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RESEARCH ARTICLE:

Do Firms' Growth Rates Follow a Random Walk? Evidence from Incubated Small and Medium Enterprises in South Africa

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Abstract

Debate on the validity of the Law of Proportionate Effect (LPE) on firm growth is ongoing decades after it was postulated by Gibrat in 1931. The theoretical model which asserts that firm growth follows a random walk has been largely tested in developed economies using data from non-incubated firms, with scanty research in developing regions like Africa. This paper, therefore, aims to address this gap by being the first to assess the validity of Gibrat's law on incubated small, medium, and micro enterprises (SMMEs) in South Africa. The study utilised four-year panel data from 300 incubated SMMEs across the country, for the period between 2018 to 2021. Utilising the Law's generalised growth rate model, the generalised least square regression modelling was harnessed, using R Software. The findings, using sales as firm size proxy, confirmed Gibrat's Law. The results showed that firm size had no effect on the sales growth rate of incubated firms, on the other hand when employment proxied performance the LPE was rejected. The findings provide important implications for both practitioners and pertinent stakeholders in the SMME sector in South Africa.

Keywords*: Gibrat's law; incubation; random walk; SMME; South Africa; stochastic*

Introduction

Small, Medium and Micro Enterprises (SMMEs) are key in driving socio-economic development, especially in emerging economies like South Africa (D'imperio, 2015; Herrington and Kew, 2016; Zhou and Gumbo, 2021b). As a result, various governments have over the years developed numerous interventions aimed at driving the growth of SMMEs (National Planning Commission, 2011; MBEC, 2017; Zhou, Dash and Kajiji, 2021). In South Africa, subsidised funding support, market access customised training programmes, and in recent years, incubation programs have been harnessed with the aim of driving the sustainable growth of SMMEs (Hewitt and van Rensburg, 2020; Zhou, 2022). However, several studies have questioned the efficacy of these support programmes as the failure rate in the SMME sector remains disturbingly high (Leboea, 2017; Msimango-Galawe and Hlatshwayo, 2021). Covid-19 has further exacerbated the already struggling sector, with thousands of SMMEs ceasing operations despite desperate support by the government (Bartika *et al.,* 2020). The current trends threaten the cornerstone of the National Development Plan's (NDP's) tripartite objective of reducing poverty, inequality, and unemployment through a thriving SMME sector. The NDP anticipated that the sector will grow the economy by 5.4% per year through to 2030 (National Planning Commission, 2011). However, this has not been the case as SMME failure rate has worsened since the dawn of democracy (Dludlu, 2021).

The continued SMME failure rate has inexorably led to a plethora of enquiries, not only in South Africa but across the world, on the growth process of these enterprises as various stakeholders seek solutions to their continued poor performance (Moorthy *et al.,* 2012; Machado, 2016). To date various theories that explain firm growth patterns and how such relate to size have been postulated (Yasuda, 2005; Achtenhagen, Naldi and Melin, 2010; Machado, 2016; Filho *et al.,* 2017). Gibrat's Law of Proportionate Effect (LPE) assumes that a random walk firm growth process is the most widely researched theory (Geroski, 1999; Geroski, 2005; Malepe, 2014; Masenyetse, 2017).

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This continued interest over the years is understandable as its validity or lack thereof has important implications for both practitioners and policy makers, especially on how support interventions should be crafted. The popularity of this stylised fact lies in that it can be easily tested, making it ideal for studying firm growth (Stam, 2010; Bentzen, Madsen and Smith, 2012). Its tractability has incentivised many to assess this theoretical perspective in many countries (Hall, 1986; Lotti, Santarelli and Vivarelli, 2003; Almsafir *et al.,* 2015).

However, literature review shows that there is a paucity of studies on the growth process of SMMEs, especially those under incubation programme, mainly due to lack of panel data to assess the validity of this theory. In South Africa, at national level the only available studies in the area are by McPherson (1996) and Masenyetse (2017). The former relied on data from only two townships in South Africa while the latter utilised data from the Johannesburg Stock Exchange (JSE). At provincial level, the only available studies are by Malepe (2014) and Zhou and Gumbo (2021a). The former focused on Gauteng and Western Cape provinces, the latter on KwaZulu-Natal (KZN) province; however, the data utilised was only from non-incubated firms. In this light, this paper seeks to address this gap by utilising four-year panel data collected quarterly to investigate the validity of Gibrat's random walk theory on incubated SMMEs in South Africa.

Literature Review

While it is not the governments' direct role to establish and run new businesses, they have a role in ensuring that key fundamentals, like a conducive operating environment, are in place to promote vibrant entrepreneurship (Herrington and Kew, 2016). Numerous interventions, including SMME sector focused policies, have been developed in order to prop up the development of small businesses in an effective way. Emerging economies have established dedicated structures to help promote small business growth through SMME-centric policy formulation (Hyder and Lussier, 2016). Teruel-Carrizosa (2006) contended that governments can directly or otherwise create policies that promote the growth or adversely impact the performance of small businesses. The need for judicious policy interventions was pronounced during the Covid-19 pandemic, which led to the closure of many small businesses (GEN 22 On Sloane, 2020). Recent studies have shown that various countries across the globe have devised numerous interventions aimed at assisting SMMEs survive the impact of the Covid-19 pandemic (Bartika *et al.,* 2020; Adam and Alarifi, 2021; Chen *et al.,* 2022). Adam and Alarifi (2021) argued that during the pandemic, external support like incubation programmes positively impacted the performance of SMMEs. This is in line with submissions by Freire, Neto and Moralles (2022) who argued that incubation support improves beneficiaries' skills to innovate and deal with unexpected external environmental eventualities like Covid-19.

In light of its significant impact on the growth of SMMEs, the incubation concept has gained popularity, especially in developing countries, as governments and various private sector players continue exploring means to drive sustainable growth of small enterprises (Msimango-Galawe and Hlatshwayo, 2021; Nicholls-Nixon and Valliere 2021). The concept, which in recent years has morphed into both physical and virtual configurations, has been marked by considerable success in developed countries as reflected by the sustainable growth of SMMEs in these regions (Nemaenzhe, 2010; Nicholls-Nixon and Valliere, 2021). Lose and Tengeh (2015) argued that incubation programmes have been found to be effective in providing a platform for nurturing small businesses. However, the SMME sector has been found to be heterogeneous, with size and also age being important drivers in the growth of small enterprises (Zhou and Gumbo, 2021a). This begs the question as to whether incubation programmes neutralise the role of size in the growth process of SMMEs. This could be an easier way to assess the impact of incubation, as homogeneous growth rates would imply that both size and age play an insignificant role, whereas customised support impacts the SMME growth process.

Growth is a critical element for small enterprises as their survival in the market depends on it (Machado, 2016). A review of literature shows that whilst firm growth theories abound, much of the research is focused on large enterprises as compared to small firms (O'Farrell and Hitchens, 1988; Miller, 2015; Machado, 2016; Zhou, 2022). There is little known about firm growth, especially relating to small firms, due to the fragmented approach utilised in researching this phenomenon (Wiklund, Patzelt and Shepherd, 2009; Machado, 2016). Limited investigation of various theories using the empirical datasets attest to this challenge. Some firm theories, like the lifecycle theory, have been criticised for being too subjective and difficult to empirically investigate (Farouk and Saleh, 2011). This has led to interest in Gibrat's Law which asserts that firm size growth follows a random walk or stochastic process (Geroski, 1999).

Various studies contend that this theoretical model provides a solid basis for investigating firm growth and in the process offers practical implications for various stakeholders, especially those in the SMME sector (Coad *et al.,* 2016; Masenyetse 2017; Zhou and Gumbo, 2021). The SMME sector is regarded as one of the key avenues through which issues like poverty, inequality and unemployment can be addressed (McPherson 1996; National Planning Commission, 2011; Zondo, 2016). Despite the growing dominance of specialised interventions like the incubation support programme, review of literature shows that the theory has been hardly tested using incubated firms' data, not only within developing but developed countries as well. It thus remains imperative to empirically test this firm growth model with a particular focus on incubated SMMEs in developing countries like South Africa, as the majority of studies on Gibrat's Law have been tested mainly in developed countries, using non-incubated firms' data (Hermelo and Vassolo, 2007; Nassar, Almsafir and Al-Mahrouq, 2014; Zhou and Gumbo, 2021).

The theoretical model that was introduced by Robert Gibrat in 1931 (O'Farrell and Hitchens, 1988; Stam 2010; Malepe, 2014) asserts that all firms have the same growth likelihood regardless of size. The model's claim aligns with the aims of incubation programmes, which aim to provide level ground for all SMMEs' sustainable performance despite their size or experience in the market. The theory charges that firm size follows a random walk, which in essence means that growth is a path dependant process (Geroski, 1999; Geroski, 2005; Stam, 2010). Gibrat's LPE claimed that the growth rate of the firm is independent of its current size and also that the latter, together with growth, show no heteroscedasticity (Bigsten and Gebreeyesus, 2007; Nassar, Almsafir and Al-Mahrouq, 2014). In other words, the theorical model claims that the commensurate firms' growth performance is independent of previous success. The underlying assumption of the model is that a firm's initial stock of resources contracts or expands in response to stochastic shocks and exit occurs when resources drop below minimum threshold (Bentzen, Madsen and Smith, 2012). This ties with Levinthal's (1991) submission, firstly that firm growth follows a stochastic pattern and secondly, that firm survival is dependent on resources to absorb shocks experienced by the business. Gibrat's LPE theory contends that stochastic shocks are independent and identically distributed (iid), thus the log size of the measure follows a normal distribution with mean (μ) and variance (δ^2) (Geroski, 2005; Masenyetse, 2017). More formally represented, the theory claims that firm growth occurs according to the following random process:

$$x_t = x_{t-1} + \varepsilon_t \quad (1)$$

where x_t denotes the log of firm size at time t, and ε_t is a random shock which is multiplicative on a linear scale, but additive in logs with mean μ and standard deviation δ. The theory asserts that factors which influence firm growth are complex and there is no systematic pattern of firm growth across different sizes, as the growth rate distribution is the same for all enterprises despite their size (You, 1995; Geroski, 1999; Teruel-Carrizosa, 2006). This means, as strongly argued by Geroski (2005) that firm growth rate is a function of idiosyncratic shocks that are inherently unpredictable and have a permanent effect on its size. Stochastic theory further postulates that growth is not a function of any structural organisational or environmental characteristics, but rather random exogeneous shocks (Stam, 2010). The unpredictability of these shocks makes it extremely difficult to predict the firm size in the future (Geroski, 1999). Owing to its tractability, Gibrat's LPE has been adapted by various researchers to include additional variables with attention being paid to the size effect (Sutton, 1997; Teruel-Carrizosa, 2006; Coad *et al.,* 2016). Previous studies in this area (Teruel-Carrizosa, 2006; Voulgaris, Agiomirgianakis and Papadogonas, 2015) showed that before the 1960s the theory was largely accepted, while the majority of studies after the 1990s rejected it.

The theory has been mainly tested on non-incubated manufacturing firms with a handful of other studies looking at the services sector (Teruel-Carrizosa, 2006; Nassar, Almsafir and Al-Mahrouq, 2014). Against the backdrop of perennial firm exit from the markets in less than 12 months Agarwal and Gort (2002) rhetorically asked," What is it, other than random shocks…?" which influence firm growth and thus ultimately survival in the marketplace. Recently, as if responding to the duo's question on their study of United Kingdom new ventures, Coad *et al.* (2016) charged that business survival is a function of random shocks, thus advocating for the validity of Gibrat's LPE on firm growth. This assertion has been supported by the Fariborzi, Osiyevskyy and DaSilva (2022) finding on Swiss SMEs, which exhibited homogenous growth rate despite their initial size. Concerningly, Nassar, Almsafir and Al-Mahrouq (2014) noted that there are limited studies on the stochastic theory in developing countries and recommended that studies testing the theory in these countries be undertaken. However, the theory was rejected by all previous studies in South Africa, thus indicating the heterogeneity of SMMEs as captured by their differing growth rates (McPherson, 1996; Malepe, 2014; Masenyetse, 2017; Zhou and Gumbo, 2021).

Further to this, the review of literature revealed that despite the growing role of incubation support to drive sustainable SMMEs growth, there are limited studies assessing whether incubated firms exhibit similar growth rate despite their different sizes. Establishing this would be key as the main assumption behind incubation, as already highlighted, is to provide customised support to beneficiaries and ensure that it is not size that is the main driver of performance but rather the quality of interventions. It is against this backdrop that the study aims to contribute to literature within the South African context, by testing the validity of the random walk theory as postulated by Gibrat on incubated SMMEs. To the best of our knowledge this theory has not been tested on SMMEs under the incubation programme in South Africa before. As such, this study is contributing to literature by being the first to empirically assess its validity using longitudinal data from incubated firms.

Data Analysis

In order to assess the validity of Gibrat's random walk theory, secondary panel four-year data from the Small Enterprise Development Agency (SEDA) was utilised. SEDA is the South African government agency responsible for the running of various SMME funded incubation programmes across the country. The data covered the four years between 2018 and 2021 and was collected on a quarterly basis. The dataset covered a total of 300 SMEs in South Africa. KwaZulu-Natal made up the majority of the SMMEs (64.6%), followed by Gauteng (16.3%), Mpumalanga (11.6%) and Eastern Cape (7.5%). Incubated firms were under this support programme for at least 24 months before graduation. Previous studies utilised data over the same or less time length (Almsafir *et al.,* 2015; Zhou and Gumbo 2021a).

Following previous related studies, logarithm of quarterly sales ($LogSales$) were used as a measure of firm size (Almsafir *et al.,* 2015; Masenyetse, 2017; Adam and Alarifi, 2021). The granularity of sales compared to other firm size measures is a particular strength (Coad *et al.* 2016). The sales growth is considered the realistic indicator of success since other performance figures like income or assets might be biased by diverse accounting practices of private firms (Adam and Alarifi, 2021). Panda (2015) also noted that using workers or assets as firm size proxies tends to create a bias against capital or labour intensive SMMEs, respectively. However, since total number of workers was also included in the dataset, the same was utilised for comparative purposes. Growth was measured as $LogSales_t - LogSales_{t-1}$ where t represents the quarters for the years 2018, 2019, 2020 and 2021.

Control variables

The dataset for the study included various other variables. In order to improve the econometric model's predictive power, these were thus included in the as additional features (Becker 2005). This is in line with previous studies in developing countries (Hermelo and Vassolo, 2007; Özar, Oezertan and İrfanoğlu, 2008) and also an improvement from other studies that were carried out in South Africa (Malepe 2014; Masenyetse 2017; Zhou and Gumbo, 2021). The variables were thus coded for inclusion into the econometric model. Owner's gender (Gen) was proxied by 1 for female and 0 for male SMME owners. Owner's age (Owner_Age) was coded as the difference between the four years between 2018 and 2021 and the entrepreneur's year of birth. Type of registration (Reg) was defined as 1 for limited liability (Pty Ltd) companies and 0 for other. Meeting type (Meet_type) was defined as 1 for virtual and 0 for face to face (in person) engagements. Total number of employees (Tot_emp) was the total number of workers in each of the four years. SMME's age (SME_Age) was coded as the difference between each of the four years and the company's year of registration. One-hot encoding was used to convert SMME sectors into an analysable format with Other_sectors serving as the anchor variable. The same process was utilised for Location (Loc) with rural serving as the anchor variable. R Statistical Software for computing, version 3.6.3 was utilised for the analysis.

SMMEs' size distribution

Following Bigsten and Gebreeyesus (2007) graphical analysis as per Figure 1 below was harnessed to informally assess the random walk theory over the incubation period. The log mean of the SMME size was 10.65, with a standard deviation of 1.47 and skewness of 0.60. The analysis reveals a normal (log) normal distribution-like shape of the incubated SMMEs' sales as suggested by Gibrat's LPE theory.

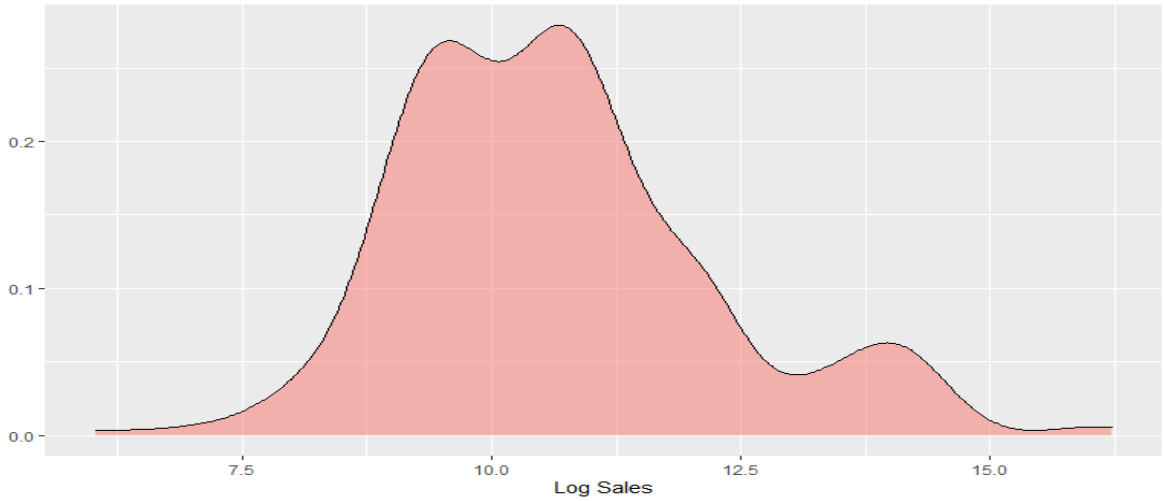

Figure 1: Firm size distribution

As a rule of thumb, a bell shape curve shows that growth rate closely mimics a normal distribution, implying that sales growth of SMMEs during the incubation period followed a stochastic process. However, the graphical analysis is an informal test and to investigate whether the theory holds and if not, to ascertain which firm size grows faster, it requires direct tests (Bigsten and Gebreeyesus, 2007), which are conducted as per the next section.

Econometric modelling

Various authors have tested the Gibrat's Stochastic theory in a formal framework (Geroski, 2005; Teruel-Carrizosa, 2006; Zhou and Gumbo, 2021a). The law claims that firm growth rate probability distribution is the same for all sizes and this can be mathematically expressed as per Equation (2).

$$\frac{S_{it}}{S_{it-1}} = \varepsilon_{it} \quad (2)$$

Where S_{it} denotes firm size at time t, S_{it-1} is firm size at the beginning of the period and ε_{it} is random error term, independently distributed of S_{it-1}. Taking logs of both S_{it} and S_{it-1} as per Equation (2), then the following generalised equation is specified:

$$logS_{it} = \alpha_i + \beta_1 logS_{it-1} + \varepsilon_{it} \quad (3)$$

Equation (2) is commonly refered to as the the logarithmic specification and this can be further exploited to obtain the growth method which is harnessed in this paper to test LPE (Teruel-Carrizosa, 2006; Masenyetse, 2017). This is achieved by obtaining the firm growth rates during the periods "$t-1$" and "t" ($\Delta\log(S_{it})$), as per equation (4).

$$\Delta logS_{it} = \alpha_i + \beta_1 logS_{it-1} + X_{it}B + \varepsilon_{it} \quad here\ \beta_1 = \beta - 1 \quad (4)$$

where α_i is the model intercept, X_{it} contains entrepreneur, firm and environmental factors (control variables), vector B contains the predicated regression weights. Based on Equation (4), β_1 which is the coefficient for size at the start of the period ($logS_{it-1}$), should be significant and equal to 0 in order for Gibrat's Law to be satisfied, thus implying that incubated SMMEs' growth rate is a random walk. However, if the β_1 coefficient is significant and less than zero then it means smaller firms have higher growth rate than large ones, implying a convergence in the industry. On the other hand, if β_1 is significant and greater than zero then large firms will be growing faster than smaller firms and thus divergence in firm size will occur. As already indicated, total workers were also used as size measure for comparative purposes.

Since we are dealing with panel data, the technique adopted for testing the stochastic theory is by Generalized Least Squares (GLS) regression analysis as per a previous related study (Teruel-Carrizosa, 2006; Zhou 2022). This modelling technique ensures that the model outputs standard errors are heteroscedastic consistent (Bigsten and Gebreeyesus, 2007; Perugachi-Diaz and Knapik, 2017). The GLS modelling approach has been found to be

more effective in estimating unknown β coefficients for panel data. GLS also effectively deals with correlation of errors and produces results upon which one can make reliable statistical inference (Perugachi-Diaz and Knapik, 2017).

Empirical results

Our results as per Table 1 as per Model 1 show that Gibrat's stochastic theory is satisfied, which in turn provides key implications on the performance of incubated SMMEs in South Africa.

Table 1: Gibrat's LPE GLS Output

	Model 1: log (Sales)	**Model 2: log (Total Workers)**
α_i	4.730 (4.470)	0.3980 (0.1810)
S_{it-1}	-0.5457 (0.3373)	0.1449*** (0.0070)
Firm_Age	0.5701 (0.1694)	-0.0336*** (0.0072)
Owner_Age	-0.0054 (0.0524)	0.0019 (0.0022)
Reg	-1.4923 (1.5691)	-0.2058*** (0.0668)
Manufacturing	2.1342 (1.5430)	0.1236* (0.0649)
Services	0.8453 (1.5439)	0.2051** (0.0653)
Construction	0.6440 (2.2422)	0.0688 (0.0993)
Agriculture	-0.3878 (1.8777)	0.0694 (0.0746)
Township	0.4960 (1.9008)	-0.0910 (0.0808)
Urban	1.7047 (2.0273)	-0.1451* (0.0819)
Female	-1.0931 (1.0192)	0.0319 (0.0470)
Meet_type	1.5513 (1.297813)	-0.080 (0.0362)
Sales	-	-0.0178 (0.0119)
Total employment	0.029885*** (0.2290)	-
	N = 300 RSE = 0.3256 AIC= -285.5	N = 300 RSE = 2.5954 AIC= -193.4

*The table shows the GLS estimates for testing Gibrat's LPE. Models heteroscedasticity-robust standard errors in parentheses, *** p-value<0.01, ** p-value<0.05, * p-value<0.1.*

Essentially, Model 1 results show that β_1, which is the initial firm size (as proxied by sales), has no significant effect on the growth rate of SMMEs under the incubation programme in South Africa. This is contrary to a plethora of past studies, especially in developing countries like South Africa, which rejected the validity of the random walk phenomenon, establishing that size had a significant impact on growth and small firms grew faster than their larger counterparts (McPherson, 1996; Masenyetse, 2017; Cowling, Liu and Zhang, 2018; Mamburu, 2018; Zhou and Gumbo, 2021a). The finding suggests that the determinants of incubated SMME growth rates are complex and can be hardly be determined as their growth is a function of random shocks on initial firm size (Almsafir *et al*., 2015). Importantly, this finding suggests that the size of an incubated small business does not necessarily determine its growth rate, thus implying that incubated small businesses in South Africa can grow at the same rate as their larger counterparts if they have the right strategies in place (Zhou and Gumbo, 2021). This means that smaller sized businesses should focus on developing effective growth strategies, such as expanding their customer base, developing innovative offerings, or diversifying into new markets.

It's also noteworthy that Gibrat's Law validity not only suggests that incubated SMEs have the same chance of growing as larger businesses, but it also implies that small businesses have the same chance of failing. This means that small businesses under incubation must manage their risks carefully, including financial risks, operational risks, and market risks (Chiliya *et al*., 2015; Crovini, 2019). As a result, incubation programmes should ensure that part of their offerings includes risk management so that incubation beneficiaries can effectively manage their risks and be more likely to succeed even in environments dominated by uncertainty like the Covid-19 pandemic (de Araújo Lima, Crema and Verbano, 2020; GEN 22 On Sloane, 2020; Adam and Alarifi, 2021). The results confirming the stochastic theory indicates that investment in small businesses has the same potential for return as investment in their larger counterparts. Essentially, this finding shows that investors may be more willing to invest in incubated small businesses in South Africa that demonstrate potential for growth and effective strategies for managing risks (Gabriele and Tundis, 2018).

Model 1 indicates that only total workers had a significant (at 1% level) and positive impact on sales. The finding connotes that workers are a valuable asset for incubated small businesses in South Africa, and their contributions can be critical to driving sales growth (Chadwick and Flinchbaugh, 2016; Zhou and Gumbo, 2021b). By extension, this finding requires that small businesses actively invest in their workers by providing training and support to help them develop their skills and expertise, which can ultimately help the business succeed and grow sustainably. However, as already established based on literature (Evans, 1987; Dunne and Hughes, 1994; Zhou and Gumbo, 2021a), the stochastic theory mainly focuses on the impact of initial size on firm growth (Gabriele and Tundis, 2018), which in this case had no significant effect on growth rate. This finding bears important implications for both practitioners and policy makers as incubation support seems to be providing a fair basis for SMME growth despite their sizes. Key to note also is that contrary to Jovanivic's Passive Learning Model (PLM) (Jovanovic 1982) firm experience as proxied by age does not play a significant role in driving sales growth rate for SMMEs under incubation. This finding is indicative of the impactful interventions available to SMMEs under the incubation support programme. This is in line with various studies charging that incubation programmes play a critical role in driving revenue growth of SMMEs, especially in developing countries. Through financial support, mentorship, training, access to networks, and access to markets, incubators provide SMMEs with the resources they need to succeed (Al-Mubaraki and Busler, 2013; Ramar *et al*., 2020; Almeida, Pinto and Henriques, 2021; Rens *et al*., 2021).

In contrast, the result as per Model 2, shows that when employment proxies firm size, Gibrat's Law is rejected, as β_1 is signficant at 1% level. Since $\beta_1 > 0$ then it can be concluded that large sized incubated SMMEs tend to grow faster in terms of employment compared to their younger counterparts. This finding, whilst it aligns with previous studies by rejecting Gibrat's Law, however is interestingly contrary in terms of which firms grow faster. In this case, unlike previous studies, it is large sized firms that grew faster compared to their smaller counterparts (Dunne and Hughes, 1994; McPherson, 1996; Teruel-Carrizosa, 2006; Mamburu, 2018; Zhou and Gumbo, 2021a). The finding, however, aligns with few other studies that established the faster growth rate of large sized firms compared to the small sized ones (Bentzen, Madsen and Smith, 2012; Malepe, 2014). It was also established that operating in the manufacturing (at 10% significance level) and services (at 5% significance level) sectors positively impacted employment growth rate performance compared to SMMEs in other sectors. This is expected as these sectors are largely labour absorptive compared to other industries in the country. On the other hand, Pty Ltd registration type (at 1% significance level) and urban location (at 10% significance level) had an adverse impact on the growth performance of incubated SMMEs. In addition, as argued by the PLM model (Jovanovic, 1982; Navaretti, Castellani and Pieri, 2012), age had a significant inverse relationship with employment growth rate. The key implication of this finding is that large sized firms have high growth tendency in the market, hence increased likelihood of monopolistic trends in the various sectors in which they operate. The fundamental consequence of this trend is the divergence of firm size in the market.

Conclusion and Recommendations

The main objective of this study was to establish if incubated South African SMMEs' growth rate follows a random walk as postulated by Gibrat's Law. The theoretical model was empirically tested on incubated South African SMMEs for the period between 2018 to 2021. Following previous studies, sales turnover was used as a measure of firm size. The results found that incubated SMMEs' growth rate in South Africa does indeed follow a random walk as suggested by the LPE. In the main this implied that incubation neutralised the role of a firm's unique traits like owner's age, gender, experience, among others, in driving the growth of SMME performance. On the other hand, the results differed when employment proxied firm size, as Gibrat's LPE was rejected, and large sized firms grew faster than their smaller-sized counterparts. However, as has been argued by previous studies, employment is not an ideal measure of firm size as this variable can hardly change over short periods of time and also tends to discriminate against capital intensive firms (Coad *et al.,* 2016; Adam and Alarifi, 2021).

Overall, the results provide hope for the South African government as they aim to address the continued failure rate of SMMEs via incubation programmes (DTI 2014). In order to drive SMMEs' sustainable sales growth rate, the South African government needs to rollout incubation programmes. Through incubation, SMMEs will be able to access strategic networks, mentorship and technical business management support among other customised interventions (Ramar *et al*., 2020; Almeida, Pinto and Henriques, 2021). Also, importantly, incubation provides SMMEs with access to finance. Many SMMEs struggle to access finance from conventional lenders, and incubation provides an alternative source of funding (International Finance Corporation, 2019). This is because incubators offer seed capital, grants, and other forms of funding to startups to help them get off the ground (DTI, 2014). This

financial support enables businesses to invest in the right resources, such as equipment, marketing, and skilled labour, which are crucial for revenue growth (Al-Mubaraki and Busler, 2013; Rens *et al*., 2021). The study clearly indicated that labour plays an important role in driving sales growth and thus incubation programmes should provide both generic and technical training support that extends to SMME workers.

It is also noteworthy that these results have important implications for key stakeholders in the SMME ecosystem as this study shows that for incubated SMMEs, their sales growth process is a random process, thus implying that performance is a function of stochastic shocks on size rather than that of a set of a few identifiable endogenous or exogenous factors. It is therefore recommended that the government should promote the roll out of incubation programmes across the country as these help firms to grow despite their resources or experience. From the incubated SMMEs' standpoint, this finding demands that they embed innovation within their business processes to differentiate their products from those of other incumbents. Finally, there are some limitations associated with our study. Firstly, the study mainly focused on incubated firms, thus our findings may not be generalised on non-incubated SMMEs in South Africa and beyond. Secondly, compared to studies in the developed countries, a four-year period is short. In this regard, it is recommended that future studies include non-incubated firms and utilise data that cover periods longer than four years.

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