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Firm Size and Rate of Growth of Ugandan Manufacturing Firms

Babirye Stella, Niringiye Aggrey[1] and Katerega Eseza
Makerere University, Kampala, Uganda

Abstract

This paper aimed at investigating whether small and medium manufacturing firms grow faster than large firms. The dynamics of firm growth is an interesting and important study topic because the growth of firms is a main ingredient in economic growth and has an impact on the consequences of industrial concentration. The descriptive results showed that medium firms grow faster than the small and large firms. The regression results also confirmed that medium firms significantly grow faster than the small firms and large firms, contradicting the Porters "stuck in the middle" hypothesis. Regression results also showed no significant difference between the growth of small and large firms, a finding that is consistent with Gibrats law. To promote growth of firms Ugandan there is need to formulate policies that promote growth of small firms such as tax holidays that are currently being enjoyed only by medium and large firms.

Jel code: O31, O32, O33, L11, L12, L16.

Keywords: *Firm size, Gibrats law, Growth and Catching-up*

1. Introduction

This paper investigates the dynamics of firm growth in the Ugandan manufacturing sector during the recent past. The dynamics of firm growth is an interesting and important study topic because the growth of firms facilitates poverty reduction through fiscal transfers and income from employment. In addition, the actual dynamics has an impact on the consequences of industrial concentration. The extent which smaller firms catch up with large firms is an important check on the development of monopoly power by the large firms in the economy. In theory, firms grow by making good investments that allow them to earn a profit by satisfying tastes and demands of consumers better than their competitors.

Should industrial policy be neutral with respect to size, or favor a certain size category of firms? (Niringiye et al, 2010). Despite this unanswered question, there is limited knowledge on whether small, medium and large firms grow at different rates in Uganda. Knowledge on the size growth relationship would guide policy makers to target resources to firms, which employ them more efficiently. Evidence showing that few rapidly growing firms stand for most of the net creation of jobs has sparked interest among researchers and policy maker for so called high growth firms. The high growth firms' contribution to the net creation of jobs far surpasses that of other categories of firms (Henrekson and Johansson, 2010). However in Ugandan case, we don't know the size category that is composed of high growth firms. This paper answers the question "Do small and medium firms grow faster than large ones?"

[1] Correspondence to Niringiye Aggrey, Email address: aggrey1970@yahoo.com

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The theory of the dynamic aspects of firms can be traced back to Alfred Marshall (1920). In his Principles of Economics, Marshall discusses the entry of firms, their growth, and finally, their decline and exit. Marshal suggests that larger firms are prone to inertia, and the bureaucratic ossification that goes along with age, they are unlikely to have flexibility to make rapid adjustments to changing circumstances and are likely to lose out in the performance stakes to smaller and more agile firms. The dynamic approach is perhaps best associated with Joseph Schumpeter (1942). Like Marshall, Schumpeter emphasized the role of innovations and experiments in the workings of the dynamic economy (Metcalfe, 2010). He believed that the innovative force of firm entry, along with new designs and better products, is what transforms the market system from within. It does so by destroying the previously established structure in a process that Schumpeter later called creative destruction (Schumpeter, 1942).In Schumpeter's view, creative destruction is intimately connected with technology. Writing in the early 20th century, Schumpeter focused on the role of new entry and entrepreneurial small firms as drivers of innovation and economic progress. Later however, with the rise of large business in the interwar period, he came to revise his theory, emphasizing larger firms, which benefit from increasing returns, as the driving force behind new innovations.

Gibrat(1931) devised a model of the dynamics of individual firms that predicts that all firms grow at the same proportional rate, irrespective of their initial size (Gibrat's law) implying that large, medium and small firms have the same average proportionate rates of growth. Mansfield (1962), however, argued that the departure from the Law decreases as firm size increases due to the exit of slow-growing small firms from the industry. The learning model by Jovanovic(1982) shows that young firms grow faster than old ones as a result of accumulation of market knowledge overtime. Since young firms are usually smaller than older businesses, Jovanovic concludes that small firms grow faster than large ones.

Other theoretical models of firm growth, such as work by Lucas (1978), Nelson and Winter (1982), and others, have more specific implications for the actual dynamics of individual firm growth. These models emphasize the role of the U-shaped cost curve and learning in the evolution of the firm size distribution. A related set of analytical models explains the distribution of firm size as a function of rigidities and frictions in financial markets (Cabral and Mata, 2003). According to Cabral and Mata (2003), small firms cannot reach their desired size due to financial constraints. In the theory of Rossi-Hansberg et al (2007), however, the size distribution is endogenous to the accumulation of industry specific human capital.

Theory postulates that key features of a large firm are its diverse capabilities, abilities to exploit economies of scale and the scope and the formalization of procedures. These characteristics, by making the implementation of operations more effective, allow larger firms to generate superior performance relative to smaller firms (Penrose, 1959; Alexander, 1949; and Ravichandran et al, 2005). Bigger firms also benefit from improved capacity to access critical resources such as business finance (Penrose, 1995). It is also argued that larger firms are more experienced, have enjoyed the benefits of learning, are not prone to liabilities of newness (Stinchcombe, 1965) and can, therefore enjoy superior performance. In addition, Biggs and Srivastava (1996) argues that large firms have an advantage over the smaller ones in the sense that the larger firms can enter into all the product lines that the small firms enter, and that larger firms have an easier access to capital and money market than the less well known small firms. Indeed, access to external sources of finance is now widely recognized as important to firms' ability to survive and grow over time. Large enterprises in developing countries achieve productivity increases to a great extent simply by borrowing from the shelf of technologies available in the world (Christopoulos and Tsionas, 2004). According to Aldrich (2000) and Auster (1986) firm size reflects past success and may influence current firm performance. Alternative points of view suggest that size is correlated with market power (Shepherd, 1986),

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along with market power inefficiencies are developed, leading to relatively inferior performance. Demsetz (1973) , argues that some firms are inherently more efficient than others due to superior management and are therefore rewarded with both growth and elevated profits.

Porter (1985 and 1998) argues that profitable niches are available to both very small and very large firms, but medium firms find it difficult to have profitable niches or are stuck in the middle. Usually, there are profitable localized markets available to small firms and profitable wider markets available to large firms. On the hand, medium size firms, find small niche markets unprofitable and also find it difficult to compete with large firms in the wider market.

However according to (King, 2005) smaller firms are very quick to respond to problems and solve them due to smaller chain of command. In contrast, other research suggests that most small, less wealthy firms especially in poor countries cannot afford financial services, so financial development disproportionately facilitates the growth of large firms (Greenwood and Jovanovic, 1990).It is clear from the above theoretical literature review that the association between firm size and firm growth is not clear.

Empirical scrutiny of Gibrat's law began as early as 1956 by Hart and Prais (1956) and their results did not agree with the law compared to Hymer and Pashigian (1962), Mansfield (1962) studies that empirically validated the Gibrat's Law. The empirical literature on developed economies shows that the key determinants are size and age (see Evans, 1987). Singh and Whittington (1957) tested Gibrat's law for firms in the manufacturing, and found that the growth of firm decreases with size. Most studies (Mata 1994; Hall, 1987; Dunne et al, 1989) find a significant role of size on firm growth. Evans (1987) found that small sized firms tend to grow faster than large firm. In England Dunne and Hughes (1994) reached the same conclusion by using data from 2000 firms and in Taiwan Liu et al. (1999) find negative relationship between the growth and size of firms. Mercedes (2010), in his study of small firms and their capacity to grow, found that smaller firms grow faster than large firms.

Evidence seem to confirm the negative size and firm growth relationship in Botswana, Kenya, Malawi, Swaziland, Burundi, Lesotho, South Africa,Zimbabwe, Ethiopia, and Swaziland (see Mead and Liedholm, 1998; Mengistae, 1998; Sleuwaegen and Goedhuys, 1998; and McPherson, 1996; Aguilar and Kimuyu, 2001). In contrast, Teal (1999) finds firms of different sizes growing at the same rate, suggesting that there is no catching up.

The existing empirical literature (mostly) using manufacturing data provides inconclusive results about the effect of size on firm performance. In addition,the theoretical and empirical literature reviewed is also silent on whether there are variation in growth rates among small, medium and large firms. This study fills the existing empirical research gap on effect of firm size on growth of manufacturing firms in Uganda by investigating whether small, medium and large firms grow at different rates. Evidence from this study will guide policy makers to formulate industry specific strategies. This study, explored the effect of firm size on growth using data from Ugandan manufacturing firms for the period 2001 to 2002. Our results show that there is a positive correlation between average size and firm growth. Moreover, we also find some evidence showing that medium firms grow faster than small firms. In addition the results show that there are no significant growth differences between large and small firms. These findings show that the Gibrat law applies to small and large firms not the medium firms in the Ugandan case. The results also contradict Porters "stuck in the middle" hypothesis. The rest of the paper is organized as follow. The next section describes the methodology. The third section discusses the results. The last section concludes.

2. Methodology

The Model: As a basic theoretical framework, we adopt and integrate the models of Gibrat (1931) and Jovannovic (1982) that focus on size and age (e.g. Brock and Evans, 1986). Gibrat's LPE pioneering model assumes that firm growth rates are independent of initial firm size, and the variance of firm growth rates is also independent of firm size. The Jovanovic model shows that younger firms accumulate market knowledge over time and are therefore able to improve their performance. According to this model, young firms which are usually small grow faster than large ones.

We estimate the basic age-size-growth model that takes the following very simple form:

$$(S_{it} - S_{it-1}) / S_{it-1} = F(A_{it}, S_{it}) + \mu + d_{it} + \varepsilon_{it} \quad \ldots\ldots(1)$$

where S_{it} stands for size of firm i at time t, A_{it} for age at time t, μ represents the firm random effects, d_{it} is a set of time dummies defined separately, ε_{it} is a random disturbance and is independent of size and age. Size and age variables are expected to represent everything happening inside the firms. Size may represent the firm capabilities, and age may represent accumulated capabilities (Jovannovic 1982; Nelson and Winter 1982).

Firm growth is defined as the relative change in a firm's number of permanent employees over a period of time. This measure is preferred to other measures such as sales, given that it is less prone to measurement errors and it does not need to be deflated (see Nkurunziza, 2004). Besides the use of the continuous firm size variable we use dummies to represent the three groups of firm sizes (i.e. small (<50 employees), medium (50<100 employees) and large (100+employees)) to detect variations in sensitivity of growth in the different size groups. For the firm age, two alternative proxies are used, first, a variable showing the years that each firm is under operation and second, a dummy variable that takes the value of 1 for firms with less than 5 years in operation, 2 for firms with more than 5 but less than 10 years in operation, and 3 for firms with more than 10 years in operation. Ugandan firms are young with an average of 14.4 years because of the country's short history of development

Data used: This study utilized RPED data set that was collected in 2003 by the World Bank on 300 manufacturing firms in Uganda. The standard questionnaire administered in these surveys has a number of sections covering firm characteristics. The survey was stratified according to location, sector and size. Data was gathered through face-to-face interviews conducted with senior managers or owners and accountants.

3. Results

3.1. Descriptive results

Table 1 presents the distribution of the growth of firms in the sample according to age and size. Young firms compared to old firms, small firms compared to large firms, and medium firms compared to large and small firms were more likely on average to grow faster. We proceed next by analyzing these mechanisms using econometric methods.

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Table 1. Growth rates by size and age

Variable	Average growth rate of firms
Old firms(10+ years)	.0453(107)
Young firms(<10 years)	.199(165)
Small firms(<50 workers)	.141(216)
Medium firms(50-100 workers)	.286(24)
Large firms(100+ workers)	.008(32)
Overall	.138(272)

**Figures in the parenthesis are the number of firms.*

3.2. Regression Results

The results show that firm size is positively associated with firm growth, a finding that is consistent with that of Singh and Whittington (1975) who found a positive relationship between firm size and firm growth in a study on manufacturing firms in UK(Table 2). This finding contradicts both the Gibrat's LPE model which predicts that firm growth is independent of firm size. The existence of a positive relationship between firm growth and firm size and no association between firm size squared and firm growth suggest that firm growth increases with size of firm until when a firm size threshold is reached and firm growth is no different from the growth of small firms. Regression results in equation 3 confirm this result because medium sized firms are shown to grow faster than small firms but large firm's growth rates are not significantly different from the growth rates of small firms. This finding is also consistent with Bain (1956) argument that there is a Minimum Efficient Scale (MES) which is achieved when a firm attains a size corresponding with the minimum long run average cost. Firms with sizes smaller than the MES enjoy economies of scale until they reach the MES but all firms beyond the MES are characterized by constant returns to scale. However, MES may differ according to the type and level of technology for respective firms.

Table 2: GLS Random regression estimates for equations (1-4) Dependent variable: Growth rate

Variable	1	2	3	4
Constant	.098(2.08)**	.269(1.77)*	.171(5.06)***	.0894(1.30)
Ln(size)	.089(2.61)***	.0769(3.95)***		.0608(3.3)***
Ln(age)	-.142(-2.79)***	-.143(-4.26)***	-.103(-2.76)***	
$Ln(size^2)$		-.0144(-.90)		
$Ln(age^2)$		.014(.94)		
Median size firm dummy			.091(1.68)*	
Large size firm dummy			-.039(-.78)	

Median age firms				-.152(-2.3)**
dummy(5-<10years)				
Old firms(10+years)				-.235(3.3)***
R^2: Within	.130	.024	.0344	.026
R^2:Between	.0287	.085	.0663	.054
R^2:Overall	.0245	.064	.0240	.040
Wald chi2	13.38	25.35	13.38	17.81
Prob>chi2	.0039	.000	.0039	.0005
No. of observations	546	454	548	454

****, **, and *: indicates significance at 1%, 5% and 10% respectively. Values in parenthesis are robust Z-statistics*

The results show a negative association between age and firm growth in Ugandan manufacturing firms. This result confirms Jovanovic's model, which predicts a negative relationship between age and firm growth. This finding is also consistent with evidence that confirm the negative relationship between firm age and firm growth in Botswana, Kenya, Malawi, Swaziland, Zimbabwe, Ethiopia, Burundi, Lesotho, South Africa and Swaziland (see Mead and Liedholm, 1998; Mengistae, 1998; Sleuwaegen and Goedhuys, 1998; Oliveira and Fortunato, 2008; McPherson, 1996; Aguilar and Kimuyu,2001).The study also showed that old and medium aged firm's growth rates are lower than the growth rates of young firms. This is also consistent with the findings of studies in both Africa and Latin America which show that young medium scale firms are more likely to grow at high rates of growth compared with medium scale firms that have been in existence longer (Liedholm,2002). Old firms may not invest sufficiently in existing, leaving them with relatively outmoded equipment and hindering productivity levels compared to younger firms. Jovanovic (1982) explains this negative relationship between firm age and growth with a learning model in which a firm expands quickly at first, and then tapers off its growth as it approaches its optimal size. However, the findings do not confirm a nonlinear relationship between firm age and growth.

4. Conclusion and policy implications

This study investigated the relationship between firm size and firm growth in Ugandan manufacturing firms. The central question was, "Do small and medium firms grow faster than large firms". The theoretical and empirical literature is silent on whether there are variation in growth rates among the small, medium and large firms. This study filled this literature gap by investigating whether large and medium firms grow faster than small firms. The descriptive results showed that medium firms grow faster than the small and large firms. The regression results also confirmed that medium firms significantly grow faster than the small firms and large firms contradicting the Porters "stuck in the middle" hypothesis. Since medium-sized enterprises are shown to grow faster than the small and large, the government should base its policy on this type of enterprises which has a significant potential for job creation. Regression results showed no significant difference between the growth of small and large firms, a finding that is consistent with Gibrats law. However, growth is a dynamic process and the long-term environmental conditions may affect the results at another point of time.

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Some policy implication emerge from the findings of this study. Results from this study on the size -growth of firms relationship should guide government policy makers to target firms that will contribute to employment creation and poverty reduction. To promote growth of firms Ugandan policy makers should formulate policies that promote growth of small firms such as as tax holidays that are currently being enjoyed only by medium and large firms in Uganda.

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