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Determinants of Firm Growth in the Vietnamese Commercial-Service Sector

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Abstract

Employing the dynamic panel model, this study tests the validity of Gibrat's law and investigates determinants of firm growth in Vietnam. The empirical study is set up for both simple and multiple regressions with the data of the commercial-service sector. The balanced panel dataset used in this paper is abstracted from the National Census of Vietnamese Enterprises during the period 2000-2007. Applying the system GMM estimator to control unobserved heterogeneity and endogeneity, the findings imply that Gibrat's Law should be rejected. The results confirm the sensitivity of the growth-size relationship to firm attributes. Besides, firm size and labor quality are the main determinants of firm growth.

Keywords: Firm growth, determinants of firm growth, developing countries, dynamic panel model, Gibrat's Law, GMM estimator.

1. Introduction

The analysis of firm growth plays an important role in the field of economic dynamics. From a microeconomic perspective, the more continuously firms grow, the higher probability of survival they have (Ghosh, 2008). Furthermore, firms with positive rates of growth will reduce unemployment via creating new jobs, and even push competition in the market. Firm growth at a high rate will increase its market share, thus enhancing its competitiveness. Therefore, a dynamic analysis of firm growth in terms of evaluating which factors affect growth becomes extremely important in microeconomics. From a macroeconomic perspective, economic growth is mainly determined by firm growth (Ghosh, 2008). An increase in firm growth implies an increase in the firms' contribution to gross domestic product (GDP). Firm growth requires a higher demand for production factors through backward linkages, supplies more products through forward linkages, as the result, this boosts economic growth at regional level as well as national level (Ghosh, 2008). Therefore, the particularly important question for any economy is which factors firm growth depends on.

One suggestion by Gibrat's law (Gibrat, 1931) is that firm growth rate is random with its size at the beginning of the studied period. ''According to this law, the probability of a given proportionate change in size during a specified period is the same for all firms in a given industry regardless of their size at the beginning of the period''[1]. Numerous studies have tested the validity of this law. However, this law is still disputed due to conflicting findings. The law was supported by some authors (Steindl, 1965; Prais, 1976, Chap. 2), but rejected by others (Reid, 1992; Audretsch *et al.,* 1999; and Calvo, 2006). Recently, Gibrat's law has been tested in the presence of other potential determinants of firm growth (Higson *et al.,* 2004; Beck *et al.,* 2005; Bartelsman *et al.,* 2005; Fisman and Svensson, 2007).

Whereas most empirical studies testing Gibrat's law focus on developed countries, few studies look at developing countries, including Taiwan (Yang and Huang, 2005), Ethiopia (Bigsten and Gebreeyesus, 2007) and Ghana (Robson and Obeng, 2008). Vietnam offers an appropriate laboratory among developing countries to test the validity of Gibrat's law and investigate determinants of firm growth. As a typical developing country in Asia, Vietnam has implemented an economic transition from the centrally planned economy to the market-oriented economy. During this period, Vietnam has experienced tremendous changes in economic structure, which have enhanced the growth of enterprises (Baughn *et al.,* 2004) and international integration, such as joining the WTO in 2006. While Asia has recently become one of the world's three major economic centers, Vietnam has considered one of the most prosperous and successful developing countries in Asia, with the growth rate of real GDP by 7.4% p.a. over the 1990s (Oostendorp *et al.,* 2009), and by 7.6% p.a. during the period 2000-2007 (GSO, 2009). This growth was mainly contributed by the equitization from state-owned enterprises (SOEs) to quasi-private enterprises and to private small and medium-sized enterprises (SMEs) (Neupert *et al.,* 2006), which experienced a significantly rapid

growth, around 300% during the period 1998-2002 (GSO, 2009). Concisely, Vietnam offers an outstanding opportunity for a dynamic study of firm growth in developing countries.

Therefore, this study tests the validity of Gibrat's law via the relationship of firm growth and size and investigates determinants of firm growth in Vietnam. This study focuses on the commercial-service sector due to some of the following reasons. Most empirical analyses related to this law have focused only on the manufacturing sector (Audretsch *et al.,* 2004; Teruel-Carrizosafa, 2008), not the commercial-service sector although this sector plays no less an important role in the economy. Furthermore, the difference of scale economies between the manufacturing and commercial-service sectors results in their difference of mean efficient sizes (Teruel-Carrizosafa, 2008). All these reasons call for further investigations of the commercial-service sector.

The study presents some main contributions. The study employs a simple dynamic panel model to test the null hypothesis that firm growth is random or stochastic with its size. In addition, a multiple dynamic panel model tests the sensitivity of this "stochastic" process to various economic factors. In addition, the study compares its findings with other studies' findings. Besides, it investigates a comprehensive set of suspected determinants, including capital intensity, financial structure, economic integration and globalization, especially passive learning and employee quality.

In addition, because Gibrat's law refers to a relationship between firm growth (growth of size) and size, an endogeneity problem may occur. Besides, in dynamic analysis, there is the pervasive existence of unobserved individual heterogeneity[2]. Thus, the problems of unobserved heterogeneity as well as of endogeneity, which have been so far neglected in numerous studies which will be addressed in this study by applying the GMM system methodology of Blundell and Bond (1998). The employed dataset in this study is abstracted from the National Census of Vietnamese Enterprises for the period 2000-2007. This period corresponds to the strongest process of globalization in Vietnam as well as belongs to ten-year strategy of national economic development.

The rest of the study is organized as follows. Section 2 is devoted to an overview of the literature and research questions. The next section briefly describes the performance of Vietnamese enterprises. Section 4 focuses on the employed methodology, including model, variables, and data. Section 5 presents the empirical results and analysis. The final section concludes and points out some policy implications.

2. Literature review and research hypotheses

Robert Gibrat (1931) postulated that the growth rate and the size of a given firm were independent. Afterwards, Sutton (1997) developed this law to become the law of proportionate Effect (LPE). Several early literatures supported this law, for instance, Hart and Prais (1956), Hymer and Pashigian (1962), Steindl (1965), Prais (1976), and Dunne *et al.,* 1989. Nevertheless, these empirical tests of the law were not sufficient to support its theoretical point of view due to heterogeneous and some-

times contradictory findings.

The controversial outcome may result from characteristics of firm samples (Oliveira and Fortunato, 2008; Teruel-Carrizosa, 2008). While some further studies investigate smaller and younger firms instead of large and mature firms as in previous studies, the results turn to reject the law. Based on firm samples, Mansfield (1962) classified the literature on this law into three versions. The first version applies the law to all firms, including both survivors and loser. The second type excludes the loser during the analyzed period because they cause sample bias and indicate that the law is valid only for survival firms. This version was underlined by Hart and Prais (1956). The third type argues that the law may be suitable only for firms with output larger than the minimum efficient scale level. This version of Gibrat's law was supported by Simon and Bonini (1958).

Similarly, Geroski (1995) pointed out that the controversial evidence resulted from differences in growth patterns between large and small firms, in this sense, well-established enterprises had growth rates random with their sizes. Afterwards, Sutton (1997) and Caves (1998) developed and defended the hypothesis of ''Gibrat's Legacy'', that is, firm growth rate is random with its size only after it has achieved the minimum efficient scale (MES) of output and become large or mature. In addition, Geroski *et al.* (2003) argued that Gibrat's law tended to be valid for large-sized enterprises only, or for firms that had exhausted scale economies.

Inspired by Gibrat's law, some scholars have proposed and developed more sophisticated concepts of evolutionary learning, including the *passive* and *active learning* models. The '*passive learning*' model, developed by Jovanovic (1982), indicates that firms' adjustment of size is based on their productivity levels which are realized only post-entry. This model initially explores unknown and time-invariant characteristics which may influence firm decision on its size and growth. It rejects Gibrat's law in the short run with findings that the efficient and smaller firms grow more rapidly than the larger and more experienced ones. The '*active learning*' model, proposed by Ericson and Pakes (1995), argues that firms could invest actively and continuously to increase their size and productivity. It states ''investment, entry and exit decisions depend continuously on the distribution of future states, which in turn depends continuously on those decisions''[3].

In addition, the controversial findings of Gibrat's law may result from different types of economic activity (Oliveira and Fortunato, 2008). For the case of the manufacturing sector, Mansfield (1962) gave evidence to support the law while Utton (1971) did not. Similarly, there was a difference between these sectors in the case of Chinese Taiwan (Chen and Lu, 2003). This research gave evidence to reject the law for the manufacturing but not for the services sector. However, Oliveira and Fortunato (2008) suggested that Gibrat's law was rejected for the services enterprises. Besides, Teruel-Carrizosa (2008) found that small firms in the manufacturing industries grew faster than those in the services sector. In contrast, Geroski (1995), and Caves (1998) concluded that there was no difference

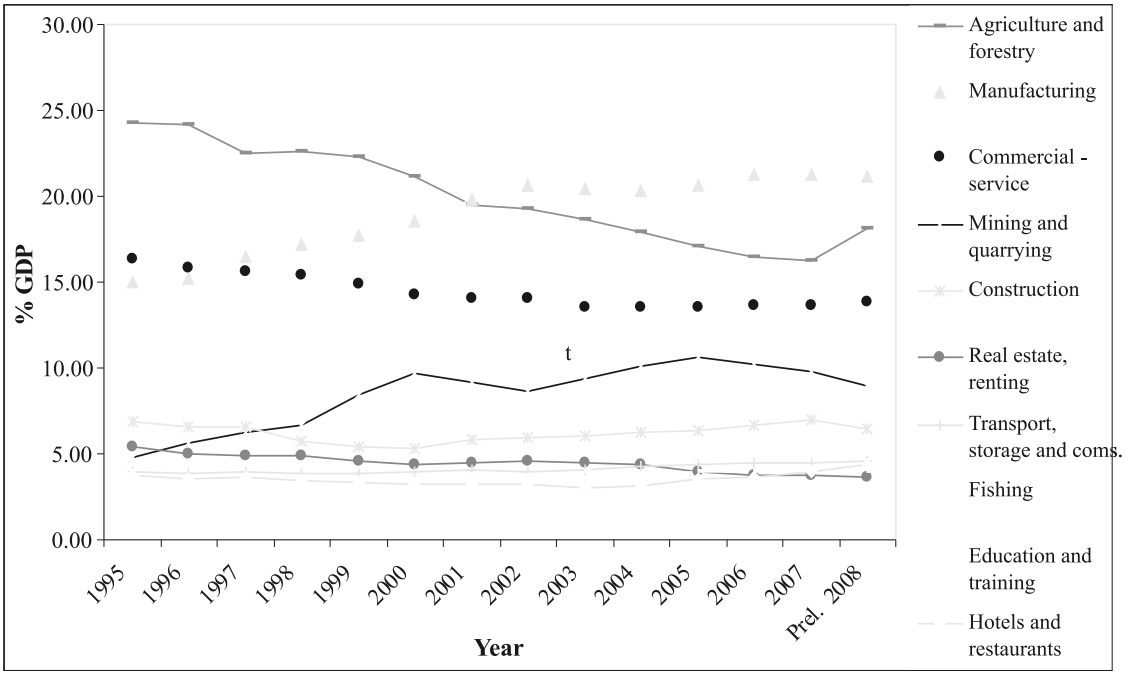
between the manufacturing and services sectors regarding the validity of Gibrat's law. Some other scholars also distinguished between these industries, however, gained inconsistent findings, such as Kumar (1985), Tschoegl (1996), Almus and Nerlinger (2000), Goddard *et al*. (2004), and Fotopoulos and Giotopoulos (2008).

Recently, scholars have attempted to investigate under which conditions the relationship between firm growth and size becomes consistent with Gibrat's law. Calvo (2006) investigated whether small, young, and innovating firms gained greater employment growth than others. His results were inconsistent with Gibrat's law and supported the proposition that small firms had grown more rapidly. In addition, he concluded that young firms grew faster than old ones, and innovating activity had a significant positive effect on the firm survival and growth. However, Fotopoulos and Giotopoulos (2008) accepted the law for old, medium, and large firms. Oliveira and Fortunato (2008) employed specifications of financial structure and foreign participation and suggested that Gibrat's law was invalid for the services firms. Lotti *et al.* (2009) postulated that Gibrat's law was invalid in the short-run, due to the evidence that smaller firms seemed to have higher growth rate. Nevertheless, they detected a considerable convergence toward Gibrat's law in the long run as the evidence of this law. Melhim *et al.* (2009) found that the smallest and largest firms grew fastest and new entrants grew faster than comparably sized incumbents did. The invalidity of Gibrat'Law is underlined by Teruel-Carrizosa (2008) with findings that small firms in the manufacturing industry grew faster than those in the service industry. This implies that market structure influences the relationship between firm growth and size.

Furthermore, many subsequent empirical studies provide evidence of the invalidity of Gibrat's law by employing more comprehensive determinants of firm growth (Ghosh, 2009), including age (Calvo, 2006; Oliveira and Fortunato, 2008), firm ownership structure (Geroski and Gugler, 2004; Oliveira and Fortunato, 2008; Ghosh, 2009), innovation and technology (Almus and Nerlinger, 2000; Calvo, 2006; Ghosh, 2009), uncertainty of demand (Lensink et al., 2005), profitability and financial risk (Goddard *et al*., 2004; Oliveira and Fortunato, 2006; Ghosh, 2009), human capital (Almus, 2002), capital structure (Adamou and Sasidharan, 2007), and geographical and macroeconomic factors (Goddard et al., 2004; Beck et al. 2005; Falk, 2007), interaction effects (Ghosh, 2009). Moreover, sophisticated econometric techniques are applied (Lotti et al., 2009) to address sample selection (Evans 1987a, 1987b; Dunne and Hughes, 1994; Harhoff *et al.,* 1998), endogeneity (Yang and Huang, 2005; Oliveira and Fortunato, 2008), panel unit root (Goddard *et al.,* 2002, 2004), and heteroskedasticity (Blonigen and Tomlin, 2001; Teruel-Carrizosa, 2008; Oliveira and Fortunato, 2008; Fotopoulos and Giotopoulos, 2008; Lotti *et al.,* 2009; Ghosh, 2009).

However, empirical studies of firm growth almost exclusively test Gibrat's law for developed countries. Only few scholars pay attention to developing countries. Yang and Huang,

Figure 1: Structure of GDP by economic (sub-)sectors



Source: *General Statistics Office of Vietnam (GSO)_(2009)*

(2005) studied the relationship between the growth rate of firm size and R&D of Taiwanese electronics firms. The results rejected Gibrat's law for small firms but turned out to support the law for large-sized ones, an evidence of the weak form of Gibrat's law, which argues that the law is only valid for firms in a specific size cohort (Simon and Bonini, 1958). Bigsten and Gebreeyesus (2007) focused on the relationship between Ethiopian firm growth and its attributes, and concluded that firm size had a negative effect on its growth.

In general, most studies only focus on developed countries; ignore the effect of lagged growth and issues of both endogeneity and heteroscedasticity (Goddard *et al*., 2002b). Moreover, a common shortcoming of most studies is that they are not often confined to the reform era, thereby considerably delimiting empirical appeal of reform (Ghosh, 2009). Especially, no research has hitherto provided an analysis for the commercial-service sector and comprehensive specifications of factors under a process of a significant restructuring and globalization process, thus the recent study will cover those issues.

In order to fulfill these gaps, the study tests the below hypotheses:

Hypothesis 1: Firm growth is random or stochastic with its size.

Hypothesis 2: Firm growth and the relation-

ship between growth and firm size depend significantly on firm attributes.

3. Overview on Vietnamese enterprises' performance

This study focuses on the commercial-service sector because this sector plays an important role in contribution of GDP (see Figure 1). This sector is categorized in the census as those engage in activities related to trade, repair of automobiles and motors, of personal and household properties.

Figure 1 presents the top-ten sectors among total nineteen sectors in contribution to overall GDP in Vietnam. Evidently, from 1997, the commercial-service sector has been the third highest GDP-contributing sector. This study focuses on this sector instead of the first ranked sector in GDP contribution, the manufacturing sector, because this study intends to fill the lack of study in the commercial-service sector. There are only slight decreases in the share of GDP of the commercial-service sector during the period 1995-2000. Noticeably, the share of GDP of this sector is steady during 2000s, especially during 2003-2005. However, it turns to slightly increase from 2006. This may be thanks to the fact that Vietnam becomes a member of World Trade Organization (WTO). However, there is a fluctuation in the GDP growth rate of the commercial-service sector (see Figure 2). Growth rate of this sector decreases noticeably during the period 1995-1999, then increases tremendously from 2000 to 2007. Interestingly, the dynamics of this sector seems to coincide with that of GDP. This suggests that the growth rate of the commercial-service sector may predict that of GDP. In other words, this growth rate may have an important effect on that of GDP. Besides, the growth rate of the manufacturing sector is at the highest and has the same trend as that of the commercial-service sector and GDP. On the contrary, the growth rate of agriculture and forestry sector is at the lowest and experiences a different orientation compared with others in Figure 2.

4. Methodology

4.1. Research model

My starting *hypothesis* is that Gibrat's law (1931) is valid for the case of commercial and service firms in Vietnam. To test Gibrat's law, the standard regression model can be formulated as follows:

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

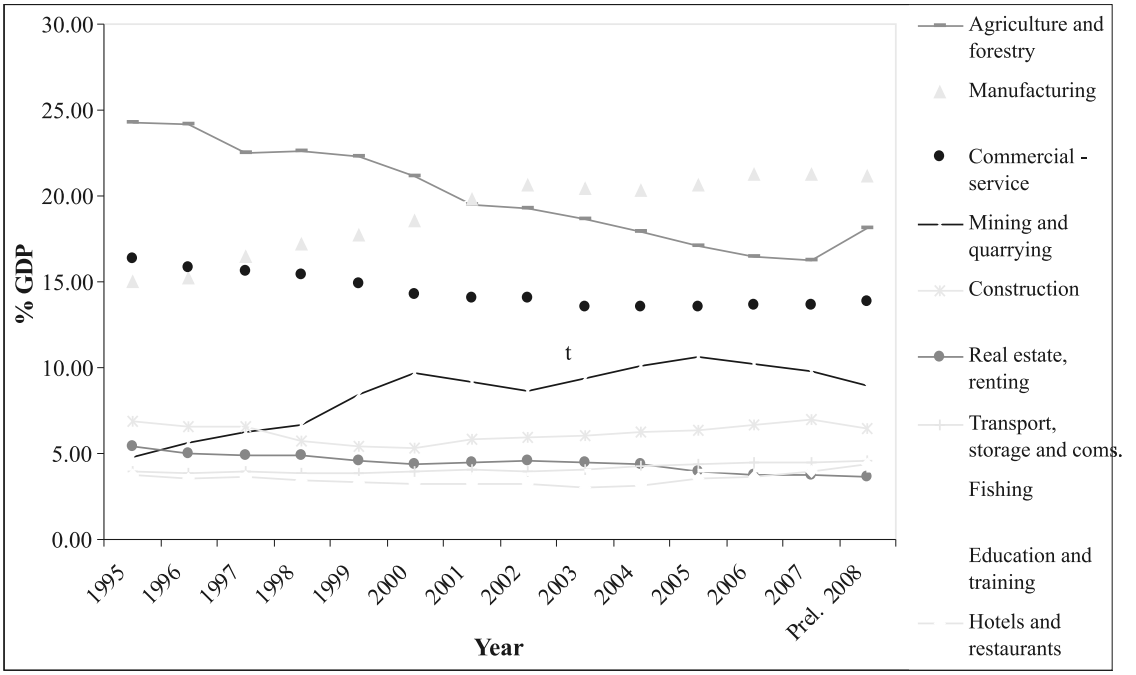
where $\mu_{it} = \rho \mu_{it-1} + \varepsilon_{it}$

Following Oliveira and Fortunato (2008), (II-1) can be generalized as follows:

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

Equation (2) is the first order autoregressive model of lnS_{it-1}, the natural logarithm (ln) of the size of firm *i* at time *t*-1. This firm growth function considers the simple dynamic panel data model with the null *hypothesis* that firm growth $Growth_{it}$, the first difference of log size, is random with its size, indicating no evidence of a significantly systematic difference in growth between large and small firms. α_i is the unobserved firm specific effects, implying that there is heterogeneity across firms. δ_t represents time effects. β expresses the relationship between firm growth, denoted as $Growth_{it}$, and size. The first hypothesis will become true or Gibrat's law is valid when β is

Figure 2: Growth rate of GDP by economic sectors



Source: *GSO (2009*)

equal to 1. If β is larger than 1, large firms grow faster than small ones. In addition, ρ represents serial correlation in μ_{it}, which is the error term in the growth equation. ε_{it} is a random disturbance and is assumed to be normal, independent and identically distributed (IID) with and.

Following Goddard *et al.* (2002b) and Oliveira and Fortunato (2008), (2) can be generalized as follows:

$$Growth_{it} = \alpha_i(1-\rho)+\delta_t +(\beta-1)lnS_{it-1} +\rho(lnS_{it-1}- lnS_{it-2}) + h_{it} \quad (3)$$

where $h_{it}= \rho (1- \beta) lnS_{it-2}+ \varepsilon_{it}$ so under or

$$Growth_{it} = \alpha_i(1-\rho)+\delta_t +(\beta-1)lnS_{it-1} +\rho Growth_{it-1} + h_{it} \quad (4)$$

To investigate the hypothesis of the sensitivity of the relationship between the growth and size to various firm characteristics, this study applies the multiple dynamic panel data model developed by Evans (1987a) as follows:

$$Growth_{it} = \alpha_i(1-\rho)+\delta_t +(\beta-1) lnS_{it-1} +\rho Growth_{it-1} + G(X_{it-1}) + h_{it} \quad (5)$$

where X_{it} denotes other firm attributes (including labor quality, productivity, total assets, capital intensity, leverage, share of FDI). Variables including labor quality, productivity, total assets, and capital intensity are expressed *in logarithm* form.

Firm growth is expressed by the growth of employment between two consecutive periods. The firm size is measured by the number of

employees. The models will be estimated separately for whole sample by the GMM system method.

4.2. Econometric methodology

The GMM-system estimator is developed from the difference GMM estimator, which is first presented by Arellano and Bond (1991). In this method, they employ first-difference equations to remove the unobservable firm-specific effects, α_i, and valid instruments from available lagged values of endogenous variables to solve endogeneity. With Monte Carlo tests, Arellano and Bond (1991 indicated that results of this method are more efficient than those of previously used methods. However, it also has shortcomings when the lagged levels of independent variables are not strongly correlated with the subsequent differences, then the instruments become invalid to replace the endogenous variables, leading to the risk of large finite-sample bias (Blundell and Bond, 1998).

Afterwards, Arellano and Bover (1995) adjusted this GMM estimator and then Blundell and Bond (1998) finally improved it, namely GMM system method. In this method, they employed an equation system, including differenced equations and equations in levels, and the unobservable firm-specific effects were removed by orthogonal deviations transformation. *With the addition of level equations, the variables in levels which are in the second equation will be instrumented by their own first differences, and they found that this increased efficiency. The analysed instruments are firstly based on assumptions of variable classifications which are predetermined or endogenous, then instrument validity is considered by Arellano-Bond test for autocorrelation, and Hansen test for over-identifying restrictions* (Blundell and Bond, 1998).

According to Roodman (2006), GMM system method is designed for the dynamic analysis due to some reasons. *Firstly,* the GMM sys-

Table 1: Variables

Variable name	Explanations
Dependent variable	
Growth	Annual employment growth is measured by the logarithmic difference of number of employees between two consecutive years: $Growth_{it} = [lnS_t - lnS_{t-1}]$
Independent variable	
Size	The firm size is measured by the number of employees of firm.
Labor quality	Total incomes of employees per number of employees.
Labor productivity	Total sales are divided by number of employees.
Total assets	Book values of total assets
Capital intensity	Total fixed capital is divided by number of employees.
Leverage	Book values of total liabilities are divided by total assets
FDI share	Share of foreign direct investment per total registered capital

tem method is suitable for the case of the panel data in this study, that is T (time period, eight years,) $<<N$ (number of observations, 1,613 firms). Besides, this method could be applied for a dynamic process in which the current analysed variable is affected by the lagged ones. In addition, when regressors are not completely exogenous, (such as the lagged dependent variable), the idiosyncratic disturbances, $\mu_{it,}$ might involve in serial correlation and heteroskedasticity. Moreover, when regressors are endogenous; that is, independent variables (such as labor quality) are affected by dependent variables (such as firm growth) then endogeneity problem will occur[4]. Other available methods could not solve all the above problems, leading to inconsistent and biased estimators, thus application of the GMM system method is rational (Oliveira and Fortunato, 2008).

4.3. Variables

The firm growth is expressed by the growth of employment between two consecutive periods. Employment is applied for firm growth in order to compare with numerous earlier empirical studies. Moreover, this proxy helps to avoid the inflation effects and to find policy implication from the employment perspective. Explanatory variables are theoretically driven (see Table .1).

The firm size is measured by the number of employees. Under the process of trade liberalization, Vietnam faces an increasing demand of skilled labor and enterprises lure labor with high quality mainly by high income. Thus, to examine the effect of labor quality (*quality)*, the ratio of total earnings of employees per number of employees is used as the proxy for the quality of employees. Besides, due to limited data, income is the only available information suitable to be proxy for labor quality. Labor quality is possibly endogenous if higher firm growth lead to higher labor quality, in the case that higher growth rates of employment will encourage employees to learn as well as to compete with each other. Besides, Vietnam enterprises do not only need high quality of employment but they also need improvement in productivity. Especially, labor productivity represents the passive learning effect as well as the effect of a market selection process (Jovanovic, 1982). Thus, the study employs labor productivity, *productivity,* for these concerns. *Productivity* could be an endogenous variable if firm growth can improve labor quality, thus an improvement of labor quality may enhance productivity. Besides, on one hand, a rational adjustment of the capital–labor structure can improve growth. On the other hand, the extension of business requires an adjustment of capital intensity. Thus, capital intensity could be an endogenous variable in explaining firm growth. In this study, capital intensity (*capitalInten)* is measured *by* the ratio of total fixed capital to the number of workers. Furthermore, increasing competition under the process of trade liberalization may cause financial risk and thus require firms to adjust their financial structures. Thus, total assets (*asset)* are investigated by using their book value. Similar to capital intensity, the variable *asset* can be endogenous. The financial risk, *leverage,* is defined as the book values of total liabilities divided by total assets. In fact, firm enlargement may require more investment and capital, which could be

financed by liabilities. In other words, firm growth may affect leverage then this variable is probably endogenous. In addition, the globalization effect on an economy can be expressed by the amount of foreign direct investment endowed to that economy. Thus, the last explanatory variable is *FDIshare,* which is calculated by the share of foreign direct investment per total registered capital of firm. In some cases, firm extension may call for cooperation like foreign participant. Thus, *FDIshare* could be an endogenous variable. When variables are possibly endogenous, the endogeneity problem can occur. All financial variables are deflated by the annual consumer price index (CPI). Variables including *size, quality, productivity, asset, capitalInten* are expressed *in logarithm* form.

4.4. Data

The panel firm-level data employed in this paper are extracted from National Census of Enterprises in Vietnam during the period 2000-2007. This census was conducted by Vietnam General Statistics Office (GSO). It investigated all enterprises, namely State-owned Enterprises, joint-stock companies, private enterprises, co-operatives, limited-liability companies, partnerships, and foreign-invested enterprises. In this study, following the category of the census, the commercial and services enterprises are those who engage in activities related to 'trade, repair of automobiles and motors, of personal and household properties'. For the purpose of empirical research, cleaning procedures are followed. *Firstly,* this study excludes observations with either non-positive or missing values for the employed variables (number of employees, earning, sales, FDI share, total assets, fixed assets, and liabilities). *Secondly,* outlier values[5] are removed to avoid biased estimates. "An outlying observation, or outlier, is one that appears to deviate markedly from other members of the sample in which it occurs"[6]. Identification of the outliers of the model is based on the standardized residuals and student residuals. Observations with maximum values of the standardized residuals and student residuals equal or greater than 10 and minimum values of those equal or less than -10 are dropped. *Thirdly,* the dataset is limited to surviving enterprises to analyse the persistence of firm growth during the observed time[7]. Furthermore, the method applied in this study is GMM system, thus estimators are still unbiased with valid instruments. *Finally,* the used dataset is a balanced panel data with 12,904 observations of 1,613 commercial and service firms with descriptive statistics in Table 2.

5. Empirical results and analysis

5.1. Log-normality of size distribution

Generally, processes characterized by Gibrat's law converge to a limited distribution, which may be log-normal (Gebreeyesus, 2006). Therefore, the below graph of the distribution of log of employment illustrates whether the size distribution of the commercial and service firms is log-normal as suggested by Gibrat's law. It could be evidence of the invalidity of Gibrat's law if this distribution deviates from normal (Gebreeyesus, 2006). In Figure 3, the dashed line presents normal distribution plot, and the solid line is the kernel density function. The graph shows that the log size distribution is quite far from normal. The highest spike belongs to firms with around ten to thirty employees. The graphical method

Table 2: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Growth	-0.004	0.398	-4.567	4.101
Size	80.403	195.309	3	4,964
Labor quality	15.656	15.649	0.054	575.778
Labor productivity (millions VND)	1,413.418	2,890.409	0.147	91,019.350
Total assets (millions VND)	28,485.070	83,075.900	36.910	1,976,993
Capital intensity	50.578	129.305	0.011	2,734.984
Leverage	0.582	0.254	0.000	0.999
FDI share	0.009	0.085	0	1

provides evidence that Gibrat's law is not suitable in this case. However, this method requires more support from empirical results.

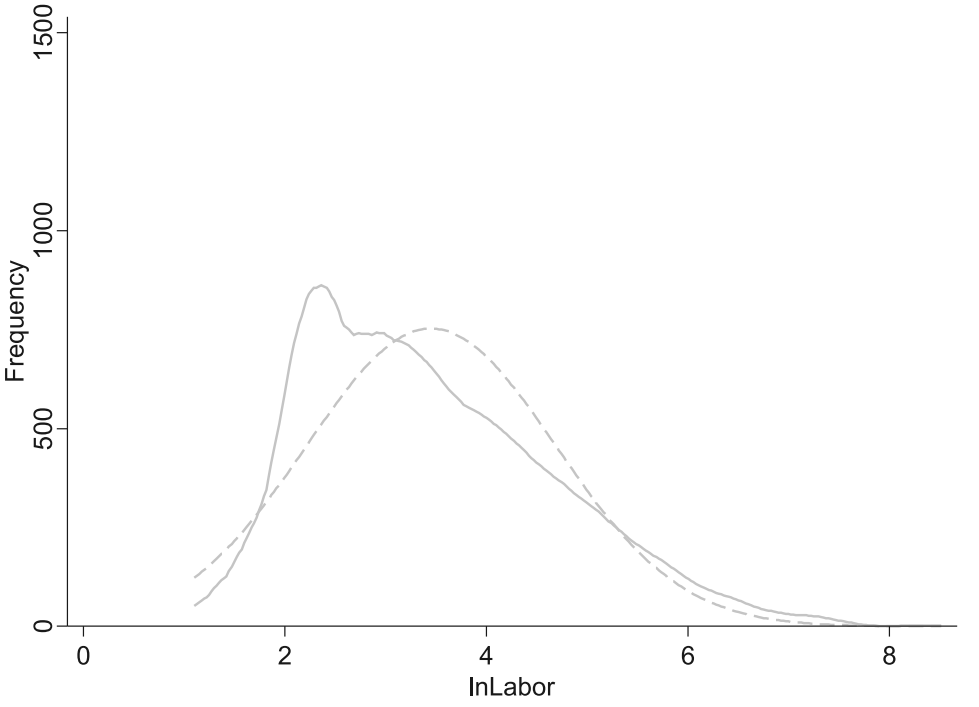
The next section will analyse the results of the simple and multiple regressions for the commercial and services enterprises in Vietnam[8].

5.2. Determinants of firm growth for the whole samples

The estimates are displayed from the simple model to the multiple one by adding stepwise variables to evaluate the change of factor effect in various economic contexts. For each model, this study treats right-hand variables as endogenous ones in all regressions, with lags from t − 2 in the first-differenced equation and lags from t − 1 in the level equation as *instruments*. In terms of validity of estimators, the study examines the problems of overall model fit by the Wald *chi*-squared test, the over-identifying restrictions by the Hansen test and the problem of serial correlation by the Arellano-Bond test (m2)[9]. Based on these tests, all reported estimators are adequate and the chosen instruments are valid.

In general, the empirical results indicate that the *hypothesis* of the validity of Gibrat's law (1931) is rejected for the case of commercial and service firms in Vietnam. Coefficients on the *lagged size* variable are all negative and significant (see Table 3). This provides more evidence similar to other previous studies that small firms grow more rapidly than the large ones. The inclusion of firm attributes in the multiple models reduces the magnitude of the coefficients on the firm size, from -0.5 in model (1) to around -0.2 in models (4)-(7). This suggests that the coefficient of the size variable may be over-estimated in the simple model due to the omission of firm attributes. In other words, the relationship between firm growth and its size depends on the economic context, thus the hypothesis of the sensitivity of the size-growth relation to firm characteristics is supported. In terms of lagged value of firm growth, $Growth_{i(t-1)}$, model (1) suggests that firms that grew fast in the past will grow more slowly in the future or there is no persist-

Figure 3: Log-normality of size distribution



ent growth for commercial and service firms. With respect to *labor quality*, the coefficients are all positive and significant. This implies that firms with better employment compensation systems will grow faster than others. This represents convincing evidence that the past labor quality acts as a significant stimulus for the current growth. The result is plausible because labor is one of the most important production factors and the creative and learning capabilities of firms depend mainly on the quality of this factor.

With respect to *labor productivity*, the positive and significant results suggest that the passive learning effect enhances firm growth. Similarly, total assets have a positive and significant effect on firm growth. Firms with higher total assets will grow faster than those with lower total assets. In contrast, *capital intensity* has negative and significant coefficients for all cases. These results indicate that increasing capital intensity is not helpful for the commercial-service sector, which does not require a high level of capital intensity as in the manufacturing sector. An interesting consequence from the results of positive effect of total assets in conjunction with a negative effect of capital intensity (based on fixed assets) on firm growth is that firm growth may be improved by the current assets and short-term investments. This is plausible for the case of the commercial-service sector, which always needs large amounts of current assets and short-term investments for purchasing and

Table 3: Determinants of Firm Growth for the Whole Sample

Dep. Var.: Growth $_t$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exp. Vars.							
Growth $_{it-1}$	-0.0555*	-0.0700***	-0.0720***	-0.0632***	-0.0726***	-0.0716***	-0.0745***
	(0.032)	(0.021)	(0.021)	(0.019)	(0.020)	(0.019)	(0.019)
Ln(size) $_{it-1}$	-0.5181*	-0.3425***	-0.1735***	-0.2211***	-0.2112***	-0.2093***	-0.1868***
	(0.295)	(0.109)	(0.046)	(0.044)	(0.044)	(0.045)	(0.045)
Ln(quality) $_{it-1}$		0.0222	0.0535***	0.0557***	0.0604***	0.0623***	0.0635***
		(0.031)	(0.020)	(0.015)	(0.015)	(0.015)	(0.015)
Ln(productivity) $_{it-1}$			0.0417***	0.0294*	0.0356**	0.0406***	0.0468***
			(0.014)	(0.015)	(0.015)	(0.014)	(0.015)
Ln(asset) $_{it-1}$				0.1069***	0.1047***	0.1136***	0.0960***
				(0.027)	(0.030)	(0.037)	(0.037)
Ln(capitalInten) $_{it-1}$					-0.0423**	-0.0426**	-0.0354*
					(0.018)	(0.019)	(0.019)
Leverage $_{it-1}$						-0.1443**	-0.1379**
						(0.067)	(0.069)
FDIshare $_{it-1}$							-0.1803*
							(0.097)
Constant	1.4855	0.7923*	-0.1613	-0.8887***	-0.8370***	-0.8699***	-0.8603***
	(1.062)	(0.455)	(0.237)	(0.167)	(0.156)	(0.175)	(0.177)
Wald chi-squ. test	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hansen test	0.31	0.19	0.19	0.42	0.30	0.24	0.22
Arellano-Bond test AR(2)	0.52	0.40	0.26	0.25	0.28	0.28	0.30
No. of instruments	14.00	22.00	48.00	63.00	68.00	79.00	87.00
Cor. coefficient	0.27	0.32	0.42	0.43	0.43	0.43	0.44

Note: The table provides the results of the two-step system GMM estimator. (*), (**), (***) denote statistical significance at least at the 10%, 5%, and 1% levels, respectively. "Wald chi-squ. test" examines the null hypothesis that all parameters are zero. "Hansen test" is a test of the null hypothesis of the over-identifying restrictions. "A.-B. test AR(2)" is a test of the null hypothesis of no second order serial correlation. For each period, this study treats right-hand variables as endogenous ones in all regressions, with lags from t − 2 in the first-differenced equation and lags from t − 1 in the level equation as instruments. All models are regressed with time dummy variables. This study does not report these variables here. The sample consists of 1613 commercial-service firms and a total of 12,904 observations.

Besides, *leverage* has a negative impact on firm growth. This may be related to the fact that the risk in finance will be an obstacle for firms to grow. For example, a high demand of financial resources will increase its cost, thus, to access a financial resource, firms may have to exchange a cost, which is too high compared with their low revenues. This interpretation differs from the explanation of Oliveira and Fortunato (2006) for the case of Portuguese manufacturing firms. The explanation for this difference may be related to differences in structure and scale economies between the two sectors. Similarly, the share of *FDI* has a negative effect on the growth of commercial and service firms. This may suggest that the foreign participant does not encourage the firm to expand in terms of employment, even that the number of low-skilled or low-qualified employees will be reduced.

In short, the empirical estimation indicates that Gibrat's law should be rejected but the *hypothesis* of the impact of firm attributed to firm growth is supported for the case of the whole sample of the commercial-service sector.

6. Concluding remarks and policy implications

Gibrat's law still draws empirical researchers' attention due to its significantly important implications for the economic development (Teruel-Carrizosa, 2008). Studies of Gibrat's law investigate the asymmetric size distribution of firms and then suggest which source, smaller or larger firms, will exert a sharper competitive pressure in the near future on the incumbents. The results suggest which size of firms policy makers should target. Furthermore, from the relationship between economic growth and employment, this dynamic analysis of firm growth provides powerful implications for policy makers[10].

This study examines the validity of Gibrat's law via investigating the relationship of firm growth and size and investigates determinants of growth of the commercial and services enterprises in Vietnam for period 2000-2007. The empirical study is set up for both simple and multiple regressions, which are estimated for the whole sample. This study employs the dynamic panel model measured by GMM system methodology (Blundell and Bond, 1998) to produce efficient and consistent estimation.

With consistent estimators, empirical results have given some main interesting findings. *Firstly*, the hypothesis of Gibrat's law that firm growth does not depend on its size is rejected. Firm growth depends significantly on its size with the coefficients on *firm size* are all negative and significant in the whole sample, in both simple and multiple models. The magnitude of the size effect on firm growth changes when other firm characteristics are included. *Secondly,* in general, the firms that experienced fast growth in the past are not likely to grow in the future. The negative relationship between the current *firm growth* and the past becomes more significant after inserting other firm attributes. Therefore, the results confirm the sensitivity of the growth-size relationship to firm attributes. Interestingly, *labor quality* is the most useful factor in terms of boosting firm growth. Thus, investigating a new variable related to employee quality contributes to the literature on determinants of firm growth.

Moreover, the positive and significant impact of *labor productivity* provide evidence that the passive learning effects enhance firm growth.

With respect to other firm attributes, effects of total *assets* generally contribute to firm growth while *capital intensity* seems not useful for the case of commercial-services firms. An interesting induction is that firm growth may be improved by the current assets and short-term investments rather than the long-term. Besides, the cost of accessing financial resources seems to undermine the importance of *leverage* on firm growth for Vietnamese commercial-services enterprises. Effects of FDI share is generally negative, implying that the economic integration and globalization pose too severe challenges for firms to grow. This is plausible because the market-oriented economy in Vietnam is still in its infancy thus it needs time to confront with those challenges. Besides, all estimated results are consistent by controlling unobserved heterogeneity and endogeneity. Therefore, it could be concluded that *size* and *labor quality* are the main determinants of firm growth thus these factors should not be ignored in explanation of firm growth dynamics.

In conclusion, these findings lead to some main policy implications. With regard to enterprises, the smaller firms could grow faster than larger ones. As the result, the incumbents will suffer a stronger competitive pressure in the near future, in other words, SMEs will be the main source in pushing the market competition and the main source in creating jobs in the future economy (Teruel-Carrizosa, 2008). This implicates that policy makers should create favorable conditions for SMEs to further grow. Furthermore, because the quality of labor is the most important determinant of firm growth, improving the quality of labor should be a main economic policy. Besides, labor productivity of SMEs has positive affect on firm growth, consistent with the prediction of the *passive learning* model that firms learn their exact efficiency levels or relative comparison from their counterparts and then improve their size accordingly (Jovanovic, 1982). This is also an evidence of market selection for these firms, such that inefficient firms will be gradually driven out from market. In addition, to deal with the above-mentioned financial issue, the government should pay more attention to set up a stimulation package of favor short-term loans for SMEs. Finally, the effiency of FDI should be improved through re-identifying the criteria of attraction of FDI which should create spillover effects rather then become the means to explore local natural resources and low-cost labor..

Notes:

1. Mansfield (1962, pp. 1030-1031).
2. Firms have some important but unobserved factors, such as management quality, fame, prestige (Manjo´n-Antolı´n and Arauzo-Carod, 2008).
3. Ericson and Pakes, 1995, pp. 97.
4. Roodman, 2006, pp. 15.
5. An outlier in a regression relation is a data point with an unusual value, or is an observation associated

with large residuals (in absolute terms), a data point that the model fits poorly (Baum, 2006).

6. Grubbs (1969, pp. 1)
7. Because of the short interval of growth and short time period of the studied data, the sample selection bias seems insignificant for this case (Oliveira and Fortunato, 2008).
8. The results estimated by OLS and fixed effect methods shall be provided upon request.
9. The system GMM estimations in this study are computed by Stata software with option of two-step GMM estimator, with option that standard errors are robust asymptotically to heteroskedasticity.

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