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An Examination of the Financial Determinants of Growth of the Firm

Abstract

The corporate finance literature has put significant emphasis on how firms make financing, investment and dividend decisions in order to help the firm to grow. It is quite plausible to assume that firms must make productive investment decisions and provide the efficient financing (internal and external) required for investment. One common interest in the literature of corporate finance is that firms must grow in order to secure existence in the market. Positive growth helps firms compete in the market. Negative growth threatens the existence of the firms. Considering that a firm is a nexus of relationships (Eisenberg, 1998; Boatright, 2002; Saint, 2005) that are commonly referred to as contractual relationships, the existence of the firm is interrelated with the interests of diverse of stakeholders where growth of the firm offers benefits to all. This argument implies that growth of the firm is also affected by many factors. A convenient classification to these factors considers that growth of the firm might be related to three groups. The first group includes the inner factors that are under the management control. The second group includes the factors that are related to the market where a firm operates. The third group includes the factors that are related to institutional arrangements that a government regulates to either help firms grow or decline. This paper examines the collective nexus of factors that affect growth of the firm.

Key words: Finance – growth of the firms- size growth theory- financial determines

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إختبار المحددات المالية لنمو الشركة

الملخص

ركزت الدراسات التي أجريت عن تمويل الشركات بشكل كبيرعلى كيفية اتخاذ الشركات قرارات التمويل والاستثمار وتوزيع الأرباح من أجل مساعدة الشركة على النمو. وعليه يمكن افتراض أنه لابد أن تتخذ الشركات قرارات استثمار منتجة وتوفر التمويل الفعال (الداخلي والخارجي) المطلوب للاستثمار. ومن بين الاهتمامات المشتركة في الدراسات حول تمويل الشركات هو أن الشركات يجب أن تنمو من أجل ضمان وجودها في السوق. إذ أن النمو الإيجابي يساعد الشركات على المنافسة في السوق، في حين يهدد النمو السلبي وجودها.

وإذا نظرنا إلى الشركة على أنها رابطة من العلاقات (Eisenberg, 1998; Boatright, 2002; Saint, 2005) يشار إليها عادة بالعلاقات التعاقدية، فإن وجود الشركة مرتبط بمصالح أصحاب المصلحة الذين يستفيدون من نمو الشركة. والجدل القائم هنا هو أن نمو الشركة يتأثر أيضًا بالعديد من العوامل يمكن تصنيفها إلى ثلاث مجموعات. تتضمن المجموعة الأولى العوامل الداخلية التي تخضع لسيطرة الإدارة، في حين تتضمن المجموعة الثانية العوامل المتعلقة بالسوق الذي تعمل فيه الشركة. وتشمل المجموعة الثالثة العوامل المتعلقة بالترتيبات المؤسسية التي تنظمها الحكومة إما لمساعدة الشركات على النمو أو التسبب في تراجعها. تبحث هذه الدراسة في الترابط بين العوامل التي تؤثر على نمو الشركة.

الكلمات المفتاحية: تمويل– نظرية نمو الشركة– نظرية الحجم/ النمو– محددات مالية

1. Size-Growth Theory of the Firm

The literature on growth of the firm examines, in different aspects, the sources and measures of growth. The latter has always been considered a logical justification of the well-being of the firm. That is, a positive growth indicates that a firm has potentials to preserve its existence in the market. The relationship between a firm and its market has been initiated by Robert Gibrat (1931) who argues that growth of the firm follows the lognormal firm-size distribution that is also being recognized as "proportional growth law." The size of the firm is measured by its assets, while growth refers to the asset's productivity. This law assumes that a firm's growth rate is independent of both its current size and its past growth history. This argument implies that growth of the firm does not depend only on its current assets (or investments) but depends on certain factors in the market where a firm operates. This proposition is based on reliable observations in reality. That is, firms vary from each other in terms assets productivity. Firms that use assets efficiently are able to grow than otherwise. In addition, even though a firm may be able to use its assets efficiently, the potentials for growth in the market may require the firm to expand its assets beyond the current size. This is obvious in any firm's balance sheet when a firm issues equity or borrow loans to buy fixed assets. In this case, the size of the firm increases. The otherwise is also true. Firms may reduce production in times of low demand which causes decreasing growth. In these cases, firm's assets, thus its size, change according to potential growth in the market where the firm operates.

The above-mentioned arguments have been subject to examination in many studies in the literature. Kalecki (1945), Hart and Prais (1956), Hart (1962) and Clarke (1979) validated Gibrat's law. Simon and Bonini (1958) report that Gibrat's law holds for firms that are above the minimum size for efficient

operation. Mansfield (1962) extends Gibrat's argument to all firms that belong to the same industry and in competitive market considering that all firms are subject to proportional growth potentials. That is, Mansfield (1962) describes growth-size independence as 'the probability of a given proportionate change in size during a specified period being the same for all firms in a given industry regardless of their size at the beginning of the period' (pp.1030-1031).

Although many studies have examined Gibrat's growth-size independence using static specifications, Ijiri and Simon (1964) have reached the same conclusion using dynamic specifications. Lucas (1967) and Lucas and Prescott (1971) report that firms' capital adjustment, employment and output follow Gibrat's law. In an extended distinguished effort, Lucas (1978) used Gibrat's law to prove the existence of equilibrium firm size in both developed and developing economies.

Although the previous theories apply to the complete size distribution, Scherer (1980) considered small-size firms and reported a negative relationship between the size of the firm and its growth. This case happens when a firm is not using its assets efficiently or a firm reduces production due to a decrease in market demand.

Nelson and Winter (1982) report a simulated concave (or non-linear) relationship which implies that growth of the firm increases then decreases with its size. Nevertheless, their model is considered not analytically tractable. From the 1990s until 2003, other studies in the literature have reported negative relationships between growth of the firm and its size (Almus and Nerlinger, 2000; Audretsch, 1995; Audretsch, Santarelli and Vivarelli, 1999; Bechetti and Trovato, 2002; Caves, 1998; Dunne, Roberts and Samuelson, 1989; Dunne and Hughes, 1994; Evans, 1987; Geroski, 1995; Goddard et al., 2002, Hall 1987; Hart and Oulton, 1996; Mata, 1994; Sutton, 1997; Weiss, 1998). These negative relationships raise the question that firms may expand assets while growth of sales

decreases. Eldomiaty (2010) and Eldomiaty and Rashwan (2011) report that variants of sales ratios have significant influences on growth of the firms. This argument refers to the influence of other factors in the market where the firm operates.

Chen and Lu (2003) added another element to the literature by examining the Taiwanese service sector as well as the usual manufacturing sector. They found that Gibrat's law does not hold for the latter sector but does for the former.

The above-mentioned studies show that size of the firm produces contradicting results. That is, a positive growth-size relationship exists in large firms, whereas a negative relationship exists in small firms. Sutton (1997) offers a support to this conclusion, pointing out that these contradictory results lie in systematic differences in the selected samples. The earlier studies included only large firms, whereas more recent studies have included small firms.

2. Motivation of the Study

This paper is undertaken based on the understanding that the literature on theories of growth of the firm do not include a consensus regarding the factors that can be taken into consideration to enhance firm growth.

3. Objectives of the Study

a) Examine the association between liquidity and firm growth.

b) Examine the association between Asset efficiency and firm growth.

c) Examine the association between Expense Control and firm growth.

d) Examine the association between leverage and firm growth.

e) Examine the association between profitability and firm growth.

4. Contribution of the paper

This paper offers certain contributions to current literature in terms of offering a comprehensive examination of the intrinsic firm-specific determinants of firm growth.

5. Research Hypotheses

General and preliminary hypotheses can be developed as follows.

H1: A positive association exists between liquidity and growth of the firm.

H2: A positive association exists between asset efficiency and growth of the firm.

H3: A positive association exists between expense control and growth of the firm.

H4: A positive association exists between leverage and growth of the firm.

H5: A positive association exists between profitability and growth of the firm.

6. Data

The data are obtained for the non-financial firms listed in two indices: Dow Jones Industrial Average and NASDAQ. The data, being quarterly, allow for the computations of the required statistical parameters and estimations.

6-1 Dependent Variable

The independent variable is growth of the firm (Eldomiaty, 2010). This measure combines firms' growth of total assets and growth of sales. This measure matches the core of Gibrat's Size-Growth theory of the firm.

6-2 Independent Variables

The independent variables include (a) liquidity ratios, (b) asset efficiency ratios, (c) expense control ratios, (d) leverage ratios, (e) profitability ratios.

6-3 Statistical Tests

The author will perform the standard statistical tests that include Normality (Anderson and Darling, 1952). Since the data are cross section–time series panel, the Hausman specification test (Hausman, 1978; Hausman and Taylor, 1981) is required to determine whether the fixed or random effects model fits the data. The test looks for the correlation between the observed x_{it} and the unobserved λ_{k}, thus is run under the hypotheses that follow.

$$\mathrm{H}_0 : \mathrm{cov}(x_{it}, \lambda_{\mathrm{k}}) = 0$$
$$\mathrm{H}_1 : \mathrm{cov}(x_{it}, \lambda_{\mathrm{k}}) \neq 0$$

Where x_{it} = regressors, and λ_{k} =error term.

The issue of linearity versus nonlinearity is examined using Regression Equation Specification Error Test RESET (Ramsey, 1969; Thursby and Schmidt, 1977; Thursby, 1979; Sapra, 2005; Wooldridge, 2006). The test runs under the two hypotheses that follow.

$$\mathrm{H}_0 : \hat{\gamma}^2, \hat{\gamma}^3 = 0$$
$$\mathrm{H}_1 : \hat{\gamma}^2, \hat{\gamma}^3 \neq 0$$

The null hypothesis refers to linearity and the alternative refers to nonlinearity.[1] The multicollinearity is examined using Variance Inflation Factor (Briand and Carter, 2011; Studenmund, 2016).

7. Statistical Estimation

The statistical estimation is carried out through three stages.

$F-\text{statistic} = \dfrac{(\mathrm{SSE_R} - \mathrm{SSE_U}) \div \mathrm{J}}{\mathrm{SSE_U} \div (\mathrm{T} - \mathrm{K})}$ where $\mathrm{SSE_R}$ and $\mathrm{SSE_U}$ are the sum squared errors [1] for the restricted and unrestricted models respectively, J refers to the two hypotheses under consideration, T is the number of observations, and K is the number of regressors.

The estimating equation of the random effect nonlinear model takes the form of Least Squares Dummy Variables (LSDV) that follows.

$$\mathbf{y}_{tk} = \alpha_k + \sum_{i=1}^{k} \beta_{ik} \mathbf{X}_{itk} + \lambda_k + \upsilon_{tk}$$

Where t = 1, …..,n

k = number of firms in each group, $\mathbf{y}_{tk}$ = growth of the firm, $\mathbf{X}_{itk}$ = firm-specific financial ratios, λ_k = Random error term due to the individual effect, υ_{tk} = Random error.

7-1 Testing for Random Vs Fixed Effects (Hausman test)

Since the data are cross section-time series panel, the Hausman specification test (Hausman, 1978; Hausman and Taylor, 1981) is required to determine whether the fixed or random effects model should be used. The test looks for the correlation between the observed x_{it} and the unobservedλ_k thus is run under the hypotheses that follow.

$$H_0: \text{cov}(x_{it}, \lambda_k) = 0$$
$$H_1: \text{cov}(x_{it}, \lambda_k) \neq 0$$

Where x_{it}= regressors, and λ_k=error term.

Table 1: The Results for Hausman Test

Model 1: Main Financial Determinants	**Model 2: Size Effect**	**Model 3: Industry Effect**
$\chi^2(30) = 33.61$ (Prob.= 0.0045)	$\chi^2(30) = 63.07$ (Prob. = 0.008)	$\chi^2(30) = 93.18$ (Prob. = 0.0001)

From the above table, we can conclude that the best model for fitting the first model is fixed effect model as the p-value associated with the test is less than 5%.

7-2 Linearity Vs Nonlinearity Test (RESET)

The issue of linearity versus nonlinearity is addressed and examined as well. Regression Equation Specification Error Test RESET (Ramsey, 1969; Thursby and Schmidt, 1977; Thursby, 1979; Sapra, 2005; Wooldridge, 2006) is employed to test the two hypotheses that follow.

$$H_0: \hat{y}^2, \hat{y}^3 = 0$$
$$H_1: \hat{y}^2, \hat{y}^3 \neq 0$$

The null hypothesis refers to linearity and the alternative refers to nonlinearity.

Table 2: Ramsey RESET test using powers of the fitted values.

Model 1: Main Financial Determinants	**Model 2: Size Effect**	**Model 3: Industry Effect**
F(3, 1176) = 2.14 (Prob > F =0.632	F(3, 1249) =1.88 (Prob > F =0.1803	F(3, 1226) = 2.74 (Prob > F = 0.2109

From the above we can conclude that at 95% confident we fail to reject the null hypothesis of the RESET test which means that the linear model fits the data.

7-3 Heteroskedasticity test

Table 3: The Results for Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity

Model 1: Main Financial Determinants	**Model 2: Size Effect**	**Model 3: Industry Effect**
$\chi^2(1)$ = 272.92 Prob > chi2 = 0.0000	$\chi^2(1)$ = 211.51 Prob > chi2 =0.0000	$\chi^2(1)$ = 266.77 Prob > chi2 =0.0000

From the above table we can conclude that the null-hypothesis of the Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity is rejected and this with confident 95%, this mean that variances of residuals are not constant, this means that we will use the robust estimation to estimate the parameters of the model. The results in (3) show that the null-hypothesis of the Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity is rejected at 1% significance level. That is, the variances of residuals are not constant, which requires the use of robust estimation in order to estimate the parameters of the models under consideration.

8. Results and Discussion

Table 4: The Firm-Specific Determinants of Growth of the Firm

	Model 1: Main Financial Determinants	**Model 2: Size Effect**	**Model 3: Industry Effect**
(Constant)	-0.251	0.041	-0.025
	(-0.056)	(1.810)*	(-2.882)***
Liquidity Ratios			
Quick Ratio	0.002	0.003	0.004
	(2.001)**	(2.197)**	(2.91)**
Cash Ratio	0.088	0.091	0.073
	(1.441)**	(1.118)**	(1.227)**
Assets Efficiency Ratios			
Inventory Turnover	0.00027	0.00019	0.00026
	(2.876)***	(2.104)**	(2.628)***
Inventory Ratio	-0.108	-0.078	0.076
	(-2.099)**	(-1.749)*	-1.129
Days in Period/Inventory Turnover	2.04E-05	1.66E-05	3.00E-05
	(2.333)**	(2.037)**	(2.790)***
Expense Control Ratios			
Operating Expenses/Total Assets	0.077	0.519	0.115
	(2.112)**	(3.210)**	(2.617)***
Debt Financing Ratios			
Long Term	0.089	0.084	0.217

Debt/Total Assets	(3.210)***	(3.001)***	(5.923)***
Profitability Ratios			
Return on Equity	0.0013	0.002	0.0012
	(1.870)**	(2.025)**	(2.075)**
Return on Assets	-0.327	-0.128	-0.277
	(-1.324)	(-0.927)	(-1.135)
Earnings Yield	0.912	0.877	0.886
	(2.771)**	(2.440)***	(2.812)***
Retained Earnings/Total Assets	0.343	0.338	0.329
	(4.288)***	(4.548)***	(4.200)**
Control Variables			
Size (ln Total Assets)		0.084 (4.7998)***	
Type of Industry			Yes
N	4468	4468	4468
F stat	56.21***	48.17***	41.88***
Adj R square	0.2278	0.2669	0.2871
D-W	1.782	2.391	2.861

The results in table (4) show that a positive relationship between liquidity ratios and growth of the firm. The interpretation is that growth of the firm is observed in the short run as far as liquidity ratios are related to investment in current assets. This positive impact of liquidity has been examined as an alternative source of financing in the early beginning of the literature on the determinants of capital structure (Myers, 1977). Further positive impact is reported by related studies such as Kim, et al., (1998) and osler, et al., (1999). This positive relationship is also reported by Megaravalli and Sampagnarob (2018) for a sample of Indian firms, although being observed in two different groups of high and low growth firms which renders those estimates not robust. A further positive relationship is also reported by Mbulawa and ogbenna (2019) for the firms listed in Botswana.

Maksimovic, et al., (2015) argue that liquidity being a source of short-term financing helps absorb shocks in the product market.

Nevertheless, the negative relationship between working capital and growth of the firm is valid in Italy (Megaravalli 2017) as well as in the current study. In this sense, the researcher argues that, as far as the cash and quick ratios are positive, the negative working capital ratio indicates that the observed growth of the firm is associated with inventory and accounts receivable negatively which is an indication to liquidity constraints.

In terms of size, the results in table (4) show that liquidity has a positive impact on the growth of the smaller-size firms (1st Quartile). A comparable result is reported by (Oliveira and Fortunato, 2006) for the Portuguese manufacturing firms. Nevertheless, the results also show a negative impact on the growth of larger-size firms (4th Quartile). These results indicate that liquid cash is necessary for smaller-size firms to grow, while liquid cash has a reverse effect for larger-size firms which might be considered an idle financial resource. This reverse effect is also reported by Goddard, et al., (2002) for the Japanese firms that the distribution of the size is mean-reverting and shows a heterogeneous pattern. An analogous growth patterns are reported for the Spanish firms (Lopez-Garcia and Puente, 2011; Fariñas and Moreno, 2000). Therefore, it can be concluded that Gibrat's Law of Proportionate Effects doesn't hold not only in developed economies such as the US, Japan, and Spain, but also the same finding is reached in developing economies such as Ghana (Yakubu, 2020) and Nigeria (Nkwor and Ikpor, 2019).

The results show consistent, significant, and positive impacts of debt financing on the growth of the firm. A plausible implication can be drawn that debt financing has been used excessively. This is referred to as lack of liquidity constraints. The latter was considered a contributor to the investment behavior of Bulgarian firms

although the lack of liquidity constraints was considered a sign of the weakness of the financial markets to allocate funds efficiently (Budina, et al., 2000). It is worth noting that the positive relationship of debt and liquidity was not observed among the determinants of corporate borrowing (Myers and Rajan, 1998). In addition, Kumar, et al., (1999) conclude that the availability of external financing helps firms grow to a recognizable large size. Ayaydın and Hayaloglu (2014) extend the positive effect of leverage on growth of the firm in Turkey.

Nevertheless, recent evidence on a negative relationship between debt financing (being proxied by debt liquidity risk) and growth of the firm (in terms of growth of assets, sales, employees) is offered by Liu, et al., (2023). It is worth noting that the negative relationship is well-documented as one of the determinants of corporate borrowing (Myers and Rajan, 1998; Bradley et al., 1984; Barclay, et al., 1995; 2003; Rajan and Zingales, 1995).

The Results show a positive relationship between firm profitability and growth of fixed assets using three ratios, namely return on equity, net operating profit ratio, and the percentage of retained earnings. These results offer further emphasis that growth of the US firms is profitable growth. These findings conform to the drivers of growth of the firms where Bottazzi, et al., (2008) found a significant role of profitability to the growth of the Italian firms. Indeed, similar findings were reported for two different groups of countries; developed and developing countries (Demirgüç-Kunt and Maksimovic, 1996). That is, the growth of investment in fixed assets (which is one measure of firm growth) is positively correlated with retained earnings.

The positive coefficient of the Earnings Yield and firm growth carries significant implications. This impact extends the literature about the effects of changes in stock prices on corporate investment decisions. The Earnings Yield offers a link between the changes in firms' net income and the changes in stock prices, and

thus reflects the shareholders' assessment of firms' net income. Mullins and Wadhwani (1989) conclude a significant effect of stock prices on investment decisions in both the US and the UK, although being insignificant in the Germany and Japan. Fischer (1989) argues that the conclusion reached by Mullins and Wadhwani (1989) reflects the impact of the world-wide stock market crash in 1987 on corporate investment plans. Barro (1990) reached a same conclusion for the Canadian firms. Hamada (1989) argues that this impact, although reflective, carries stock market irrationality to the corporate investment decisions.

Nevertheless, Blanchard, et al., (1993) examines the impacts of financial fundamentals on investment decisions over 90 years concluding that, in general, a weak impact of fundamentals. In this sense, the results reported in this paper offer updated evidence that during the period 1990 – 2018, the Earnings Yield, being one the most commonly financial fundamentals, affects the growth of fixed assets positively and significantly. Ayaydın and Hayaloglu (2014) extend the positive effect of profitability on growth of the firm in Turkey.

The Results in table (4) show that the growth of the firm (being associated with increases in total assets) is positively associated with operating expenses, which reflects the nature of business operations. Nevertheless, the negative relationship between firm growth and operating expenses to gross profits indicates that firms' operations are associated with an increasing productions cost that affects gross profits negatively.

9. Conclusion

A general conclusion can be drawn out of the results reported in this paper being examining data about the US firms, which is in line with the findings reported by Bottazzi, et al., (2002) for Italian firms, that growth of the firm does not depend only on size only but also on further firm-specific drivers that include

liquidity, the efficiency of asset management, the debt management, the extent of expense control and profitability. The researcher argues that, as far as the cash and quick ratios are positive, the negative working capital ratio indicates that the observed growth of the firm is associated with inventory and accounts receivable. In addition, debt financing has been used excessively. The positive and significant Earnings Yield offers a link between the changes in firms' net income and the changes in stock prices, and thus reflects the shareholders' assessment of firms' net income. it can be concluded that Gibrat's Law of Proportionate Effects doesn't hold not only in developed economies such as the US, Japan, and Spain, but also the same finding is reached in developing economies such as Ghana and Nigeria.

References

Almus, M. and Nerlinger, E. (2000) 'Testing Gibrat's law for young firms: Empirical results for West Germany', Small Business Economics, Vol. 15, No. 1, pp. 1-12.

Anderson, T. W., and Darling, D. A. 1952. Asymptotic theory of certain 'goodness-of-fit' criteria based on stochastic processes. Annals of Mathematical Statistics, 23(2): 193-212.

Anderson, T. W., and Darling, D. A. 1954. A test of goodness-of-fit. Journal of the American Statistical Association, 49 (268): 765-769.

Audretsch, D. (1995) Innovation and Industry Evolution, MIT Press, Cambridge.

Audretsch, D.B., Santarelli, E. and Vivarelli, M. (1999) 'Start-up size and industrial dynamics: Some evidence from Italian manufacturing', International Journal of Industrial Organization, Vol. 17, No. 7, pp. 965-983.

Barclay, M. J., Marx, L. M. and Smith, C.W. Jr 2003. The joint determination of leverage and Maturity. Journal of Corporate Finance, 9(2): 149-167.

Barclay, M. J., Smith, C. W. and Watts, R. L. 1995. The determinants of corporate leverage and dividend policies. Journal of Applied Corporate Finance, 7(4): 4-19.

Barro, Robert J. 1990. The Stock Market and Investment. The Review of Financial Studies, 3(1): 115-131.

Bechetti, L. and Trovato, G. (2002), 'The determinants of growth for small and medium size firms' Small Business Economics, Vol. 19, No. 4, pp. 291-306.

Blanchard, O., Rhee, C., and Summers, L. 1993. The Stock Market, Profit, and Investment. The Quarterly Journal of Economics, 108(1): 115-136

Boatright, J. R. (2002). Contractors as stakeholders: Reconciling stakeholder theory with the nexus-of contracts firm. Journal of Banking and Finance, Vol. 26, No. 9, pp.1837-1852.

Bottazzi, G. and Angelo, S. and Federico, T. 2008. Productivity, Profitability and Financial Performance (August 2008). Industrial and Corporate Change, 17(4): 711-751.

Bottazzi, G. Cefis, E. and Dosi, G. 2002. Corporate Growth and Industrial Structure: Some Evidence from the Italian Manufacturing Industry. Industrial and Corporate Change, 11(4): 705-723.

Bradley, M., Jarrell, G.A. and Kim, E.H. 1984. On the existence of an optimal capital structure: theory and evidence, The Journal of Finance, 39(3): 857-878.

Briand, G. and Hill, R. Carter. 2011. Using Excel for Principles of Econometrics. 4th edition, Wiley.

Budina, N., Garretsen, H. and Jong, E. 2000. Liquidity Constraints and Investment in Transition Economies: The Case of Bulgaria. Economics of Transition, 8(2): 453-475.

Caves, R. (1998). 'Industrial organization and new findings on the turnover and mobility of firms', Journal of Economic Literature, Vol. 36, No. 4, pp. 1947-1982.

Chen, J. and Lu, W. (2003) 'Panel unit root tests of firm size and its growth', Applied Economics Letters, Vol. 10, No. 6, pp. 343-345.

Clarke, R. (1979) 'On the lognormality of firm and plant size distributions: Some U.K. evidence', Applied Economics, Vol. 11, No. 4, pp. 415-433.

Demirgüç-Kunt, A. and Maksimovic, V. 1996. Financial Constraints, Uses of Funds and Firm Growth: An International Comparison. Policy Research Working Paper No.1671, The World Bank Policy Research Department, Finance and Private Sector Development Division.

Dunne, P. and Hughes, A. (1994) 'Age, size, growth and survival: UK companies in the late 1980s', Journal of Industrial Economics, Vol. 42, No. 2, pp. 115-140.

Dunne, T., Roberts, M. J. and Samuelson, L. (1989) 'The growth and failure of US manufacturing plants', The Quarterly Journal of Economics, Vol. 104, No. 4, pp. 671-698.

Eisenberg, Melvin A. 1998. The Conception That the Corporation Is a Nexus of Contracts, and the Dual Nature of the Firm. Journal of Corporation Law, Vol. 24, pp.819-836.

Eldomiaty, T. 2010. The Contribution of Sales Revenue Management to Firm Growth: A Test of Two Competing Models. International Journal of Revenue Management, 4(2): 131-144.

Eldomiaty, T. and Rashwan, M. 2013. Monitoring Competing Models of Firm Growth using Financial Data? International Journal of Economics & Business Research, 6(1): 69-86.

Evans, D.S. (1987) 'Tests of alternative theories of firm growth', Journal of Political Economy, Vol. 95, No. 4, pp. 657-674.

Fariñas, José C. and L. Moreno, 2000. Firms Growth, Size and Age: A Nonparametric Approach, Review of Industrial Organization, 17: 249–265.

Fischer, S., 1989, The Effect of the Stock Market on Investment: A Comparative Study: Comment, European Economic Review 33, 956-59.

Geroski, P. (1995) 'What do we know about entry?', International Journal of Industrial Organization, Vol. 13, No. 4, pp. 421-440.

Geroski, P. and Mazzucato, M. (2002) 'Learning and the sources of corporate growth', Industrial and Corporate Change, Vol. 11, No. 4, pp. 623-644.

Goddard, J., Wilson, J. and Blandon, P. (2002) 'Panel tests of Gibrat's law for Japanese manufacturing', International Journal of Industrial Organization, Vol. 20, No. 3, pp. 415-433.

Goddard, John, John Wilson, and Peter Blandon. 2002. Panel Tests of Gibrat's Law for Japanese Manufacturing. International Journal of Industrial Organization 20(3): 415-433

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. Econometrica, 37(3), 424-438.

Hair, J.F., Anderson, R.E., Tatham, R.L. and Black, W.C. (1995) Multivariate Data Analysis, 4th ed., Macmillan, New York.

Hall, B. (1987) 'The relationship between firm size and firm growth in the US manufacturing sector', Journal of Industrial Economics, Vol. 35, No. 4, pp. 583-606.

Hamada, K., 1989, The Effect of the Stock Market on Investment: A Comparative Study: Comment, European Economic Review 33, 959-61.

Hart, P. E. and Oulton, N. (1996), 'The size and growth of firms' Economic Journal, Vol. 106, No. 438, pp. 1242-1252.

Hart, P.E. and Prais, S.J. (1956) 'The analysis of business concentration: A statistical approach', Journal of the Royal Statistical Society, Series A (General), Vol. 119, No. 2, pp. 150-191.

Hart, P.E. (1962), 'Size and growth of firms', Economica, Vol. 29, No. 1, pp. 29-39.

Hausman, J. A. 1978. Specification Tests in Econometrics, Econometrica, 46(6): 1251-1271.

Hausman and Taylor, William E. 1981. Panel Data and Unobservable Individual Effects, Econometrica, 49(6): 1377-1398.

Ijiri, Y. and Simon, H.A (1964), 'Business firm growth and size', American Economic Review, Vol. 54, No. 2, pp. 77-89.

Kalecki, M. (1945), 'On the Gibrat distribution', Econometrica, Vol. 13, No. 2, pp. 161-170.

Kim, C.S., D. C. Mauer, and A. E. Sherman. 1998. The Determinants of Corporate Liquidity: Theory and Evidence. Journal of Financial and Quantitative Analysis, 33: 335-359.

Kumar, Krishna B., Rajan, Raghuram G. and Zingales, L. 1999. What Determines Firm Size? NBER, Working Paper 7208, DOI 10.3386/w7208

Liu, Z., Liang, H., and Liu, C. 2023. The effects of debt liquidity risk on firms' growth rate. International Journal of Managerial Finance, Forthcoming, https://doi.org/10.1108/IJMF-02-2022-0073.

Lopez-Garcia, P., and Puente, S. 2011. What Makes a High-Growth Firm? A Dynamic Probit Analysis Using Spanish Firm-Level Data, Small Business Economics 39: 1029–1041.

Lucas, R.E., Jr. (1967) 'Adjustment costs and the theory of supply', Journal of Political Economy, Vol. 75, No. 4, pt. 1, pp. 321-334.

Lucas, R.E., Jr. and Prescott, E.C. (1971) 'Investment under uncertainty', Econometrica, Vol. 39, No. 5, pp. 659-681.

Lucas, R.E., Jr. (1978) 'On the size distribution of business firms', The Bell Journal of Economics, Vol. 9, No. 2, pp. 508-523.

Maksimovic, V., Tham, M., and Yook, Y. 2015. Demand Shock, Liquidity Management, and Firm Growth during the Financial Crisis. Finance and Economics Discussion Series 2015-096. Washington: Board of Governors of the Federal Reserve System, http://dx.doi.org/10.17016/FEDS.2015.096.

Mansfield, E. (1962) 'Entry, Gibrat's law, innovation, and the growth of firms', American Economics Review, Vol. 52, No. 5, pp. 1023-1051.

Mata, J. (1994) 'Firm growth during infancy', Small Business Economics, Vol. 6, No. 1, pp. 27-39.

Mbulawa, S., and Ogbenna, F. 2019. The dynamics of firm growth, size and liquidity constraints for Botswana listed firms. Jurnal Perspektif Pembiayaan Dan Pembangunan Daerah (Journal of Perspectives in Financing and Regional Development), 6(4), 445-460.

Megaravalli, A. 2017. "Estimating Growth of SMES Using a Logit Model: Evidence from Manufacturing Companies in Italy." Management Science Letters 7 (3): 125–134.

Mullins, M, and S.B. Wadhwani, 1989, The Effect of the Stock Market on Investment: A Comparative Study, European Economic Review 33, 939-56.

Myers, S. 1977. Determinants of Corporate Borrowing. Journal of Financial Economics. 5: 147-175.

Myers, S. and R.G. Rajan. 1998. The Paradox of Liquidity. Quarterly Journal of Economics, 5: 733-771.

Nelson, R.R. and Winter, S.G. (1982) An Evolutionary Theory of Economic Change, Harvard University Press, Cambridge.

Nkwor, Nelson N. and Ikpor, Isaac M. 2019. Firm Size and Growth: Testing Gibrat's Law in the Nigerian Life Insurance Industry. Social Sciences and Humanities, 27(3): 2121-2142.

Oliveira, B. and Fortunato, A. 2006. Firm Growth and Liquidity Constraints: A Dynamic Analysis. Small Business Economics (2006) 27: 139–156

Opler, T., L. Pinkowitz, R. Stulz and R. Williamson, 1999. The Determinants and Implications of Corporate Cash Holdings. Journal of Financial Economics, 52: 3-46.

Rajan, R.G. and Zingales, L. 1995. What do we know about capital structure? Some evidence from International Data. The Journal of Finance, 50(5): 1421-1460.

Ramsey, J. B.1969.Tests for Specification Errors in Classical Linear Least Squares Regression Analysis. Journal of Royal Statistical Society B, 31(2): 350–371.

Saint, Daniel K. 2005. The Firm as a Nexus of Relationships: Toward a New Story of Corporate Purpose, A PhD dissertation, Benedictine University, Illinois, USA.

Sapra, S. 2005. A regression error specification test (RESET) for generalized linear models. Economics Bulletin, 3(1): 1-6.

Scherer, F.M. (1980) Industrial Market Structure and Economic Performance, 2nd ed., Houghton Mifflin, Boston.

Simon, H.A. and Bonini, C.P. (1958) 'The size distribution of business firms', The American Economic Review, Vol. 48, No. 4, pp. 607-617.

Studenmund, A. H. 2016. Using Econometrics: A Practical Guide (7th Edition), Pearson.

Sutton, J. (1997) 'Gibrat's legacy', Journal of Economic Literature, Vol. 35, No. 1, pp. 40-59.

Thursby, Jerry G., Schmidt, P. 1977. Some Properties of Tests for Specification Error in a Linear Regression Model. Journal of the American Statistical Association, 72(359): 635–641.

Thursby 1979. Alternative Specification Error Tests: A Comparative Study. Journal of the American Statistical Association, 74(365): 222-225.

Van der Waerden, B. L. 1927. Beweis einer Baudetschen Vermutung, Nieuw Archief voor Wiskunde 15: 212–216

Van der Waerden, B. L. 1930. Moderne Algebra, volume 1. Julius Springer, Berlin, 1st edition.

Van der Waerden, B. L. 1931. Moderne Algebra, volume 2. Julius Springer, Berlin, 1st edition.

Weibull, W. 1951. A statistical distribution function of wide applicability. Journal of Applied Mechanics, Vol. 18, pp. 293–297.

Weiss, C. (1998) 'Size, growth and survival in the upper Austrian farm sector', Small Business Economics, Vol. 10, No. 4, pp. 305–312.

Wooldridge, Jeffrey M. 2006. Introductory Econometrics–A Modern Approach. Thomson South–Western, International Student Edition.

Yakubu, Ibrahim N. 2020. Testing the Validity of Gibrat's Law in the Context of Profitability and Leverage. The Economics and Finance Letters, 7(2): 85–91.