

Determinants of Firm Growth: Evidence from Vietnamese Small and Medium Sized Manufacturing Enterprises

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Abstract

Using data from a survey of small and medium scale manufacturing enterprises (SMEs) in Vietnam, this study investigates the impact of firm and owner characteristics on firm growth. The results reveal that firm size has a negative effect on firm growth, suggesting the invalidity of Gibrat's Law. Moreover, the results indicate the dependence of firm growth on firm and owner attributes. Regarding firm characteristics, leverage, labor quality, training and export activities all enhance growth, while firm age is negatively associated with the growth of SMEs. As for owner characteristics, the results indicate a negative relationship between owner age and firm growth. Furthermore, female-headed firms have higher growth than male-headed firms; and highly educated owners create higher growth than those with lower levels of education.

Keywords: Firm attributes; owner characteristics; firm growth; Gibrat's Law; SME; Vietnam.

JEL code: M13, L25, L26

1. Introduction

SMEs play an important role in the economy as a driving engine of growth, job generation, innovation and competitiveness (Audretsch, 2002). As a result, a large number of studies have been devoted to find out the key determinants for SME growth. There are two main strands of studies on these determinants. On the one hand, some papers document the dependence of firm growth on firm size, rejecting the volatility of Gibrat's Law. For instance, using a sample of small US firms, Evans (1987) finds that firm growth is negatively associated with firm size and firm age. On the other hand, some argue that firm growth not only depends on firm size and age, but also on firm-specific characteristics. Firm-specific characteristics come from financial resources (capital structure or leverage); human resources (labor quality, labor productivity and training schemes); business characteristics (exporting activities) or owner's characteristics (age, gender and education). Depending on industry nature and data availability, empirical studies commonly combine two traditional factors (firm size and age) and some firm and owner characteristics.

In Vietnam, SMEs account for 98% of total businesses and annually contribute more than 45% to the country's total GDP¹. It is clear that SMEs play a crucial role in the Vietnamese economy. However, literature on determinants of SME growth in Vietnam is limited, typically including Nham and Yoshi (2009), Nham (2012), Nguyen (2013) and Ha (2016). Each study has its own advantages. In detail, using a small sample of manufacturing SMEs from the World Bank's survey in 2005, Nham and Yoshi (2009) investigate the impact of firm charac-

teristics, owner/manager's characteristics and external factors on firm growth. With the same sample, Nham (2012) extends the model in Nham and Yoshi (2009) by including a new factor - gender of owner. Using a sample of SMEs in the commercial-service sector extracted from the National Census of Enterprises in Vietnam during the period 2000-2007, Nguyen (2013) analyses the impact of firm characteristics on firm growth. Recently, Ha (2016) utilizes a big sample of SMEs in three areas (agriculture, industry and service) during the period from 2006 to 2009 to examine the influence of the institutional environment on firm growth. Different from the previous empirical studies on Vietnamese SMEs, Ha (2016) mainly focuses on external factors.

On the other hand, previous studies also reveal several limitations. In detail, Nham and Yoshi (2009), and Nham (2012) examine both firm characteristics and owner characteristics. However, they use a sample of only one year and cannot take account of the dynamic process of growth - a commonly analyzed factor in empirical studies on firm growth. Nguyen (2013) employs a dynamic panel data model but just focuses on firm characteristics (firm size, labor quality, labor productivity, total assets, leverage, capital intensity and FDI share). Moreover, Nguyen (2013) uses growth in the number of employees as a measure of firm growth. However, from the viewpoint of the government, this measure is suitable, but firms themselves do not target employment growth only (Honjo and Harada, 2006). Finally, Nguyen (2013) limits her research within the commercial and service industry only.

Therefore, our study has several signifi-

cant contributions to the literature in Vietnam. Firstly, our research uses a sample of SMEs in the small and medium manufacturing enterprise survey conducted by the United Nations University World Institute for Development Economics Research (UNUWIDER) in collaboration with three partners in the period 2004 – 2014, which covers manufacturing firms across 9 different business sectors for 11 years. Secondly, different from prior literature on SMEs in Vietnam, the study applies sales growth as an alternative measure of firm growth. Thirdly, our study covers a larger range of factors including *firm characteristics* (leverage, labor quality, training or R&D, export activities and firm age) and *owner characteristics* (age, gender and education). In comparison with prior literature on Vietnamese SMEs, our research includes some new variables: export, training or R&D activities, firm age and owner age and education. These new variables are expected to capture the current context of the Vietnamese economy. Like other emerging economies, Vietnam today highlights the role of international trade, business expertise and workmanship. Given that the majority of Vietnamese enterprises now are of a small or medium size, export activities are obviously expected to be a key factor for SMEs to relax the local competition, make use of globalization, expand to the foreign market and boost firm growth. Moreover, know-how of employees and business experience and knowledge of managers or owners are believed to significantly contribute to firms' success. Therefore, export, training activities, firm age, owner's age and education are added to our model in an effort to capture the influence of these factors on firm growth.

Consistent with prior literature, we find that firm size and firm age have a negative association with firm growth. Moreover, firm growth is positively associated with leverage, labor quality, training or R&D and export activities, and negatively impacted by firm age and owner age. Additionally, female-led firms have higher growth than male-led firms. Finally, owners or managers who have a college, graduate or post-graduate degree create higher sale growth than those without degrees.

The structure of this paper is as follows: Section 2 gives a brief review about prior studies on firm growth and its determinants; Section 3 introduces methodology and data; Section 4 provides empirical results; and the last section concludes our findings.

2. Literature review

Empirical studies on firm growth normally originate from Gibrat's Law of Proportionate Effect (LPE). Accordingly, firm growth is independent of firm size. However, a large number of empirical studies provide evidence against the validity of Gibrat's law. Most studies in this strand typically show negative association between firm growth and firm size. For example, Evans (1987), as a key study in this strand, uses a sample of US manufacturing firms to uncover not only a negative effect of firm size on firm growth but also a negative association between firm growth and firm age. These findings are consistent with models of learning (Sleuwaegen and Goedhuys, 2002). When firms are established in the industry, managers learn about their efficiency. Competition pushes the least efficient firms to exit and simultaneously allows more efficient managers to learn about their efficiency and to adjust their scale of op-

erations accordingly. Thus, young and small firms can grow faster at more volatile rates when they initially seek their own efficiency (Sleuwaegen and Goedhuys, 2002). These results by Evans (1987) are also confirmed in many sectors around the world. For instance, Honjo and Harada (2006) find evidence in Japanese manufacturing firms, Coad and Tamvada (2012) in Indian firms and Sleuwaegen and Goedhuys (2002) in African firms. Using a sample of Vietnamese SMEs in the commercial service industry, Nguyen (2013) finds a negative association between firm size and growth.

Besides, Evans (1987) proposes that firm growth is influenced not only by firm size and age, but also by other firm and manager/owner attributes. Using datasets of SMEs around the world, subsequent studies attempt to find firm and manager/owner specific characteristics contributing to firm growth. Firm-specific characteristics come from financial resources (capital structure or leverage); human resources (labor quality, labor productivity, training schemes); business characteristics (exporting activities). Manager/owner's characteristics normally include age, gender and education.

Regarding external funds, if access ability to capital markets were equal for all firms, external funds would be a perfect substitute for internal capital, or in other words, a firm's financial structure is irrelevant to its investment and growth (Honjo and Harada, 2006). However, capital market imperfections result in credit rationing (Fazzari et al., 1988; Stiglitz and Weiss, 1981) and financial constraints in the capital markets influence investment decisions and firm growth (Fazzari et al., 1988). Especially, SMEs probably face difficulties in rais-

ing external funds, and thus capital structure or leverage - a measure of firm ability to access external funds - could be associated with firm growth (Honjo and Harada, 2006). However, the empirical evidence on the effect of this attribute is still mixed. For example, according to Honjo and Harada (2006) leverage associates negatively with employment growth and asset growth but positively with sales growth. Their results suggest that SMEs rely heavily on internal investment sources for employment and asset growth, but can raise external finance to support their sales growth. Using a sample of SMEs in central and eastern European countries, Mateev and Anastasov (2010) do not find a positive effect of leverage on sales growth. With samples of Vietnamese SMEs, Nguyen (2013) finds a negative association between leverage and employment growth, while Ha (2016) reports a marginal positive or insignificant effect of leverage on employment or capital growth. Nguyen (2013) interprets that high costs in external financing may be an obstacle for firm growth.

As for human resources, labor productivity, labor quality and training activities are considered as key factors contributing to firm growth. Labor productivity (measured as sales per employee) represents a firm's production efficiency, and thus is expected to have a positive impact on firm growth. Liu et al. (1999), Mateev and Anastasov (2010), Goedhuys (2007), Nguyen (2013) report significant evidence on this positive relationship. Similarly, labor quality (measured as the average income of employees), representing employment compensation, is found to have a positive association with firm growth in Nguyen (2013). Addition-

ally, well-skilled and educated employees will help a firm to cope with changes in its business environment and globalization, and thus to improve its production efficiency. Hence, training is generally expected to have a positive effect on firm growth. However, the role of training in the growth of small firms is still arguable in both practice and the literature. Small firms normally suffer a higher labor turnover and failure rate. Training efforts in small firms are frustrated when larger firms pool employees. Thus small firms are less likely to train employees than larger firms (Hankinson, 1994). Cosh, Hughes and Weeks (2000) report a positive effect of training on employment growth for a sample of UK SMEs. Nevertheless, Bryan (2006) finds that training intensity has an insignificant relationship with employment growth but a significantly positive association with sales growth.

With respect to business characteristics, accessibility to foreign markets is considered as an important factor contributing to firm growth. Export activities help firms to improve competitiveness, thus accumulating experience from science, technology and goods/service quality for firm growth. Therefore, even when the domestic market constrains firm growth, firms can find new opportunities in foreign markets (Becchetti and Trovato, 2002). In other words, businesses with export activities have opportunities to attain a higher growth than those without export activities. Coad and Tamvada (2012) report that exporting has a positive association with firm growth in all specifications, which confirms the effect of learning-by-exporting. But, Liu et al. (1999) do not find a significant impact of exporting activities on firm growth in

the Taiwan electrics industry.

Important decisions in SMEs are most often made by one or a very few individual owner/managers. Thus, manager/owner characteristics can influence decision-making and firm growth. Three key manager/owner's characteristics are age, gender and education. Regarding owner age, there are two controversial viewpoints about the impact of a firm owner's age on its growth (Mehraliyev, 2012). The first approach argues that older firm owners have more experience and thereby are able to catch more opportunities for their businesses to grow. The other approach counters that young business owners who are pro-active and full of passion are likely to pursue growth objectives. Moreover, young individuals require more income and are willing to take risks, which leads to efforts towards a growth target (Davidsson and Henrekson, 2002). Empirical research across sectors in Finland also supports that younger entrepreneurs expand their business more quickly because of the higher education level of younger business owners (Kangasharju and Pekkala, 2002). In brief, the second viewpoint seems to dominate the literature (Mehraliyev, 2012), although the relationship between firm owner's age and growth will depend on owners' viewpoints and competence.

Gender is also a key demographic characteristic that may influence firm growth. There are some reasons why female-owned and male-owned firms tend to perform differently. Females are more likely to be more conservative and risk-averse than males (Croson and Gneezy, 2009). Thus, firms managed by women might adopt different strategies and grow differently from those managed by men (Nham,

2012). In addition, because females are more relationship-focused than males, female and male managers approach customers differently (Swan et al., 1984). Consequently, female-run firms and male-run ones might have distinctive growths in sales. However, the empirical results on the relationship between gender and firm performance or growth are still inclusive. For instance, Du Rietz and Henrekson (2000) report that female-headed firms have lower sales' growth than male-headed firms. Laible (2013) confirms this result by reporting a negative association between the proportion of women in top management positions and performance. Similarly, Nham (2012) finds that male-headed firms perform better than female-owned ones. However, Davis et al. (2010) report that, due to stronger market orientation, female-led service SMEs outperform those led by males.

Lastly, owner education is another factor influencing firm growth. Recent literature highlights the impact of owners' knowledge on their decision-making or managerial behaviors. The higher education managers have, the faster firms grow (Queiró, 2016). It is argued that higher-education managers are more likely to adopt new technologies and effective practices of human resource management.

3. Methodology and data

3.1. Methodology

The basic idea of research on determinants of firm growth is testing using Gibrat's Law, which indicates the relationship between firm size at time t and its size at time $t-1$ as follows:

$$LNSIZE_{it} = \alpha_i + \delta_t + \beta LNSIZE_{it-1} + \mu_{it} \quad (1)$$

Following Chesher (1979), we assume that the error term is serially correlated or $\mu_{it} = \rho\mu_{it-1}$

+ ε_{it} , where ε_{it} is a non-serially correlated white noise component. Equation (1) can be transformed as follows:

$$LNSIZE_{it} - LNSIZE_{it-1} = \alpha_i + \delta_t + (\beta-1)LNSIZE_{it-1} + \mu_{it} \quad (2)$$

where $\mu_{it} = \rho\mu_{it-1} + \varepsilon_{it}$ and $LNSIZE_{it-1}$ is the natural logarithm of the size of firm i at time $t-1$. The left hand side – the difference in the natural logarithm of firm size between two consecutive years – is considered as firm growth ($GROWTH_{it}$). α_i and δ_t indicate firm effect and time effect, respectively. β shows the relationship between firm growth and its size. Thus, Gibrat's law is valid if β is equal to 1. ρ illustrates serial correlation in μ_{it} , the error term in equation (2). ε_{it} is a random disturbance, which is assumed to be normal, independent and identically distributed with $E(\varepsilon_{it}) = 0$ and $Var(\varepsilon_{it}) = \sigma_\varepsilon^2$.

Equation (2) can be rewritten as follows:

$$\mu_{it-1} = GROWTH_{it-1} - \alpha_i - \delta_{t-1} - (\beta - 1)LNSIZE_{it-2} \quad (3)$$

A combination of (2) and (3) leads to:

$$GROWTH_{it} = \alpha_i(1 - \rho) + (\delta_t - \rho\delta_{t-1}) + (\beta - 1)LNSIZE_{it-1} + \rho GROWTH_{it-1} + \theta_{it} \quad (4)$$

where $\theta_{it} = \rho(1 - \beta)LNSIZE_{it-2} + \varepsilon_{it}$, so $\theta_{it} = \varepsilon_{it}$ if $\beta = 1$.

In prior literature, equation (4) is used to test two hypotheses: the independence of firm growth on size (i.e., $\beta = 1$) and the autocorrelation in firm growth (i.e., $\rho \neq 0$). It should be noted that Gibrat's law holds if $\beta = 1$ and $\rho = 0$ simultaneously (Fotopoulos et al., 2014). Following prior literature, in order to test the effects of firm and owner attributes on growth, we include additional variables in equation (4):

$$GROWTH_{it} = \alpha_i(1 - \rho) + (\delta_t - \rho\delta_{t-1}) + (\beta - 1)$$

$$LN\text{SIZE}_{it-1} + \rho\text{GROWTH}_{it-1} + GX_{it-1} + KZ_{it} + \theta_{it} \quad (5)$$

Where X and Z are firm and owner characteristics measured in year t-1 and t, respectively. Dummies for years and one-digit ISIC industries are also included to control for yearly and industry fixed effects.

Dependent variable - growth

Nguyen (2013) uses growth in the number of employees as a measure of firm growth. This measure is appealing from the viewpoint of the government. However, firms themselves do not target only employment growth (Honjo and Harada, 2006). Moreover, in our sample 6,175 of 8,131 observations have zero employment growth, suggesting the unsuitability of this measure. Therefore, we use sales growth - the difference in the natural logarithm of revenue between two consecutive years - as an alternative measure of firm growth.

Independent variables

Following Evans (1987), *Lagged Growth*, $\ln(\text{Sale})$ - (natural logarithm of revenue in million VND in year t-1 - a measure of firm size) and $\ln(\text{Age})$ (natural logarithm of firm age in year t) are included in the model to test the invalidity of Gibrat's Law and the influence of firm age. Our initial two hypotheses are:

H1: Small firms grow faster than large firms.

H2: Young firms grow faster than old firms.

Additionally, in Vietnam where the capital markets are not fully matured, SMEs face many difficulties in raising external funds. Thus, following Honjo and Harada (2006) and Nguyen (2013), we add *Leverage*- measured as debt over physical assets in year t-1- to test whether access to external funds have an effect

on firm growth. Due to the mixed evidence on the effect of this variable in prior literature, our next hypothesis is:

H3: Leverage has an effect on firm growth.

Furthermore, under globalization, Vietnam SMEs also face an increasing demand for skilled labor in order to raise firms' output and revenue. Thus, the higher quality of labor a firm has, the faster it is expected to grow. Thus, labor quality should be reflected in such proxies as their academic education. However, because of the unavailability of such data, our study follows Nguyen (2013) to use average earnings per employee as a proxy for labor quality. Employees of higher quality are assumed to earn higher income; because firms seem to compete with each other in order to attract and keep highly-qualified employees mainly by high reward. Nguyen (2013) also includes *Labor productivity* (measured as sales per employee) in the model. However, this variable is excluded from our model due to its high correlation with $\ln(\text{Sale})$ - which is also measured based on sales. The inclusion of highly correlated variables could lead to a multicollinearity issue. Lastly, in efforts to enhance firm's productivity, enterprises have an incentive to invest in training to improve labor performance. However, SMEs usually have limited financial resources, and so may hesitate to offer their staff off-the-job training programs such as academic short courses. Instead, SMEs seem to prefer on-the-job training. This kind of training not only makes workers more quickly adapt to firms' quality standards and maintain continuous production lines, but also facilitates incremental innovation that employees may develop while engaged in working on production

lines. Therefore, training or R&D activity at a micro-level is expected to positively contribute to firm growth. We add $\ln(\text{Labor quality})$ (measured as a natural logarithm of the total wage bill per employee in million VND in year $t-1$) and *Training* (One if the firm invests in R&D or human capital upgrading in year t) to test our next hypotheses:

H4: Labor quality has a positive effect on firm growth.

H5: Firms with training or R&D activities have higher growth.

As an emerging economy, Vietnamese nowadays generally highlights the role of international trade. Given that the majority of Vietnamese enterprises are now of a small or medium size, export is expected to be a key factor for SMEs to relax the local competition, make use of globalization and expand to foreign markets and boost firm growth. Next, we add *Export* (One if firm exports directly or indirectly in year t) to test the next hypothesis:

H6: Firms with export activities have higher growth.

One or a few individuals in SMEs account for all important decisions. Thus owner/manager characteristics can influence decision-making and firm growth. Finally, we include *Owner Age*, *Owner Gender* (One if the owner/manager is male) and *Owner Education* (One if the owner/manager has a college, undergraduate or postgraduate degree). The arguments on the association between owner age and growth are inclusive. On the one hand, the older firm owners have more experience and thereby are able to catch more opportunities for businesses to grow. On the other hand, young business owners who are pro-active and full of passion are

likely to pursue growth objectives. Similarly, arguments and evidence on the relationship between gender and growth are mixed. Females are more likely to be more conservative and risk-averse than males (Croson and Gneezy, 2009), thus firms managed by women might employ different strategies and achieve different performance or growth to those managed by men (Nham, 2012). However, females are more relationship-focused than males, thus female and male managers approach customers in different ways (Swan et al., 1984). Put differently, there might be differences in sale growth between female-run and male-run firms. Thus our next two hypotheses are:

H7: Owner age has an effect on firm growth.

H8: Gender has an effect on firm growth.

More educated owners or managers are more likely to adopt new technologies and effective human resource management practices (Queiró, 2016). Furthermore, in a developing market like Vietnam, more educated owners or managers are more likely to accept new marketing techniques to expand market share. Vu (2014) finds that owner education is important for performance of SMEs in Vietnam. Thus, our last hypothesis is:

H9: Firms with highly educated owners have higher firm growth.

3.2. Data selection and descriptive statistics

Our data are extracted from the survey of SMEs in ten provinces and cities including Hanoi, Ha Tay, Hai Phong, Phu Tho, Nghe An, Quang Nam, Khanh Hoa, Lam Dong, Ho Chi Minh and Long An. This survey was conducted by the Central Institute for Economic Management (CIEM - The Ministry of Planning and

Table 1: Description and descriptive statistics of key variables

Variable	Description	Mean	Standard Deviation	Observations
Dependent variable				
Growth	Difference in natural logarithm of revenue between two consecutive years	0.060	0.278	8,131
Independent variables				
Sale	Annual revenue in million VND	6,484	107,452	8,131
Ln(Sale)	Natural logarithm of annual revenue	6.994	1.467	8,131
Firm characteristics				
Age	Firm age	13.92	9.908	8,131
Ln(Age)	Natural logarithm of firm age	2.404	0.703	8,131
Leverage	Total debt deflated by total asset	0.079	0.156	8,131
Labor quality	Total wage bill per employee in million VND	26.25	26.066	6,933
Ln(Labor quality)	Natural logarithm of labor quality	2.966	0.796	6,933
Training	One if the firm has made investments in research and development or human capital upgrading (training).	0.018	0.134	8,131
Export	One if the firm exports directly or indirectly.	0.067	0.250	8,131
Owner characteristics				
Owner Age	One if the owner/manager's age is over 40.	0.673	0.469	8,131
Owner Gender	One if the owner/manager is male.	0.647	0.478	8,131
Owner Education	One if the owner/manager has a college, undergraduate or postgraduate degree	0.232	0.421	8,131

Investment), the Institute of Labor Science and Social Affairs (ILSSA - the Ministry of Labor - Invalids and Social Affairs), the Development Economics Research Group (DERG - the University of Copenhagen), and the World Institute for Development Economics Research (UNU-WIDER – United Nations University) in 2005, 2007, 2009, 2011, 2013 and 2015, providing information on SMEs from 2004 to 2014.

The original sample includes 2,821 firms in 2005; 2,635 firms in 2007; 2,659 firms in 2009; 2,512 firms in 2011, 2,542 firms in 2013, and 2,648 firms in 2015. We eliminate outliers as follows: observations with more than 300 employees and those with their leverage being negative or exceeding one. Furthermore, micro firms, which have annual sales of less than 100 million VND, are also excluded from the sample. Finally, our sample includes 8,131 observations of 3,376 firms. The number of observations in our regressions may be less due to availability individual variable data.

Table 1 provides descriptive information on our key variables. The average sales growth over the sample is 6 percent, while the average annual sales is 6.484 billion VND. The average firm age is around 14 years. The average leverage is around 8 percent. An unreported result shows that 4,003 of 8,131 observations have zero leverage. This means that Vietnamese SMEs are unlikely to use debt. The average annual wage per employee is 26 million VND, suggesting that the respondents report the minimum wage in the surveys. Only 1.8 percent of the observations engage in training or R&D activities. Regarding owners' characteristics, 67.3 percent of owners in the sample are over

40 years old and 64.7 percent are male, and 23.2 percent have a college or undergraduate or post graduate degree. Finally, only 6.7% of the sample report that they have direct or indirect export activities.

4. Empirical results

Equation (5) is a dynamic panel data model including a lagged variable with “small T and large N”. Roodman (2009) points out that the potential correlation between the lagged variable and the past or possibly current realizations of the error should be concerned in such models with “small T and large N”. In particular, the conventional OLS will bias the estimate of the lagged variable’s coefficient upwards, while the fixed effect regression biases it downwards. To overcome the endogeneity problem, Arellano and Bond (1991) suggest the difference GMM technique by examining the first difference of the explanatory variables which are instrumented by their lagged values in levels. However, Bond et al. (2001) indicate that the first-differenced GMM estimator can be poorly behaved when the time series are persistent. In a small sample, it leads to a seriously biased estimation. Thus, they recommend using the system GMM estimator.

In the process of conducting the system GMM estimations, we treat yearly and industry dummies, firm age, owner’s age, gender and education as exogenous and the rest as endogenous variables. In choosing the proper instruments, we run and compare various specifications based on different sets of instruments such as first lags and second lags with and without earlier lags. According to the Sargan and Hansen test of over-identification, the set of instruments including exogenous variables

and earlier lags of endogenous variables passes these tests and are presented in Table 2.

In all models, the p-values of the Hansen and Sargan statistics indicate that we cannot reject the hypotheses that the instruments in all models are valid. The p-values of AR(1) and AR(2) illustrate that there is high first order autocorrelation, and no evidence for significant second order autocorrelation. In other words, the test-statistics indicate a proper specification of all models.

The significant and negative coefficient of $Ln(Sale)$ in all models indicates that small firms have higher sales’ growth than large firms. This means that H1 is supported. This is in line with the finding in Nguyen (2013) and supports the invalidity of Gibrat’s law in the sample of SMEs in Vietnam. Moreover, the negative and significant coefficient of $Ln(Age)$ in all models suggests that younger firms have higher growth than older firms. Put differently, H2 is supported. This finding in Vietnam’s manufacturing sector also aligns with other tests by Evans (1987) for US manufacturing firms, Variyam and Kraybill (1992) for US manufacturing and services firms, Liu et al. (1999) for Taiwanese electronics plants, Geroski and Gugler (2004) for large European companies, and Yasuda (2005) for Japanese manufacturing firms. This finding may be explained by the concept of ‘*liability of obsolescence*’ (Barron et al., 1994). This concept holds that older enterprises face a disadvantage in comparison with younger ones to adapt to changes in the market, because the latter might enter the market at a sub-optimal scale, actively acquire outside knowledge in their strategies, and then outperform the former.

Table 2: Estimated results

Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
<i>Lagged Growth</i>	-0.0032 (-0.37)	-0.047* (-1.70)	-0.041* (-1.92)	-0.040* (-1.93)	-0.041** (-1.96)
<i>Ln(Sale)</i>	-0.023* (-1.70)	-0.090*** (-2.65)	-0.114*** (-2.79)	-0.117*** (-2.96)	-0.131*** (-3.06)
<i>Ln(Age)</i>	-0.0284*** (-4.76)	-0.040*** (-4.55)	-0.032*** (-4.12)	-0.031*** (-4.10)	-0.018*** (-2.91)
<i>Leverage</i>		0.719*** (2.87)	0.769*** (2.90)	0.744*** (2.96)	0.737*** (2.93)
<i>Ln(Labor quality)</i>			0.065** (2.06)	0.063** (2.06)	0.066** (2.12)
<i>Training</i>			0.126*** (2.73)	0.124*** (2.70)	0.129*** (2.77)
<i>Export</i>				0.109*** (2.62)	0.099** (2.53)
<i>Owner Age</i>					-0.025*** (-2.90)
<i>Owner Gender</i>					-0.021** (-1.98)
<i>Owner Education</i>					0.111*** (3.00)
<i>Constant</i>	0.233 (2.20)	0.681*** (2.73)	0.744*** (3.53)	0.762*** (3.72)	0.824*** (3.84)
Number of Instruments	32	36	44	47	50
Sargan test	0.174	0.667	0.661	0.553	0.578
Hansen test	0.764	0.898	0.946	0.916	0.934
AR(1)	0.000	0.000	0.000	0.000	0.000
AR(2)	0.862	0.855	0.640	0.553	0.589
Observations	8,131	8,131	6,933	6,933	6,933

Notes: All two-step system GMM regressions employ Windmeijer-corrected standard errors. Yearly dummies, industry dummies, firm age, owner's age, gender and education are treated as exogenous while others as endogenous. (***), (**), (*) indicate significance at the 1%, 5% and 10% level, respectively. Z-statistics are presented in parentheses. The estimates of yearly dummies and industry dummies are not shown for brevity.

The coefficient of *Leverage* is positive and significant in four models, and thus, are opposite to the findings of Nguyen (2013). H3 is supported with this result. In detail, our results suggest that the more external capital Vietnamese SMEs can raise, the more they can expand revenue. The positive impact of leverage is consistent with prior literature such as Heshmati (2001), Becchetti and Trovato (2002),

Honjo and Harada (2006). The influence of leverage suggests that external finance would enable SMEs to expand their production by likely catching such business opportunities as export. The ADB's survey over exporting SMEs in Vietnam in 2014 also confirms that firm production could significantly increase if access to trade finance is improved². However, our result on the effect of leverage is opposed

to that of Nguyen (2013). This conflict may be explained by the difference in the two samples. While Nguyen (2013) focuses on commercial and service firms, our study mainly examines manufacturing firms. It might be because manufacturing firms seem to more easily access external resources to finance their growth than commercial service firms. Moreover, the opposite effect of leverage on firm growth in this study and in Nguyen (2013) may be attributed to the difference in the measurement of firm growth. Honjo and Harada (2006) find that leverage has a positive effect on sales' growth but a negative impact on employment growth.

Regarding the human resource variables, both *Ln(Labor quality)* and *Training* have significant and positive effects on firm growth in the three models (3), (4) and (5). H4 and H5 are both supported with these results. The positive coefficient of *Ln(Labor quality)* indicates that firms with better employment compensation have faster sales growth. This relationship is aligned with the findings in Nguyen (2013), Mateev and Anastasov (2010) and Bigsten and Gebreyesus (2007). The result implies that if staffs are well qualified and experienced, firms are willing to provide them with better income and benefit thus encouraging their devotion to working. Moreover, the finding highlights the role of training or R&D activities in manufacturing firms. Training staff or R&D activities help SMEs to grow faster. In Vietnam, employee turnover tends to be high. Hence, small firms are less likely to provide their employees with training schemes than large firms. However, the result on the impact of training confirms the active role of training in the growth of SMEs. This finding confirms the results of

some previous studies by Cosh et al. (2000) who reported a positive effect of training on employment growth for a sample of UK SMEs; and Goedhuys (2007) who found that firms offering training to their employees or investing in R&D or design have higher sales' growth. The finding is also in line with Vu (2003) who found that a bigger share of skilled workers in the workforce was positively correlated with higher technical efficiency in Vietnamese enterprises.

Regarding export activities, the coefficient of *Export* is significant and positive in model (4) and (5), implying that export business boosts firm revenue. H6 is supported, which confirms the results by Becchetti and Trovato (2002). Noticeably, this positive impact on firm growth is obvious in the current period. Indeed, export helps SMEs to expand their overseas markets and thus boost their growth. In addition, international trade is an opportunity for SMEs to gain more experience when working with foreign partners. Access to diverse cultures helps firms to identify their comparative advantage, market niches and product orientation and then, contributes to further growth.

Regarding owner's characteristics, the coefficients of *Owner Age* and *Owner Gender* are significantly negative whereas the coefficient of *Owner Education* is significantly positive in model (5). H7, H8 and H9 are supported with these results. The finding on the effect of owner age supports the results in Mehraliyev (2012) and Davidsson and Henrekson (2002). Firms with middle-aged owners have lower sales growth than those with young owners. It might be explained that older owners tend to be risk-adverse, and thus hesitate to adopt

breakthrough but risky strategies. Additionally, older owners may be so conservative that they are slower to adjust to new market conditions. Meanwhile, young owners tend to be willing to take higher risk to gain higher returns and market share.

Moreover, the outcome reveals that owner education is another factor influencing firm growth. Accordingly, it's proved that the higher education managers have, the faster firms grow. This finding is also aligned with recent literature on the impact of owners' knowledge on their decision-making or managerial behaviors. It is argued that higher-education managers more quickly acknowledge changes in the business environment (Kangasharju and Pekala, 2002), and effectively apply practices of human resource and risk management, and then are more likely adopt new technologies and catch business opportunities (Queiró, 2016). This finding is consistent with Vu (2014) who found that SMEs with highly educated owners have better performance in Vietnam.

Lastly, this study interestingly shows that female-led manufacturing SMEs outperform those led by males. This finding is in contrast to Du Rietz and Henrekson (2000), Laible (2013), and Nham (2012). The divergence may be explained by data heterogeneity. While our study focus on Vietnam's SMEs in the manufacturing sector only, Du Rietz and Henrekson (2000) investigate data sets of start-ups from various sectors in Sweden. While SMEs in our research are at an expansion stage of the business cycle, which is driven by sales, start-ups are firms at the very early stage, where their survival is characterized by innovation of new products (Baum and Silverman, 2004). Laible (2013)

investigates firms representing all industries and establishment sizes in Germany. Like other studies in developed economies that uncover the impact of gender on firm performance, Laible (2013) shows a negative contribution of women in top management positions to firm performance. It should be highlighted that firms in such developed countries as Germany may generally be larger than firms in Vietnam. And, unlike large corporations, where important decisions must go through complicated procedures involving consensus and approval among top managers, final decisions of SMEs seem mainly to depend on individual judgments by owners or managers. Although Nham (2012) also bases his contrasting outcome on data of manufacturing SMEs in Vietnam, his data dates back and is within 2005 only. Meanwhile, our study covers observations ranging from 2004 to 2014. This time is characterized not only by economic growth but also by development of women. While the local economy has benefited from export and foreign investment since WTO official membership in 2006, Vietnamese women have also significantly developed. In detail, contrary to common misconceptions, local women are now better at time management in balancing family and business, at financial knowledge in paying back loans, and at entrepreneurship to lead their own enterprises³. Especially, females are more relationship-focused (Swan et al., 1984) and more strongly market oriented than males (Davis et al., 2010). Therefore, our study's finding reasonably reveals that female-led firms outperform those led by males in sales' expansion and consequently firm growth, given that firm growth is measured based on sales.

5. Conclusion

Our results provide some interesting findings and suggest some important policy implications. Firstly, the study rejects Gibrat's Law and confirms that firm size has a negative effect on firm growth. In other words, small firms enjoy higher growth. In Vietnam, the rationale for this negative correlation might stem from the mindset of leaders. When firms grow fast, their owners may be self-satisfied and hesitate to take risks to gain greater achievements in the future. Otherwise, they would rather maximize profits as well as increase benefits for shareholders than expand the business.

Thus, the finding suggests some essential implications for both public policy and SMEs themselves. The study reveals that even well-growing SMEs also hesitate to take risks to expand their business, and that the higher education managers have, the faster firms grow. Therefore, SMEs may still face a mind gap to transform into bigger companies. As the result, the government should stimulate SMEs by offering higher education for their leaders to improve their financial management skills, and so risk tolerance, before any financial aids. Moreover, the finding also warns successful SMEs about their decreasing growth rate in the future despite current high revenue. Therefore, the study encourages SMEs themselves to actively add such new factors in their operations as innovation and entrepreneurship.

Secondly, this study also uncovers the influence of firm attributes on firm growth. It shows that leverage is the most important factor influencing firm growth. Positive influences of export and leverage suggest that additional trade-finance would enable SMEs to increase

their production, make use of export opportunities and increase recruitment. As a result, the above finding implies several suggestions for the government. Firstly, given that SMEs play as main drivers of our economy, the government should further finance SME firms to enhance their further contribution to GDP. Secondly, beside trade promotion, the government is also advised to develop trade-finance support for manufacturing SMEs with exporting orientation. Such trade-finance schemes not only increase our annual export and promote our national image, but also enhance job creation.

Thirdly, the study also highlights the role of labor quality in firm growth. The study employs the average income of employees as a proxy for labor quality. Employees of higher quality are assumed to earn higher incomes, because firms seem to compete with each other in order to attract highly qualified labor, mainly by offering high rewards. The outcome reveals that labor quality plays a role as the second-best factor enhancing firms' sales growth. Especially, although a small number of Vietnamese firms provide training courses for their staff, these training activities for staff help firms to grow faster.

The above finding refers to important implications for corporate and public policy. On the one hand, it highlights how crucially SMEs should build up training programs, not only for leaders but also for staff. Given financial constraints, SMEs can consider on-the-job training rather than off-the-job short courses. As a result, SMEs should boost the quality of human resources through training and attractive benefits together with adopting more technology to production. On the other hand, given that the

rate of Vietnamese firms providing training courses for staff is low, the government should be ready to launch mass training programs for all workers in SMEs to enhance their contribution to GDP and our export performance.

Lastly, the study especially uncovers the recent impact of gender on firm growth in Vietnam. Contrary to previous research, female-led firms are proved to outperform male-led firms. This may be explained by recent women's development since the local economy has significantly benefited from WTO membership and free trade. Given that many common misconceptions and, therefore, de-facto barriers still prevent women from getting better access to business resources; local governments are expected to further promote female-led SMEs. Therefore, several implications for public pol-

icy are obvious. Initially, local governments should raise awareness of the opportunities for banks to better serve women-owned SMEs as a separate and strategic customer segment, with uniquely tailored products and services⁴. Moreover, accompanied by banks, the central government should track gender-disaggregated data on SME performance at the micro level (e.g., repayment rates, organizational changes, revenue and employment growth, expansion to new markets). While such a database promises to benefit banks by a better risk profile for their SME customers⁵, it also mutually helps the government to better understand and forecast supply accordingly, given that SMEs account for 98% of total businesses and annually contribute more than 45% to the country's total GDP.

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Notes:

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