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The impact of accessible capital on labor growth of small and medium enterprises in Vietnam

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ABSTRACT

There are significant constraints that limit the present SMEs from extending up in terms of labor and employment. Firms have a higher demand for workforce and thus create employment when enlarging their business operation scale. There has been a theoretical gap related to the labor growth of SMEs in developing countries, such as Vietnam, and a necessity of finding solutions to overcome difficulties in accessing capital to foster firms' labor growth. Most of the previous studies on growth used the statistical frequency method. Meanwhile, the results of the Bays method can ignore the influence condition due to the small sample or missing observations. While previous studies often used debt ratio or financial leverage in the model, these are two different approaches. This study used the Bayesian estimation method to examine the labor growth of SMEs in Vietnam due to the impact of equity and liabilities, which better reflects the impact of each specific component of capital used for business growth, along with a group of control variables. The research results demonstrate that debt has a positive effect while equity has a negative impact on business growth. Enterprise size, male entrepreneurs, and businessmen with educational and vocational qualifications in the group of undergraduate and graduate, college, and vocational secondary schools have a positive impact on the growth of enterprises. Firm age, export factors, and untrained entrepreneurs have a negative impact on firm growth.

1. Introduction

SMEs in most economies in the world play an important role, creating the diversity and abundance of goods and service markets, contributing to national economic output, creating employment opportunities, and using use a large proportion of labor resources (Karaev et al., 2007). SMEs help exploit and promote local resources, make full use of national resources, reduce imbalances between regions, narrow the gap between urban and rural areas, and contribute to economic restructuring. Especially, during a recession like the COVID-19 pandemic, SMEs with their ability to improvise flexibly and dynamically play a role in reducing shocks for the economy when there is this upheaval. And most importantly, it's growth that makes small businesses bigger (Taiwo et al., 2012).

Ayyagari et al. (2007) in a study on the economies of 76 countries around the world, identified that SMEs play an important role in contributing to jobs and GDP for countries. Nine out of ten new jobs worldwide are created by small businesses. And by 2030 3.3 million jobs per month are needed in emerging markets to absorb a growing workforce (IFC, 2017). Based on data until 2020 in South Asian countries, the number of SMEs accounts for an average of 99.6% of the total number of enterprises, accounting for 76.6% of the total workforce, contributing to the national GDP of 33.9%, and accounted for 47.0% of the total export value. In Southeast Asia, the proportion of SME workers accounted for 67% of the total for the period 2010-2020, and in Vietnam, nearly 40% of the total workforce was in 2019 (ADB, 2021). Despite making great contributions to the economy, SMEs are currently under many difficult pressures. Due to the sudden impact of the trade war, the COVID-19 pandemic, the military war led to a sharp drop in global trade and investment due to disruptions and disruptions in global supply chains in manufacturing and trading. The shortage of raw materials and input materials as well as the decline in the output market has caused many businesses to suspend operations

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or operate in moderation, reduce their scale, and risk bankruptcy. According to the IMF (2022), the non-financial leverage of businesses and households increased in many countries during the pandemic. In the future, this could create some credit market holes as interest rates and risk premiums rise. War increases the risk of fragmenting the world economy into geopolitical blocs with separate technological standards, cross-border payment systems, and reserve currencies, requiring adjustment of costs, chain supply, and reconfiguring production networks (IMF, 2022). According to IFC (2017), 65 million enterprises, or 40% of formal micro, small, and medium enterprises in developing countries, have an unmet financial need of $5.2 trillion per year. In developing countries, SMEs account for more than half of all formal employment. Lussier and Pfeifer (2001) and Al-Haddad et al. (2019) highlighted the vital role of small enterprises as the main job provider, innovator, and foundation of economic growth. Kadiri (2012) mentioned that in the business world, the SME sector acts as a mechanism for the generation of employment, national development, and poverty decline. SMEs can take more employment opportunities, in comparison with large-scale firms as well as multinational corporations (Al-Haddad et al., 2019).

However, these businesses often struggle to raise the finance they need to grow and create jobs (IFC, 2021). This result is also consistent with the views of the OECD (2019), ADB (2014), Beck and Demirguc-Kunt (2006), and Oliveira and Fortunato (2006). Müller and Zimmermann (2006) argued that the challenge of accessing finance, limited credit, lack of own capital, and borrowed capital are the main obstacles to the existence and labor growth of SMEs in the world. There have been various significant constraints that limit the present SMEs from extending in terms of labor and employment (Al-Haddad et al., 2019). Firms have a higher demand for workforce and thus create employment when enlarging their business operation scale. The comparative size of the business also affects the generation of employment based on the usual perception that big enterprises generate a greater amount of employment.

In Vietnam, growth in most industries and sectors slowed down and declined (MPI, 2021). On the other hand, Vietnam is a country heavily affected by global climate change. Consequences of extreme weather, drought, saltwater intrusion, rain and flood, subsidence, landslides, etc. causing heavy damage, may result in many businesses having to suspend operations or operate in moderation, reducing scale, and in danger of bankruptcy. Vietnam is a developing country, heavily dependent on capital, technology, raw materials, and components imported from abroad; management capacity and competitiveness are still fragile, so the level of difficulty is even greater. According to the results of the survey on the competitiveness of Vietnamese localities in 2021 (PCI, 2021) by the Vietnam Chamber of Commerce and Industry-VCCI, 47% of surveyed enterprises answered that they had difficulty accessing capital. 33% of domestic private enterprises and 18% of FDI enterprises cut the number of employees with a reduction of 50% and 17% of the workforce, respectively. For export FDI enterprises, the rate of labor reduction is even higher. The most concern of domestic-oriented private enterprises is the lack of cash flow (VCCI, 2021).

In addition to difficulties caused by environmental impacts, the activities of SMEs themselves also have limitations that need to be overcome. Statistics from the Ministry of Planning and Investment of Vietnam show that the micro, small, and medium-sized enterprise sector in Vietnam attracts an increase in the number of employees each year in the 2016-2019 period compared to the previous period 2011-2015 respectively 48.8% (1.5 million employees); 13.1% (2.7 million employees); 13.2% (1.4 million employees). While large enterprises have an increased rate of 28.7% (9.0 million employees), accounting for 61.8% of the total number of employees in the enterprise sector. Micro and small enterprises have the largest number but the lowest number of employees, accounting for 28.7% of the total enterprise workforce. According to the 2019 statistics, the respective labor utilization efficiency of medium, large, small, and micro enterprises is 18.8; 16.9; 15.4; and 5.1 times. Thus, small and micro enterprises have the lowest labor efficiency. Regarding the debt index, the corresponding debt index of large, medium, small, and micro enterprises is 2.8 times; 2.3 times; 1.6 times; and 0.9 times. In terms of operational efficiency, the average period of 2016-2019 compared with the average of the period 2011-2015, each year the large-scale enterprise sector achieved VND 860.8 trillion in pre-tax profit, an increase of 87.5%; medium-sized enterprises reached VND 29.6 trillion, up 85.1%. On average in the period 2011-2015, the small business sector lost VND 3.0 trillion each year; the micro-enterprise sector suffers a loss of VND 14.0 trillion each year.

Statistics show that the micro and small enterprise sector is characterized by attracting the least amount of labor force, the lowest labor efficiency, the lowest debt ratio, and inefficient operation for many years (Ha et al., 2022). Therefore, it is highly needed to seek solutions to overcome the weaknesses and obstacles facing SMEs. This is an urgent requirement, as in addition to growth for survival and stability, small businesses also need to be transformed in terms of scale to become medium and large enterprises in the future. Considering the complicated operations of SMEs, the practical solution needs to be based on solid scientific theory and proven by reliable experiments.

Throughout recent years over the world, there have been many studies conducted by scholars on the growth of SMEs. Nevertheless, there is still a lack of unified theory on SMEs' growth in general and labor growth in particular. Based on previous research literature, scholars use heterogeneous enterprise growth scales. With different scales, the

results reflect the relationship of the variables differently (Delmar, 1997). In Vietnam so far, there have been very few studies focusing on the growth of SMEs (Pham et al., 2021; Ha et al., 2022).

To recapitulate, there has been a theoretical gap related to the labor growth of SMEs and a necessity of finding solutions to overcome difficulties in accessing capital to foster firms' labor growth (Delmar, 1997; Davidsson and Delmar, 2006; Al-Haddad et al., 2019; Pham et al., 2021; Ha et al., 2022). Considering labor growth as an important indicator of employment generation in the Vietnam context, this article is designed to answer the question: How do equity and debt affect the labor growth of SMEs in Vietnam?

Theoretically, this research can contribute to the literature development on the topic of enterprises' labor growth, with a focus on SMEs in a developing country such as Vietnam. This empirical study can be viewed as a response to the call raised by previous researchers for more studies on SMEs' growth in Vietnam (Pham et al., 2021; Ha et al., 2022) as well as a considerable reference for academies that have interest in SME growth in emerging countries. Practically, this study can help to provide governance implications as a basis for planning related policies for the purpose of enabling firms' labor growth and ultimately contributing to the country's economy.

2. Theoretical overview and related studies

2.1. Enterprises' labor growth

According to OECD (2021), the growth of enterprises can be defined both in terms of employment (number of employees/labor) and in terms of turnover. In order to study the phenomenon of high-growth enterprises, it is recommended that both criteria are used. The definition of high-growth enterprises recommended is as follows: All firms with average annualized growth greater than 20% per annum, over a three-year period should be viewed as high-growth enterprises while growth can be measured by the number of employees/labor or by turnover (OECD, 2021).

SMEs play an important role in economic development and job creation. While the general features of this role are understood, there are many features of this that require more research. Recent evidence shows that SMEs have wide variability in employment growth, showing positive and negative growth as aggregate demand changes. Among growing companies of all sizes, SMEs are associated with higher positive employment growth. However, it also greatly contributes to the unemployment of contracting firms.

2.2. Theory of business growth

Based on research papers on business growth, there are currently 3 theories formed, which are:

1. The growth theory is based on the firm boundary theory (Coase, 1937): Coase (1937) argued that a firm becomes larger as more transactions are organized by entrepreneurs (coordinated through a price mechanism), and becomes smaller as more transactions are reduced. Coase (1937) used the concept of transaction costs to explain the rationale for starting a business and determining its size. According to Coase (1937), when businesses add a transaction organization, the size of the business will be expanded, and when the scale is expanded, transaction costs will increase.
2. Growth theory based on life cycle: This theory is often presented as a life cycle or stage model covering the entire life cycle of an organization (Adizes and Adiz'es, 1989; Churchill and Lewis, 1983; Hanks et al., 1994; Flamholtz, 1986; Scott and Bruce, 1987). Typically, life cycle patterns include the stages of emergence, growth, maturity, and decline. Most models primarily consider the growth of the business to maturity and focus on the general problems faced by the organization as it grows. There are quite a few views dividing the research stage of scholars. For example, Sahlman et al. (1999) identified 3 stages, and Timmons and Spinelli (2003) divided 4 stages. There are even models that divide into 9 or 11 phases (Levie and Lichtenstein, 2010).
3. Growth theory based on gene association: This theory views an enterprise as a biological organism, and the various factors influencing an enterprise are considered across genes and chromosomes. Gouillart and Kelly (1995) are prominent scholars who have summarized the ideas of various authors and defined business transformation as the organized redesign of genes albeit at different rates according to the four aspects: Rearrangement, restructuring, re-creation, and innovation. Re-arrangement includes changing views and concepts of enterprises. The structure is related to the size of the business. Reinvention involves changing the organization and its operating environment. The transformation of the business means the transformation of systems. Innovation involves investing in individuals with new skills, and new goals.

An important emphasis on corporate growth theory was the publication of Edith Penrose's 1959 work "Theory of Firm Growth." This is an important basis for discussion of the growth perspective of the enterprise.

According to Penrose, growth is sometimes simply an increase in quantity such as growth in output, exports, and sales. But growth can also be an improvement in the quality of a growth process that resembles a natural biological process.

Many heated debates about business growth have been going on for a long time without reaching a general consensus. Delmar (1997) and Delmar et al. (2003) argued that growth is not uniform by any particular measure (for example sales; employment;

assets). According to Davidsson and Delmar (2006), the relevance of the three growth measures sales, employment, and assets depending on the unit of analysis. A growth company is considered a company with relatively stable sales growth over a significant period of time, accompanied by an accumulation of employees and assets. Growth can be understood in many different ways, from the basic concept to the driving force. And therefore, theories with different explanations are needed (Davidsson et al., 2010).

Based on an in-depth analysis of scientific studies over a 45-year growth period, Levie and Lichtenstein (2010) concluded that no single model has become dominant and propose a dynamic state model of change in business. Also based on the analysis of previous studies, the authors Mateev and Anastasov (2010), Rafiki (2020), Ha et al. (2022), and Zhang et al. (2022) also found that there is no general theory of business growth. Thus, it can be said that corporate growth is a heterogeneous concept.

2.3. Relevant empirical studies

Research on corporate growth has been started since the 50s of the 20th century. Some of the very first studies were Hart and Prais's (1956) study on the growth of firms in the UK and Hymer and Pashigian's (1962) study on the growth of firms in the United States.

A typical example is the study of Evans (1987). Research data included 42,339 firms in 100 manufacturing industries in the US from 1976 to 1980. Evans (1987) used the maximum likelihood function and the test of variance to examine the effects of age and firm size on business growth. In the study, enterprise growth was measured by the labor growth scale. Evans (1987) found that business growth declined with age and size. On the other hand, the firm's growth variability and the firm's probability of failure decreased with the age of the firm. Evans (1987) concluded that the age of the firm is an important determinant of firm growth, the variability of firm growth, and the probability of company dissolution. On the other hand, it is necessary to collect experience information about businesses and managers.

The highlight after Evans' (1987) research was Delmar's (1997). Delmar (1997) reviewed 55 previous growth studies, followed by an empirical study on a sample of data with the dependent variables representing firm growth being labor growth and revenue growth. The purpose of the study was to examine the effects of differences in the measurement and calculation of the dependent variable of growth. Delmar (1997) found that the most used growth metrics in previous studies were labor and revenue. Besides, labor growth is an important indicator of job creation dynamics and correlates with revenue growth. The logarithm of the dependent variable is often an option to get a higher fit and better use of the data; the problem of the interpretation of the model after a transformation has been highlighted. Ultimately, Delmar (1997) concluded, it is better to treat each separate study as a contribution to research since choosing different growth indices can yield different results.

An important follow-up study is related to the scale of business growth. Heshmati (2001) studied the growth of small firms in Sweden with panel data from 1993 to 1998, using OLS, GLS, and adjusted models. The dependent variable is the growth rate determined by the number of employees, sales, and assets. Thus, compared with previous studies, Heshmati (2001) added the total asset growth indicator model for research. The explanatory variables are divided into two groups, the main set includes (size and age of the enterprise), and the other set is called environmental variables. Research results show that the size and age of enterprises have a negative impact on labor growth; corporate age positively affects revenue growth and total asset growth; Firm size positively affects revenue growth and negatively affects total asset growth. On the other hand, debt has a negative impact on total asset growth, and a positive effect on revenue growth, and does not show a significant impact on labor growth.

Honjo and Harada (2006) also included a research model with 3 growth scales like Heshmati (2001), with research data from small and medium-sized enterprises in the Japanese manufacturing industry, but with different conclusions. Research results show that business size and age have a negative impact on all 3 growth scales; debt has a negative impact on labor growth and total asset growth as well as a positive impact on revenue growth.

To see the impact of capital on growth, Ullah and Wei (2017) used the revenue growth and labor growth models to study and detect the growth of firms using formal banking faster rather than firms funded by informal sources. Brown and Earle (2017) analyzed a linked database of all public bank loans across all employers in the United States to estimate the impact of financial access on labor growth. The results show an increase of 3 to 3.5 jobs for every million dollars in loans. The effects are estimated to be stronger for younger and larger firms. The impact of European Investment Bank (EIB) funding on the operations of 5,074 small and medium-sized enterprises in eight countries of Central and Eastern Eu-wire (CEE) for the period 2008-2014 has been evaluated (Amamou et al., 2023). The results show that EIB lending has a positive impact on employment, revenue, and the likelihood of success. And this impact will be stronger during the economic crisis. Sharing the same opinion, Amamou et al. (2020) studied the impact of intermediary capital provided by the European Investment Bank (EIB) on the performance of small and medium-sized enterprises (SMEs) in 28 member states of the European Union from 2008 to 2014, found that EIB lending had a positive impact on employment, firm size, investment capacity, and innovation, and it also increases the leverage ratio. Using data from the United Kingdom and Ireland, Rahaman (2011) concluded that external finance has a higher impact

on firms' job growth than internal finance. Increased access to finance allows companies to use external financing instead of relying on internal financing, which can take years to save or borrow from informal sources such as family and friends and money lenders (IFC, 2021). Based on a dataset of 129 developing countries, from 2006 to 2015, IFC (2021) found that, for SMEs in developing countries, an average of 1 million US dollars is associated with the creation of 8.15 more permanent jobs per year, when compared to businesses with no access to finance.

Regarding the environmental factor, Zhang et al. (2022) included labor growth in the research model of the data of nearly 1,800 enterprises in 12 countries around the world. The results show that effective Government efficiency, political stability, and the absence of violence are positively associated with business growth. Younger and non-state enterprises grow faster than state enterprises and older enterprises. Management experience does not affect the company's growth. Pham et al. (2017) studied a data sample of 2,500 SMEs manufactured in Vietnam from 2007-2015 through OLS, FEM, and REM methods. The purpose is to examine the relationship between network and business performance (Networks and Firm Performance). The performance of the enterprise is represented by the variables of revenue growth rate, the growth rate of the number of employees, ROA, and ROE. The results show that the age of the enterprise, the total labor force of the enterprise, the ownership of the business, the sector of the enterprise, and the level of professional education have a significant influence on the performance of the enterprise.

Ha et al. (2022) studied a dataset of 2,127 Vietnamese SMEs from 2005 to 2015. In their research, the representative variable of enterprise growth is total asset growth assessed with the Bayesian estimation method. The study concluded that for the group of explanatory variables, liabilities have a negative impact while equity has a positive impact on the growth of the business. For the group of environmental variables, firm size, and male entrepreneurs have a positive impact while firm age, female entrepreneurs, and export factors have a negative impact on firm growth.

2.4. Research hypotheses

2.4.1. Capital

Capital is the lifeblood of any business's condition for access to resources, growth in output, job creation, profitability, efficiency, exports, productivity, and return on assets (Beck and Demirguc-Kunt, 2006; OECD, 2006; IFC, 2010). The trade-off theory reflects how much debt and equity a company will use to balance the benefits and costs of its business operations (Modigliani and Miller, 1963; Kraus and Litzenberger, 1973). The theory states that firms will have an advantage when using debt capital. And the trade-off of how much equity and how much debt the firm will use is based on a comparison between the marginal benefit from the additional debt and the increased marginal cost. However, it is difficult for micro and small enterprises to apply this theory with the thought of the business itself wanting financial freedom and the constraints of debt. Newly established businesses do not have experience in accessing capital, lack information sources, lack collateral, and do not have relationships and trust with financial institutions. According to Binh et al. (2020), SMEs and start-ups, in general, are not able to raise enough capital due to low credit ratings and they have limited access to primary markets to issue shares and loans.

For micro and small enterprises in Vietnam which are operating at losses, it is even more difficult to get loans. Therefore, additional capital contributed by individual business owners can only be enough to compensate for the maintenance of current operations. In case the enterprise operates profitably, the equity is supplemented from the retained profit, then it is possible to purchase equipment that increases total assets but it is not potential to increase labor. Robb et al. (2009), based on company survey data, found that debt increases as businesses grow. According to Oakey (1984), throughout the early stages of development, many SMEs are forced to seek outside investment capital, especially growth-oriented companies.

According to enterprise statistics, compared to micro and small enterprises, medium enterprises attract more workers, have higher labor efficiency, higher debt ratios, and have stable profits over the years, so there are more favorable conditions to apply the trade-off theory and pecking order theory (Myers and Majluf, 1984; Myers, 1984) for the optimal selection of capital structure. In the context of the transition from medium-sized enterprises to large-scale enterprises, there are increased labor force indexes, increased debt ratio, and increased labor efficiency (MPI, 2021). On the other hand, based on Empirical research by Rahaman (2011), Ullah and Wei (2017), Brown and Earle (2017), Amamou et al. (2020), and IFC (2021) suggested that debt has a positive impact on labor growth, the author proposed two hypotheses as follows:

H1: Equity has a negative impact on the firm's labor growth.
H2: Liabilities have a positive effect on an enterprise's labor growth.

2.4.2. Environmental factors affecting growth

On the basis of the theory of enterprise growth, the theory of corporate boundaries, and the theory of gene association, the transformation of production and business is related to the environment, organization and operation, personnel with skills and ideas, new thinking, and new goals. Based on empirical studies by Evans (1987), Delmar (1997), Heshmati (2001), Honjo and Harada (2006), Pham et al. (2017), Zhang et al. (2022), and Ha et al. (2022),

the study proposed the following hypotheses about related factors affecting labor growth of small and medium enterprises:

H3: Firm size has an impact on a firm's labor growth.
H4: Export factors have an impact on the labor growth of enterprises.
H5: The age of the enterprise has an impact on the labor growth of the enterprise.
H6: Entrepreneur's gender has an impact on the enterprise's labor growth.
H7: Entrepreneurial education has an impact on an enterprise's labor growth.
H8: Production and business industries have an impact on the labor growth of enterprises.

3. Research data and methods

3.1. Data

The study uses the data set by the Central Institute for Economic Management (CIEM), the Institute of Labor Science and Social Affairs (ILSSA), the World Development Economics Research Institute of the United Nations University (UNU-WIDER) and the Faculty of Economics (DOE) of the University of Copenhagen collaborated on the investigation. Collected data is carried out every 2 years from 2005 to 2015 including over 2,600 SMEs in 20 industries operating in the field of processing and manufacturing in 10 provinces and centrally-run cities including Hanoi, Hai Phong, Ho Chi Minh City, Ha Tay, Phu Tho, Nghe An, Quang Nam, Khanh Hoa, Lam Dong, and Long An. Supported datasets are provided by UNU-WIDE. The number of surveyed enterprises in 2005, 2007, 2009, 2011, 2013, and 2015 respectively is 2,821; 2,635; 2,655; 2,512; 2,542; and 2,647 enterprises. To obtain panel data, the data is merged from 2005 to 2015 according to the business identification code (Identification–id) to ensure the consistency and continuity of each operating business. The total number of businesses after merging the id code is 2,127 businesses.

3.2. Research methods

Regarding research methods, most of the previous studies on growth used the statistical frequency method. The nature of frequency statistics is that research results depend on data sampling (Godambe, 1966; Basu, 2011; Scott and Smith, 1973; Rubin, 1976). But for SMEs, especially the financial sector, data is often incomplete or inconsistent (OECD, 2020; WBG, 2008). Meanwhile, the results of the Bays method can ignore the influence condition due to the small sample or missing observations (Godambe, 1966; Basu, 2011; Scott and Smith, 1973, Rubin, 1976).

On the other hand, accessing loans is a difficult and urgent problem for SMEs today. The paper introduces the model of a financial variable consisting of two components, equity and liability, which is consistent with the theory, and better reflects the impact of each specific component of capital used for business growth. While previous studies often used debt ratio or financial leverage in the model, these are two different approaches.

Therefore, the Bayesian method is used to study the impact of equity and liability on the labor growth of enterprises. Based on the stated hypotheses and applying the Bayesian analysis method, the study introduces the following variables into the model. Dependent variable: Representing the growth of the enterprise is the growth rate of full-time employees compared at year t with t-1 in terms of the Natural Logarithm, symbol (lngLT). The value lngTL is the difference in the Natural Logarithm of the total full-time labor force in year t from year t-1. To focus on the main solution, which is to consider the impact of capital on business growth, the study divides explanatory variables into two groups:

1. The main group of explanatory variables: Is a group of capital variables that affect the growth of the enterprise, including:

- Total equity at the end of the year, calculated according to the natural logarithm, symbol (lnEq).
- Total liabilities at the end of the year (representing the source of loans outside the enterprise) are calculated according to the natural logarithm, symbol (lnLi).

2. Group of control variables:

- Growth rate of total assets, symbol lngTA. The variable lngTA represents the firm size.
- Number of years of establishment of the enterprise (firm age), symbol lnFA.
- Export factor, symbol (Ex): Is a binary variable, has the value 1 if the enterprise exports, 0 if the enterprise does not export.
- The gender of the businessman, symbol Ge: Is a binary variable, with the value equal to 1 if male, and 0 if female.
- Education and training level of entrepreneurs: Is a binary variable, with the value Edu1=1 if undergraduate and graduate, Edu2=1 if college/intermediate, Edu3=1 if trained occupation without a degree, Edu1=Edu2=Edu3=0 if there is no profession.
- Business industry: Selected industries associated with binary variables to include in the model based on a survey dataset consisting of a total of 20 industries. Among the 20 industries of the dataset, the number of enterprises is unevenly distributed by industry and quite different in a number of enterprises. Therefore, in order to avoid including too many binary variables in the model, the study selects industries with an annual number of operating enterprises of 50 or more. Based on this division, there are 6 binary variables representing 6 industry groups included in the model. The remaining enterprises belong to the 7th group. The variable has the value Sec1=1 if it is the paper

industry; Sec2=1 if the garment industry; Sec3=1 for the food and beverage industry; Sec4=1 if manufacturing metal products; Sec5=1 if the wood industry; Sec6=1 for furniture, jewelry, musical equipment, watches, toys, and medical equipment; Sec1=Sec2=Sec3=Sec4=Sec5=Sec6=0 are the remaining sectors.

Based on the views of Evans (1987), Honjo and Harada (2006), Mateev and Anastasov (2010), and Ha et al. (2022), the proposed mathematical model of the topic:

$$g_t = \ln(\frac{Y_t}{Y_{t-1}}) = f(\ln X_t, \ln Z_t, D_t)$$

where, g_t is Firm growth rate; Y_t is Value at time t of the growth variable; Y_{t-1} is Value at time t-1 of the growth variable; X_t is the Group of explanatory variables; Z_t is the Quantitative control variable group; D_t is the Qualitative control variable group.

Model:

$$\ln TL_{it} = \beta_1 + \beta_2 \ln Eq_{it} + \beta_3 \ln Li_{it} + \beta_4 \ln TA_{it} + \beta_5 \ln FA_{it} + \beta_6 Gen_{it} + \beta_7 Ex_{it} + \beta_8 Edu1_i + \beta_9 Edu2_i + \beta_{10} Edu3_i + \beta_{11} Sec1_i + \beta_{12} Sec2_i + \beta_{13} Sec3_i + \beta_{14} Sec4_i + \beta_{15} Sec5_i + \beta_{16} Sec6_i + \varepsilon_i$$

4. Research results

To select the appropriate a priori information for a large sample size, the article will analyze the sensitivity through five simulations of normally distributed a priori information as follows (Table 1).

Table 1: Likelihood model

Prior distributions	lngTL~ $N(\mu, \delta)$
Simulation 1	$\alpha_i \sim N(0,1)$ $\delta^2 \sim Invgamma(0.01, 0.01)$
Simulation 2	$\alpha_i \sim N(0,10)$ $\delta^2 \sim Invgamma(0.01, 0.01)$
Simulation 3	$\alpha_i \sim N(0,100)$ $\delta^2 \sim Invgamma(0.01, 0.01)$
Simulation 4	$\alpha_i \sim N(0,1000)$ $\delta^2 \sim Invgamma(0.01, 0.01)$
Simulation 3	$\alpha_i \sim N(0,10000)$ $\delta^2 \sim Invgamma(0.01, 0.01)$
i = 1, 2, 3, 4, 5	

Bayesian coefficient test and Bayesian model test will be performed to select the most suitable simulation with respect to Log BF, Log (ML), and DIC criteria. For testing the posterior estimate of the validity of Bayesian inference, the article will use the convergent diagnosis through the tests of autocorrelation, normal distribution, stability, and the Max Gelman-Rubin Rc test. To ensure robustness and reliability for all parameters, normally distributed a priori values are adjusted from -0.5 to 0.5 with a 0.1 interval for all parameters as a basis for the conclusion. It will result in selecting model 1 as the best.

Based on the calculation results, the selected simulation will be the one with the largest log (BF), log (ML) and P(Machine) mean; mean minimum DIC (StataCorp LLC, 2021). The results from Table 2 show that the first simulation is suitable. The Bayesian estimation results based on the first simulation in Table 2 are presented in Table 3.

Table 2: Bayesian factor test and model test

	lngTL			
	Avg DIC	Avg log (ML)	Avg log (BF)	P(M/y)
Simulation 1	7272.1294	-3.69e+03	1	1.0000
Simulation 2	7271.9284	-3.71e+03	-18.6139	0.0000
Simulation 3	7272.1926	-3.73e+03	-37.0542	0.0000
Simulation 4	7272.0853	-3.75e+03	-55.2562	0.0000
Simulation 3	7272.0123	-3.77e+03	-74.0166	0.0000

Table 3: Bayesian simulation results (lngTL)

	Mean	Std. dev.	MCSE	Median	Equal-tailed [95% Cred. interval]	
lnEq	-.019893	.0062293	.000036	-.0198603	-.0321947	-.0077492
lnLi	.0097885	.0049992	.000029	.0097551	.0000017	.0196299
lngTA	.0364819	.0088226	.000051	.0365312	.0189782	.0535417
lnFA	-.0271732	.013181	.000076	-.0272199	-.0531002	-.0011748
Gen	.0071309	.017113	.0001	.0070847	-.0262439	.0409751
Ex	-.0045322	.0311544	.00018	-.0044694	-.0654671	.0569635
Edu1	.0139207	.0263005	.000152	.0140766	-.0375766	.0651132
Edu2	.042792	.0239564	.000138	.0428668	-.0039512	.0899485
Edu3	.0281715	.0229306	.000133	.0280889	-.0168266	.0730256
Sec1	-.0002645	.0511374	.000295	-.0002729	-.1006922	.1002076
Sec2	-.0554145	.042957	.00025	-.0553036	-.1396501	.0284413
Sec3	-.0077646	.0223975	.000129	-.0076302	-.051933	.0364247
Sec4	-.0230086	.0242729	.00014	-.0230561	-.0705328	.0246176
Sec5	-.0329904	.0294628	.000171	-.0331898	-.0906932	.0244749
Sec6	-.0082062	.0321804	.000186	-.0083568	-.070561	.0549379
_cons	.08921	.0518499	.000304	.0893311	-.0120526	.1906573
var	.2899702	.0061046	.000035	.2898822	.2781801	.3023563

Number of obs = 4,535; Avg acceptance rate = 1; Avg efficiency: min = .9705; Max Gelman-Rubin Rc =1

To consider MCMC convergence, Gelman and Rubin (1992) and Brooks and Gelman (1998) suggested that a diagnostic Rc value greater than 1.2 for any model parameter should indicate non-convergence. In practice, Rc<1.1 is often used to declare convergence. Therefore, a Max Gelman-

Rubin Rc value in Table 3 is 1<1.1 indicating that the MCMC convergence is acceptable for Bayesian analysis.

After Bayesian estimation, the author performed a visual test of the MCMC convergence of lngTL. Autocorrelation, normal distribution, and stability tests will be performed via a diagnostic graph. The resulting histograms show low autocorrelation while the trace plots show a good association. Normal distributions can be plotted from density histograms and frequency distribution histograms. Therefore, MCMC convergence is kept.

Regarding the sensitivity test: Through the author's calculations, the certainty test shows that the following estimates are not significantly different in terms of the posterior mean, MCSE, and the confidence interval when the baseline is normal for all parameters are adjusted from -0.5 to 0.5 with 0.1 intervals. So, it can be said that the results are very good.

The estimated results from Table 3 show that debt has a positive effect on a firm's labor growth, supporting the views of Ullah and Wei (2017), Brown and Earle (2017), and Amamou et al. (2020). The results are consistent with the view of Robb et al. (2009) and Oakey (1984) that firms need debt to grow, and consistent with the capital structure trade-off theory, that firms Businesses take advantage of tax shields to maximize profits. The results are also consistent with the performance statistics of Vietnamese SMEs in the period 2011-2019 (MPI, 2021), in which, compared to micro and small enterprises, medium to large-scale firms attract more workers and are more efficient in using labor, have a higher debt ratio, and are profitable. Compared with research results in Vietnam, Trinh and Doan (2018) generally concluded that capital has a positive impact on business growth; Nguyen et al. (2018) found that foreign direct investment (FDI) has a negative impact on business growth.

Regarding the impact of equity, the point of view of scholars mentioned above is that businesses need to borrow capital to increase their production and business scale. This opinion is similar to that of some authors such as Berger and Udell (1998), Cassar (2004), Huyghebaert and Van de Gucht (2007), Wu et al. (2008), Harvie et al. (2013), and Rand et al. (2016). In specific, in the case of small-scale enterprises within the early stages of formation, capital is mainly internal capital, which is extracted from retained earnings. Thus, equity is not the main driver of growth in firm size. On the other hand, there are businesses that are not growth-oriented or do not want to depend on debt capital. When equity is added, the opportunity to replenish debt capital is lost according to the trade-off theory of capital structure. Meanwhile, debt capital is a positive factor in labor growth. Therefore, equity has a negative effect on labor growth.

For control variables, firm size has a positive effect on labor growth. This result is different from the research results of Evans (1987) and Heshmati (2001) but consistent with the views of some other authors. According to Abdulsaleh and Worthington (2013), there is almost an assumption that size is associated with the growth of SMEs. Larger firms must have more internal resources and also have better access to external resources, so the size of a firm is positively related to growth (Federico et al. 2012). Compared with the research results in Vietnam, Pham et al. (2017) and Nguyen (2020) found that firm size has a positive impact on business growth. Meanwhile, Nguyen et al. (2018) and Tuan and Yoshi (2009) argued that firm size has a negative impact on growth. Larger firms are more likely to grow faster (Nguyen, 2020) regarding the performance of Vietnamese SMEs.

Firm age has a negative impact on firm labor growth, supporting the point of view of Evans (1987), Heshmati (2001), Honjo and Harada (2006), and Coad and Tamvada (2012). According to Coad and Tamvada (2012), young companies tend to grow faster than older companies. This result is also consistent with the study of Ha et al. (2022) on Vietnamese SMEs, suggesting that the age of the enterprise has a negative effect on its growth of the enterprise. Besides, Tuan and Yoshi (2009) suggested that age has a negative impact while Pham et al. (2017) and Nguyen (2020) suggested that age has a positive impact on enterprise growth.

Regarding the export factor, the estimation results show that with other factors being held constant, exporting enterprises have lower labor growth than non-exporting enterprises. The results are consistent with the point of view of Brenner and Schimker (2015), that exporting has a negative effect on firm growth. The results of the Vietnam SMEs survey in 2015 show that the proportion of exporting enterprises with informal payments is nearly twice that of non-exporting enterprises. Exporting firms have an average profit per employee of VND 30.4 million, while the average profit per employee of non-exporting firms is VND 36.9 million (Rand et al., 2016). Thus, since higher profits of non-exporting firms may be good news, and favorable for borrowing, while debt has a positive effect on firm growth, the negative impact of the export factor on growth in the case of Vietnam is appropriate in the current Vietnamese context. Meanwhile, Le (2022) believed that the export factor has a positive impact on the revenue growth and asset growth of enterprises.

Regarding the level of education and training of entrepreneurs, the estimated results show that, with all other factors being constant, enterprises belonging to the group of entrepreneurs have educational and vocational qualifications such as the degrees of undergraduate, and graduate students, Colleges, and vocational secondary schools. Such firms have higher growth rates than enterprises in the group of untrained entrepreneurs. This result is consistent with the views of many scholars. According to Cassar (2006), entrepreneurs who invest in education and training will improve their skill level, be more productive, and thus earn more. This can also lead to more growth and profits in their

business. According to Cooper et al. (1994), human capital helps to run a business successfully. Education is important because it is a source of knowledge, skills, problem-solving, discipline, motivation, and confidence. Human capital motivates people to acquire new knowledge that helps individuals adapt to new situations (Davidsson and Honig, 2003). Human capital increases the quality and consistency of assigned work (Becker, 1964; Mincer, 1974).

Regarding gender, according to Goffee and Scase (1985), female entrepreneurs are often reluctant to scale up because business growth requires time, affects their lifestyle, and therefore can threaten the pattern of conjugal and family relationships. Lee-Gosselin and Grise' (1990) argued that women entrepreneurs who are bound by family responsibilities and are aware that they do not have enough resources and experience to pursue business growth will deliberately apply it. Lower growth expectations accommodate these constraints. These opinions are also similar to the views of Croson and Gneezy (2009) and Charness and Gneezy (2012), who claimed that women are less inclined to take risks than men. Meanwhile, female entrepreneurs often face more challenges related to access to finance and education than male entrepreneurs (Harvie and Vo, 2009). Therefore, the growth of male-owned enterprises is higher than that of female-owned enterprises, considering all other factors constant. The result is consistent with the Vietnamese context.

Regarding the impact of industry groups, according to the SME survey in Vietnam 2015, there are 3 industries with the largest number of surveyed enterprises: Food and beverage, prefabricated metal products, and wood product processing (Rand et al., 2016). The service sector and construction industry has the highest profit and the highest debt index (MPI, 2021). The results of the estimation of six binary variables representing the six industries included in the model are all negative. This is probably due to the disadvantage of fierce competition among many companies in the same industry within the above 3 groups, and the disadvantage of accessing debt as they are not in the group of enterprises with advantages in profit and debt ratios. Such affects the growth of enterprises in these industry groups.

5. Conclusion

The topic clearly reflects the impact of equity and debt on the growth of SMEs in Vietnam with relatively large data, through Bayesian analysis and test techniques. The topic has added evidence about the empirical results of the impact of equity and debt on the growth of Vietnamese SMEs. The results show that debt has a positive effect and equity has a negative impact on business growth. In terms of the group of control variables, factors creating positive impacts on business growth include the size of the enterprise, businessmen, and businessmen with educational and vocational qualifications in the group of undergraduate and graduate, college and vocational secondary schools. Factors creating negative impacts on business growth include the business, businesswomen, untrained entrepreneurs, export factor, the manufacturing and trading industries of paper, apparel, food and beverage, manufactured metal products, wood, furniture, jewelry, musical equipment, watches, toys, and medical equipment.

Theoretically, this research can make a contribution to the development of literature on the topic of enterprises' labor growth, with an emphasis on SMEs in a developing country such as Vietnam. This empirical study can be considered a reply to the call raised by previous authors for more research on SMEs' growth in Vietnam (Pham et al., 2021; Ha et al., 2022). This paper is also a relatable reference for academies that have a concern about SME growth in emerging countries. The research can be viewed as a scientific and practical basis to propose policies and needed solutions to support SME growth, contributing to sustainable economic development in the region.

Regards to managerial implications, it is indicated by the research results that enterprises should try to obtain loans for growth goals, and supplement and improve professional human resource qualifications and skills. It is helpful to prepare mid and long-term strategies and action plans for institutional and human resources development, prepare qualification requirements and evaluation methodology of the staff's performance, and introduce a clear double-check system for loan appraisal, accounting, and cash operation. Additionally, business leaders should consider approaching financial consulting firms/experts for timely pieces of advice to resolve financial issues and conduct long-term financial planning. SMEs should also establish a network of mobilizing resources of qualified consultants and form a team of such consultants.

It is highly recommended that government agencies support businesses to obtain more advantages in accessing capital, pay attention to and create good conditions for export enterprises as well as support education and vocational training. The government should take note of the challenges facing SMEs in Vietnam such as access to finance, unfair competition, R&D investment, administrative issues, human resources management, capital management, technical consultation, and regulatory environment to reduce unnecessary regulations. It is suggested that the government simplify the administrative process, especially for private, small, and medium enterprises.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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