100 persons. Small and medium size enterprises have achieved a positive albeit modest employment growth especially since 2000.

Figure 6

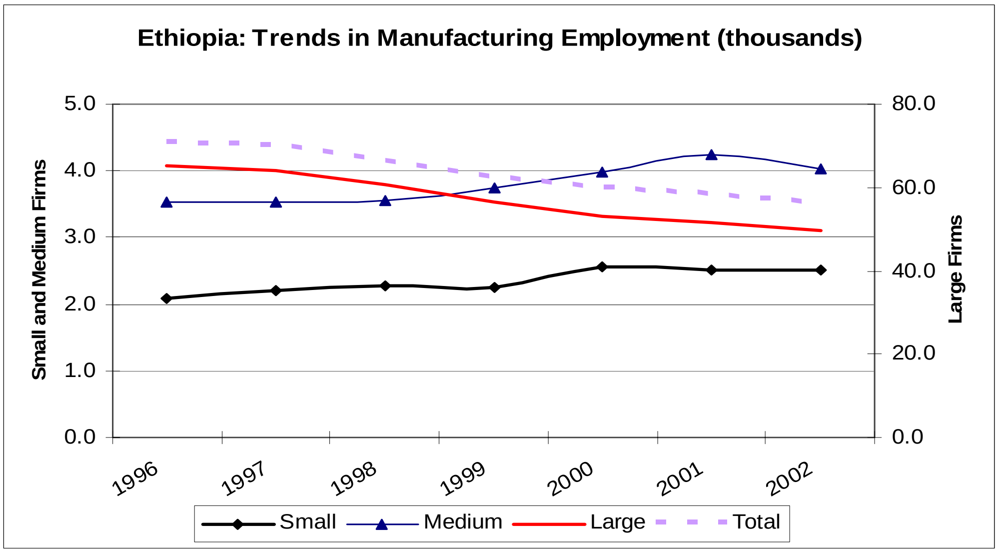


Table 3 shows that a great majority of small firms (86.3%) have experienced employment growth during the period 1996-2002. The proportion of firms with positive growth rate however declines with firm size. Only 61% of medium size enterprises and 30% of large enterprises have positive employment growth during the study period. Overall, about 30% of all firms have shaded labour and most of them are large firms. As a result of this, the average firm size in Ethiopian manufacturing has declined steadily from 136 employees in 1996 to 98 in 2002. This observation constitutes a preliminary indication that firm growth declines with firm size at least in this sample.

Table 3
Proportion of Firms with Positive and Negative Growth Rates (1996-2002)

	Negative (%)	Positive (%)
Small	13.70	86.30
Medium	39.22	60.78
Large	69.57	30.43
Total	30.74	69.26

Note: About 3% of small and medium enterprises have zero growth rates each for this period.

5.2 Results of Firm Growth Regression

The growth regression is carried out for the period 1996-2002. Table 4 reports OLS estimates in juxtaposition with the coefficients of the selection correction model. Table 5 on the other hand presents the partial derivatives of growth with respect to size and age estimated at the sample means.

Table 4
Firm Growth Regression (1996–2002)

	I		II		III	
	OLS	Selection	OLS	Selection	OLS	Selection
Log _ size	-0.0568*** (0.0186)	-0.1001*** (0.0290)	-0.0992*** (0.0191)	-0.1019*** (0.0196)	-0.0990*** (0.0199)	-0.0896*** (0.0206)
Log _ size^2	0.0041** (0.0020)	0.0072*** (0.0021)	0.0057*** (0.0019)	0.0060*** (0.0020)	0.0052*** (0.0020)	0.0043** (0.0021)
log_ age	-0.0395*** (0.0145)	-0.0302** (0.0147)	-0.0440*** (0.0138)	-0.0425*** (0.0139)	-0.0404*** (0.0138)	-0.0462*** (0.0142)
log_ age^2	0.0101*** (0.0038)	0.0069* (0.0039)	0.0108*** (0.0036)	0.0103*** (0.0037)	0.0101*** (0.0036)	0.0119*** (0.0038)
log_ productivity			-0.0022 (0.0056)	-0.0017 (0.0055)	-0.0007 (0.0056)	-0.0025 (0.0057)
log_ Market Share			0.0251*** (0.0053)	0.0232*** (0.0070)	0.0204*** (0.0054)	0.0267*** (0.0077)
Export					0.0378* (0.0212)	0.0389* (0.0213)
Import Competition					-0.0689*** (0.0237)	-0.0876*** (0.0284)
Foreign Ownership					0.0196 (0.0205)	0.0346 (0.0243)
Public Enterprise					0.0015 (0.0172)	0.0001 (0.0170)
Investment					0.0181* (0.0104)	0.0190* (0.0103)
Advertising					0.0287*** (0.0110)	0.0303*** (0.0109)
Intercept	0.1465*** (0.0531)	0.3422*** (0.0703)	0.3426*** (0.0622)	0.3548*** (0.0671)	0.3273*** (0.0628)	0.2842*** (0.0704)
λ		-0.0859*** (0.0221)		-0.0118 (0.0292)		0.0412 (0.0355)
ρ		-0.8851		-0.1542		0.5195
Wald χ^2		129.37		174.36		200.6
Adjusted R^2	13.6		21.54		24.5	
No. Observations	330	597	326	597	326	597
Censored		271		271		271

Note: *** significant at 1% , ** significant at 5% , * significant at 10%

It is interesting to note that the coefficient of the inverse Mills ratio is negative and statistically significant in Model I which includes only age and size effects. This is because of a negative correlation between the error disturbances of the growth and the selection models (see the sign of ρ). It suggests that there are unobserved features that tend to increase (decrease) the exposure to business failure while at the same time increasing (decreasing) firm growth. This is unlike the results in Hall (1987) and Evans (1987) where they find zero (or a positive but statistically insignificant) value for ρ suggesting no selection bias despite the fact that exiting firms in their sample were slow growing small firms. I find similar result in Model II and Model III which include other covariates. Including firm productivity and market share in Model II renders the selection effect insignificant although it still has a negative sign. In Model III which includes all the variables that feature in the selection model the coefficient of λ becomes positive but statistically insignificantly different from zero. These results suggest that the unobserved selection effect is not a problem and that OLS results are applicable to exiting firms as they are for surviving ones.

Turing to the main story in table 4, it turns out that firm size has a significant negative effect on firm growth in all specifications. Small firms therefore grow faster than large firms although the negative size effect tends to decline beyond a certain threshold as indicated by a significant positive coefficient on the quadratic term. Gibrat's Law of proportional growth therefore does not hold for the Ethiopian sample. The positive coefficient on the squared term indicates that the degree of failure of Gibrat's Law tends to decline among larger firms. Due to the selection bias, OLS estimates in Model I appear to understate the negative effect of initial size on firm growth. Looking at the partial derivate of growth with respect to size, Table 5 shows that except for OLS estimates in Model I, over a period of ten years a one percent increase in initial size at the mean leads to about 0.4 percent growth in size.[4] This shows that small firms grow faster than larger ones and the result is not driven by the way firms are selected into our sample. This result is also consistent with findings from a number of studies that control for sample attrition. Most importantly, the Ethiopian data is consistent with the implications of market selection models where

---

[4] The growth equation can be specified as $\ln S_t = \beta_0 + \beta_1 \ln S_{t'} + \beta_2 \ln A_{t'}$ which implies that $G = \beta_0 + (\beta_1 - 1)\ln S_{t'} + \beta_2 A_{t'}$. In the log linear model, $\beta_1 = 1$ confirms proportional growth while a coefficient less than one rejects Gibrat's Law.

small firms grow faster than large ones. Gunning and Mengistea(2001) report similar results for Ethiopia based on firm level survey data for the 1980s and early 1990s.

On the other hand, firm age does not seem to have significant effect on firm growth once initial size has been controlled for. This is unlike Evans (1987) where he finds for US manufacturing firms old firms grow slower than young firms, controlling for size.

Including additional covariates to the basic firm growth model not only dealt with the selection bias but also revealed interesting observations. The productivity term during the first year of observation does not affect subsequent firm growth while market share does. The insignificance of the efficiency term may appear to be unexpected but should not be surprising as downsizing is one aspect of maintaining or improving efficiency especially among large firms. On the other hand, the significant effect of market share points to the importance of financial constraints on firm growth in countries like Ethiopia with imperfect financial markets. It is interesting to note that while exposure to high competition from imports does not raise the exit hazard, it significantly restrains business expansion and job creation in the manufacturing sector. On the other product differentiation as proxied by the advertisement dummy promotes firm growth as well as survival time. The results also indicate that exporting firms and firms that made positive investment during the first year of observation have managed to grow faster than non-exporters and non-investing firms although the effect is small and statistically significant only at 10%.

Table 5
Partial Derivatives of Firm Growth (at the mean)

	I		**II**		**III**	
With respect to	OLS	Selection	OLS	Selection	OLS	Selection
Size	-0.0277***	-0.0482***	-0.0581***	-0.0587***	-0.0615***	-0.0589***
	(0.0052)	(0.0074)	(0.0077)	(0.0076)	(0.0087)	(0.0086)
Age	0.0037	-0.0006	0.0022	0.0017	0.0031	0.0049
	(0.0047)	(0.0051)	(0.0046)	(0.0046)	(0.0045	(0.0048)

Note: *** significant at 1% , ** significant at 5% , * significant at 10%

Table 6 provides regression results estimated separately for large and, small and medium size firms. One observation is that the negative age and size effect holds only for small and medium size firms. For large firms, age and size have the correct sign but are not statistically significant suggesting that Gibrat's law still holds for samples restricted to large firms. In both sub-samples, the selection effect is statistically insignificant particularly so for small and medium size firms. For large firms, λ is

Table 6
Firm Growth Regression by Size Category
(1996 – 2002)

	Small & Medium	Large	Small & Medium	Large
	OLS	Selection	OLS	Selection
Log _ size	-0.1610*** (0.0612)	-0.1503*** (0.0571)	-0.0495 (0.0895)	-0.0251 (0.0838)
Log _ size^2	0.0137 (0.00989)	0.0128 (0.0091)	0.0024 (0.0070)	0.0005 (0.0066)
log_ age	-0.0593*** (0.0198)	-0.0692*** (0.0209)	-0.0211 (0.0232)	-0.0165 (0.0213)
log_ age^2	0.0157*** (0.0054)	0.0186*** (0.0059)	0.0076 (0.0054)	0.0067 (0.0049)
log_ productivity	0.0036 (0.0083)	0.0004 (0.0087)	0.0101 (0.0091)	0.0069 (0.0086)
log_ Market share	0.0182** (0.0076)	0.0291** (0.0130)	0.0077 (0.0106)	0.0136 (0.0104)
Export	0.0535 (0.0633)	0.0549 (0.0638)	0.0239 (0.0223)	0.0173 (0.0209)
Import competition	-0.0367 (0.0332)	-0.0737 (0.0485)	0.0248 (0.0638)	-0.0035 (0.0603)
Foreign ownership	0.0085 (0.0242)	0.0371 (0.0374)	0.0647 (0.0582)	0.0445* (0.0539)
Public enterprise	0.0239 (0.0283)	0.0080 (0.0322)	-0.0429 (0.0289)	-0.0446 (0.0261)
Investment	0.0196 (0.0134)	0.0202 (0.0133)	-0.0100 (0.0204)	-0.0061 (0.0186)
Advertising	0.0109 (0.0153)	0.0141 (0.0156)	0.0407** (0.0172)	0.0390** (0.0158)
Intercept	0.4350*** (0.1068)	0.3841*** (0.1110)	0.2147 (0.2907)	0.0950 (0.2668)
λ		0.0588 (0.0561)		0.0557 (0.0356)
ρ		0.6606		0.9237
Wald χ^2		162.45		199.04
Adjusted R^2	22.25		20.10	
No. observations	205	461	121	136
Censored		256		15

Note: *** significant at 1% , ** significant at 5% , * significant at 10%

significant at 11% level of significance. Only two variables are statistically significant in the growth regression of large firms, i.e., foreign ownership and advertising. This suggests that foreign technological inputs and the introduction of new products or new varieties of existing products play key role for employment growth among large firms. For small firms though, initial age and size are the most important determinants of growth. Small firms with relatively large initial market share tend to growth faster perhaps because of the importance of financial constraints for firm growth which happens to be significant for small and medium size firms only.

6 CONCLUSION

On average about 20% of firms enter Ethiopia manufacturing industries every year. This rate is comparable to observations from other developing countries and most of the variation in the rate of entry is across industries rather than overtime. Capital intensity and market concentration appear to act as entry barriers. Also as documented in other studies, the rate of entry is highly correlated with exit rate. Survival therefore seems to be much more difficult than overcoming entry barriers.

The baseline hazard has interesting relations with different covariates. As predicted by theories of industrial evolution, the risk of exit varies inversely with initial size and hence small firms are more likely to exit than larger ones. A non-parametric analysis reveals that the risk of exit for entrants tends to rise during the first four years and starts to decline afterwards showing that firms learn survival skills as they get older. This implies that contemporaneous hazard of business failure exhibits a negative duration dependence after a threshold point, a fact confirmed by a less than one coefficient on age dummies. Undertaking investment and having a positive share of foreign capital prolongs survival time significantly. Improving the investment climate to increase the proportion of investing firms and to attract foreign direct investment would improve survival probability of entrants.

The paper shows that the distribution of growth among surviving firms is not random and proportional to initial size as stated in Gibrat's Law. Rather, small firms in this sample grow faster than large firms in conformity with theories of industrial evolution. However, Gibrat's Law seems to hold among large firms where growth rate does not depend on initial size. The paper shows unobserved selection effect may bias

OLS estimates if only size and age are included in the growth regression. While the existence of such a selection effect does not change the overall conclusion that small firms grow faster than larger ones, the selection bias becomes statistically insignificant once other covariates that feature in the survival model are included in the growth regression. Firm growth is positively associated with market share in Ethiopian manufacturing particularly among small and medium size firms suggesting the importance of financial constraints for firm growth. Productivity seems to be more important for firm survival rather than for growth as efficiency gains could be achieved through downsizing. Firms that operate in industries with high competition from imports achieve slower growth rates as compared to those with relatively less import competition. This happens even after controlling for initial differences in firm level market shares. It suggests that import competition tends to shrink an industry's market share leaving firm level market shares unchanged hence exerting an independent effect on firm growth. On the other hand presence of foreign capital and product differentiation significantly increase growth rate particularly among large firms.

REFERENCES

Audretsch, D. and Mahmood, T. (1994) 'The Rate of Hazard Confronting New Firms and Plants in US Manufacturing', *Review of Industrial Manufacturing* 9, 1, 41 – 56.

Bartelsman, E., S. Scarpetta, and F. Schivardi (2003) 'Comparative Analysis of Firm Demographics and Survival: Micro-level Evidence for the OECD Countries', *Economics Department Working Papers,* No.348, OECD, Paris.

Bernard, A.B., Jonathan E., Bradford J., Samuel, K. (2002) 'Plants and Productivity in International Trade' *American Economic Review* 93,4,1268-90.

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

Cox, D.R. (1972) 'Regression Models and Life Tables', *Journal of the Royal Statistical Society, Series B* 34, 2, 187-202.

Dunne, P. and A. Hughes (1994) 'Age, Size, Growth and Survival: UK Companies in the 1980s' *Journal of Industrial Economics* 42, 2, 115-140.

Evans, S.D. (1987a) 'Tests of Alternative Theories of Firm Growth' *Journal of Political Economy 95, 41, 657-74.*

Evans, S.D. (1987b) ‘The Relationship Between Firm Growth, Size, and Age: Estimates for 100 Manufacturing Industries’ *Journal of Industrial Economics* XXXV, 567-81.

Frazer, G. (2005) ‘Which Firms Die? A Look at Manufacturing Firm Exit in Ghana.’ *Economic Development and Cultural Change* 53, 3, 585-617.

Geroski, Paul. (1995) ‘What do we Know about Entry?’ *International Journal of Industrial Organization* 13, 421-440.

Geroski, P. and J. Schwalbach (eds.) (1991) *Entry and Market Contestability: An international Comparison*. Blackwell, Oxford.

Gunning, J.W. and T. Mengistae (2001) ‘Determinants of African Manufacturing Investment:The Microeconomic Evidence’ *Journal of African Economies* 10, 2, 48-80.

Hall, H.B. (1987) ‘The Relationship Between Firm Size and Firm Growth in The US Manufacturing Sector’ *Journal of Industrial Economics,* XXXV, 583-605.

Hechman, J.J. (1979) ‘Sample Selection Bias as a Specification Error’ *Econometrica* 47, 153-151.

Jovanovic, B. (1982) ‘Selection and the Evolution of Industry’ *Econometrica* 50,3, 649-70.

Liedholm C. and D.C. Mead (1999) *Small Enterprises and Economic Development.* Routledge, London.

Levinsohn, J. and A. Peterin (2003) ‘Estimating Production Functions Using Inputs to Control for Unobservables’ *Review of Economic Studies*, 70, 317-341.

Little, I., D. Mazumdar and J.M. Page (1987) *Small Manufacturing Enterprises: A Comparative Analysis of Indian and Other Economies*. NY: Oxford University Press.

Mansfield, E. (1962) ‘Entry, Gibrat’s Law, Innovation, and the Growth of Firms’ *American Economic Review* 52, 5, 1023-51.

McPherson, Micheal A. (1995) ‘The Hazard of Small Firms in Southern Africa’ *Journal of Development Studies* 32(October), 31-54.

McPherson, Micheal A. (1996) ‘Growth of Micro and Small Enterprises in Southern Africa’ *Journal of Development Economics* 48, 53-77.

Shiferaw, A. (2005) ‘Firm Heterogeneity and Market Selection in Sub-Saharan Africa: Does it Spur Industrial Progress’, *Institute of Social Studies Working Papers,* No. 414. The Hague.

Solow, R. (1956) ‘A contribution to the theory of economic growth.’ *Quarterly Journal of Economics* 70, 65-94.

Sutton, J. (1997) ‘Gibrat’s Legacy’ Journal of Economic Literature 35, 40-59.

Troske, K. (1989) ‘The Life-Cycle Behaviour of Establishments’, Mimeo, University of Chicago.

Tybout, J.R. (20000 ‘Manufacturing Firms in Developing Countries: How Well Do They Do, and Why?’ *Journal of Economic Literature* XXXVIII, 11-44.

World Bank (2005) World Development Report 2005. A Better Investment Climate for Everyone. New York: Oxford University Press.