BANK LENDING & FIRM FINANCING IN TRANSITION ECONOMIES:

EVIDENCE FORM LISTED DATA IN VIETNAM [1]

THAI HUU HONG PHAM

Ph.D candidate

Department of Accounting & Finance

Business School – University of Birmingham, UK

Email: txp404@bham.ac.uk

Tel: 07970395644

Business School - Birmingham University, UK

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Abstract

Our focus is to examine the lending behavior and Vietnamese listed firms' financing, using firm-level unbalanced panel data over the period of 1998-2006. The results show that Vietnamese listed firms have lower leverage ratios than those in the G7 countries and some transition economies (TEs). Firms tend to use more short-term debt than long-term-debt, and increase bank credit to offset trade credit during the sample years. There are signs that more profitable firms were increasing their borrowing from the banking system, and that larger firms had a strong tendency of using more bank debt than equity. We also find evidence for the hypothesis that banks prefer to direct their funds to their former clients with a hope of gaining the potential repayments of the previous debt.

Our robust results derived from changes in leverage/total assets cross-section regressions show that *(i)* tangible assets remain a poor source of collateral in 2003, *(ii)* firms increased short-term financing from their suppliers and reduced long-term borrowing from financial institutions during 2004-2006, *(iii)* more profitable firms have a lower debt capacity during the period 2003-2004, and *(iv)* the lending behavior by banks towards long-term loans shows evidence of a bias in 2003, 2004 and 2006.

However, we fail to provide evidence for the lending bias hypothesis that banks are more likely to lend to state-owned enterprises (SOEs). Our findings show some improvements in the bank-firm relationship in Vietnam. They suggest that, although certain specific-firm factors correlated with leverage from modern finance theory are portable in Vietnam even if there are some indications of profound institutional distinctions between Vietnam and Western countries, the modern theories of corporate capital structure derived from the fundamentally institutional assumptions supporting the Western models could not explain the capital structure choices of Vietnamese listed firms. The capital structure decisions of Vietnamese listed firms appear to pursue a "*modified pecking order*" model – bank borrowing, trade credit, retained earnings, equity and market debt.

JEL classifications: G21, G30, G32, P2

Key words: Bank lending, firm financing, leverage, corporate capital structure, transition economies

1. Introduction

It is generally argued that bank lending in TEs has been considered as a controversial and difficult issue. Bank credit in TEs plays a key role as a vital source of capital in the growth of economics owing to non-existence of capital markets and under-developed securities markets as well. However, the credit allocation by banks is misdirected since banks are likely to lend to poor-performing state-owned enterprises *(Perotti, 1993; Gorton and Winton, 1998)*. This is because the government both directly intervenes in the credit distribution by state-owned commercial banks (SOCBs) and provides state-owned enterprises (SOEs) with an implicit guarantee on their borrowing. The key role played by banks as a crucial source of business finance in TEs is eroded by the government ownership of banks which is large and pervasive around the world. The government ownership is reported to particularly exist in countries whose financial systems are under-developed *(Porta et al., 2000)*. Wherever there is a dominant role played by state-owned commercial banks (SOCBs), and wherever the credit allocation by SOCBs in the form of directed lending or policy loans to SOEs exists; Bank credit has tended to be scarce and costly for enterprises *(Sherif et al., 2002)*. SOBCs in TEs are often utilized for political purposes rather than commercial ones. Ownership of banks provides the government with control of finance, softens budget constraints, and politicizes resource allocation for the sake of getting votes or bribes for office holders *(Kornai, 1979; Shleifer and Vishny, 1994)*.

Due to misallocation of credit by banks, firms in transition economies often complain about the lack of credit and too-high standards set by banks *(Koford & Tschoegl, 1999)*. This credit insufficiency leads firms to largely imposing hard budget constraints on each other and downsizing in response to market pressures. Thus, the main sources of financing for unprofitable firms are bank credit and the government – in the form of the accumulation of tax arrears *(Croitoru & Schaffer, 2002)*. Due to imposing hard budget constraints on each other by firms, a further shift of soft budget constraint would be away from trade credit and towards bank credit.

However, banks find it difficult to distinguish between good and bad firms because their ability to evaluate business viability and potential cash flows from a new project remains to be limited, and many new enterprises have no credit history. The more serious problem of information asymmetries between a bank and firms concerning bank financing in TEs than in Western countries *(Cornelli et al., 1996)* resulted in the "adverse selection" by banks in firm financing. The position was aggravated when the governments in TEs utilized banks for political

objectives rather than commercial ones. Banks faced with a sizable quantity of NPLs are expected to favor SOEs that would typically receive an implicit subsidy form the state budget. The cross ownership and intimate relationship between a bank and SOEs sometimes lead to a strategic alliance to gamble for bailouts regarding a large amount of bank debt on firms' balance sheets.

Given stock and bond markets in an embryonic stage, bank financing in Vietnam could be seen as a crucial source of capital to enterprises during the early-2000s, and the alternatively external sources of funding might be trade and tax arrears. Contrary to the well-developed capital markets in Western countries, the Vietnamese securities market has not really yet been established as a place for raising capital. Many equitized securities with sufficient qualifications listed on stock trading securities are trading in the "unregulated free markets" due to the lower perceived benefits of listing than the perceived costs arising from disclosure requirements and higher standards of corporate governance *(Chun et al., 2003)*. The lack of supply of quality securities on the Securities Trading Centers and the low trading activities in the secondary market, along with the constraint on seasoned equity offering could lead listed firms to using more debt than equity.

Given significantly institutional differences between TEs and Western countries, such as ownership concentration and the agency problems inheriting from state ownership, corporate governance structure of listed firms, and the legal framework supervising the banking sector, securities markets and firms' operations, it is very important to provide a profound understanding of the bank lending behavior and firm financing in TEs. This study has attempted to fill in this gap by investigating the lending behavior by banks and firm financing in Vietnam. Our analysis is based on the firm-level data of 159 listed companies on Ho Chi Minh City Securities Trading Center (HOSTC) and Hanoi Securities Trading Center (HASTC) in Vietnam running from 1998-2006. This study uses some of the main determinants[2] of capital structure on which many empirical studies such as *Rajan & Zingales (1995)* in developed countries, *Booth et al., (2001)* in developing countries, and *Cornelli (1996), Jelic et al., (1999), Chen (2004), Nivorozhkin (2003, 2005), and Delcoure (2006)* in TEs have based. Our results show that Vietnamese listed firms have lower leverage ratios than those in the G7 countries and some TEs.

[2] *Our study focuses on tangibility, trade credit, profitability, size, the lagged bank debt and ownership.*

Firms tend to use more short-term debt than long-term-debt, and increase bank credit to offset trade credit during the sample years. There are signs that more profitable firms were increasing their borrowing from the banking system, and that larger firms had a strong tendency of using more bank debt than equity. We also find evidence for the hypothesis that banks prefer to direct their funds to their former clients with a hope of gaining the potential repayments of the previous debt *(Perotti 1993)*.

Our robust results derived from changes in leverage/total assets cross-section regressions show that *(i)* tangible assets remain a poor source of collateral in 2003, *(ii)* firms increased short-term financing form their suppliers and reduced long-term borrowing from financial institutions during 2004-2006, *(iii)* more profitable firms have a lower debt capacity during the period 2003-2004, and *(iv)* the lending behavior by banks towards long-term loans shows evidence of a bias in 2003, 2004 and 2006.

However, we fail to provide evidence for the lending bias hypothesis that banks are more likely to lend to SOEs. Our findings show some improvements in the bank-firm relationship in Vietnam. They suggest that, although certain specific-firm factors correlated with leverage from modern finance theory are portable in Vietnam even if there are some indications of profound institutional distinctions between Vietnam and Western countries, the modern theories of corporate capital structure derived from the fundamentally institutional assumptions supporting the Western models could not explain the capital structure choices of Vietnamese listed firms. The capital structure decisions of Vietnamese listed firms appear to pursue a "*modified pecking order*" model – bank borrowing, trade credit, retained earnings, equity and market debt.

The rest of the paper is organized as follows: Section 2 presents the theoretical views and empirical evidence on the bank-firm relationship regarding financing choices of firms in TEs. The data collection and methodology are presented in section 3, followed by a discussion of the regression results in section 4. We conclude the study with implications of the findings and provide some suggestions for future research in section 5.

2. **Review of the bank-firm relationship in transition economies**

2.1. Summary of Theoretical models

In early stage of transition, new commercial banks in most TEs were established by allocating to them the assets and liabilities of mono-bank, thereby receiving a sizable quantity of

bad loans on their books at the point of their inception[3]. Prior to transition, loans were not made according to market criteria, thus many of existing assets held by these banks became non-performing in the market economy. This situation was exacerbated at the outset of transition by the governments that were eager to eliminate fiscal deficits. They eliminated fiscal subsidies to SOEs, which turned to their SOCBs for financial support (*Bonin & Wachtel, 2004*). Furthermore, these commercial banks carved out of the state mono-bank were often undercapitalized and, most importantly, preferred to direct their funds to SOEs despite the fact that these SOEs were often unprofitable and inefficient in the evolving market economy (*Perotti, 1993; Gorton and Winton, 1998*). Facing with a stock of bad loans to SOEs, SOCBs have an economic incentive to continue lending to the same loss-making enterprises since they gain the potential payments of the previous debts *(Perotti 1993; Gorton & Winton, 1998; Harper & McNulty, 2004)*. As a result, SOCBs were joined by poorly capitalized and loosely regulated new entrants; particularly, inherited a large overhang of bad debts and created a flow of new weak loans.

A very detailed explanation by *Sherif et al., (2002*) about the reason why the SOCBs accumulated a large amount of bad loans in early stage of transition is that SOCBs at that time served as the primary banking vehicle for directed lending and quasi-fiscal financing, usually for unprofitable state-owned enterprises and collective farms. They merely allocated their investment funds to SOEs in their sector according to the central planners' instructions rather than had opportunity to exercise independent judgment. In order to achieve national and multi-year economic goals, the centralized planners routinely set output targets by industry or sector, on which were based to allocate and transmit budgetary resources through banks to state farms and enterprises. Hence, banks were essentially passive administrative units rather than active processors of credit information and risk-takers operating on commercial principles. As firms became increasingly subject to market forces or unable to rely on the state for financial help, banks inevitably ran into severe loan portfolio problems. This circumstance was aggravated when new prudential norms, such as tightening monetary policies and hard budget constraints, were introduced by governments to rein in hyperinflation and unstable fiscal deficits. In the meantime, the banks continued to operate under traditional processes. These conflicting approaches to prudence in monetary and banking matters combined with conditions in the real

[3] *Buch, 1996; Gorton & Winton, 1998; and Mitchell, 2001a*

sector resulted in massive volumes of unrecoverable loans. Besides, the growth in NPLs was also the result of overall economic conditions, greater effort on the part of bank management, new criteria for classifying loan performance which had the effect of making the share of NPLs appear to grow faster than it really did, and new bankruptcy legislation with a so-called automatic trigger forcing firms into bankruptcy even if creditors did not wish to force the issue (*Hersch et al., 1997*).

The overhang of bad loans creates many problems. For SOCBs, a negative net worth makes these banks difficult to privatize *(Meyendorff & Snyder, 1997)*. These existing problems may be worsened if regulators in TEs pursue misguided policies that put more emphasis on stability than on efficiency, and particularly, may leave banks with a high chance of failure *(Gorton & Winton, 1998)*. Much evidence argues that political considerations may act the same course of action[4], since taking actions against creditors might signal that banks have NPLs and cause a bank run *(Perotti & Carare, 1997)*, or a failure to support these enterprises could doubt theirs and banks' solvency as well as risk large layoffs if these firms were forced to stop operations. However, on the part of enterprises, bad debt could play a complement monitoring role to equity since monitoring by equity holders has its inherent weakness *(Baer & Gray, 1995)*. They also argue that weaknesses in the legal framework for debt collection and monitoring competence of creditors, along with a high degree of economic uncertainty might have induced creditors to be reluctant to lend to high leveraged firms on account of asset-stripping opportunities on the part of managers and owners. As a result, firms in TEs resort to heavily rely on other financing resources such as retained earnings, trade credit or equity financing. For this reason, firms' levels of leverage in TEs are likely to be low *(McKinnon 1991, Mayer 1990)*.

In TEs, creditors remained passive in the face of overdue claims. Creditor passivity in TEs was unavoidable, since newly-born market economies lacked many standard institutions of contract enforcement[5] (*Schoors & Sonin, 2003*). The optimal solution to this problem is that only the threat of bankruptcy can impose a financial discipline on a debtor in a legal way. However, although most countries did have commercial laws and bankruptcy regulation in place before

[4] *Perotti (1993); Gorton & Winton (1998); and Meyendorff & Thakor (2002)*

[5] *Schoors & Sonin (2003) propose a simple general equilibrium model that focuses on the externality effect of creditor passivity. Their approach highlights the adverse externality effect of creditors' passivity on other creditors' incentives.*

1995 (*Bruniaux, 1995)*, creditor passivity persisted due to continued non-transparency, uncertainty and inefficiency in the enforcement of new rules by the judiciary. This is referred to as the softness of legal constraints *(Perotti, 2003)*.

Schoors & Sonin (2005) argue that, after Kornai, there are 2 conceptually different soft-budget-constraint models: one based on sunk investments[6] and the other explicitly based on creditors passivity[7]. In *Dewatripont's & Maskin's* model, the bank has an intrinsic interest in refinancing a poor project and will do so if it has enough liquidity (in terms of the model when it is large). A small bank can only refinance a project by attracting a third party who provides funds against the promise of sharing the return. This will reduce the banks' incentives to monitor the entrepreneur, thus they may make refinancing unattractive altogether[8]. As for *Berglof & Roland (1995)*, they build a model where banks have no intrinsic financial incentive to refinance bad loans ex post; instead, they just want to exploit the softness of a government. Since the government has an interest ex post in keeping loss-making firms afloat, banks could commit capital to such firms beyond their current liquidity in order to trigger a government bailout. In *Mitchell (1997, 2000, 2001a, b)*, creditors are passive exactly because they are aware of showing bad debts on their balance sheets. *Perotti (1998)* focuses on collusion between economic agents to explain the build-up of arrears. Agents may collude and voluntarily extend credit to each other in the knowledge that it will not be paid, since they expect that the government will come in with a collective bailout if too many firms are threatened with collapse.

Based on the above arguments, we draw much attention to the following hypotheses relating to the lending bias behavior by banks and the strategic leverage by firms in transition economies.

Hypothesis 1: *A higher proportion of new bank loans is related to the levels of trade credit and long-term debt of the previous years (Perotii 1993, Perotti & Carare 1997, Harper & McNulty 2004).*

Hypothesis 2: *Banks in TEs are more likely to lend to state-owned enterprises (Perotti 1993)*

Hypothesis 3: *Firms' levels of leverage seem to quite low in TEs (McKinnon 1991, Mayers 1990)*.

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[6] *Dewatripont & Maskin, 1995; Maskin & Xu, 1999; and Berglof & Roland, 1997*

[7] *Mitchell, 1993, 1997, 2000, 2001a,b*

[8] *They show that small banks are "hard" and large banks are "soft"*

2.2. Summary of Empirical evidence

A huge body of empirical studies[9] in early stage of transition in CEECs found strong evidence on the lending bias. *Carare (1995), Perotti & Carare (1997) and Carare et al., (1999)* studied about the lending behavior by the Romanian banking system during the period of 1991-1995 and found that bank credit seems to be directed increasingly towards unprofitable firms and firms with large arrears position in trade and bank credit, and that Romanian banks first acted as channel to support insolvent firms after early stage of collective bailouts ended in early 1993. *Budina et al., (2000)*, based on Bulgarian firm-level data over the period 1993-1995, found that loss-making firms were financed by Bulgarian banks in the transition. Similarly, *Bonin and Leven (2000)* who conducted personal interviews and used original statistic data to assess the performance of bank BDK – the smallest of the nine regional commercial banks in Poland – found that BKD continued to provide soft lending to keep 4 old military-industry firms afloat. A high concentration of bank credit to loss-making SOEs would suggest the lending bias and passivity on the part of banks *(Jelic at al., 1999)*.

The overhang of bad loans and subsidized lending to SOEs results in a banking system that is unstable and too small to be efficient. A report by *Meyendroff & Thakor (2002)* states that bank lending in Romania is only 10% of GDP, implying that there have been still continued subsidies, that the macroeconomic environment is characterized by low growth and high inflation, and that the banking system is weak and inefficient. This is because the bad loan problem perpetuated the symbiotic relationships between enterprises and banks *(Gorton and Winton, 1998)*. Banks that poorly capitalized and diversified were vulnerable to borrowers. They lacked bargaining power to exert corporate control over enterprises and poor loans increased the probability of bank failure. The available data for 11 central European TEs for the period 1990-1996 was reported by *Scholtens (2000)* that the ratio of problematic loans to the total assets from 1995-1996 was ranging from 74% in Bulgaria to 3% in Estonia. These values are quite high for most countries – over 30% is common.

By contrast, *Dittus (1993)* based on the flows of funds between banks and firms to analyze bank lending practices in TEs. By comparing net interest payments with the change in firm

[9] *Perotti and Carare 1997, Carare 1999, Budina et al., 2000, Marlin et al., 2002, Bonin and Leven 2000, Bonin and Wachtel 2000 …*

borrowings, he found that Hungarian and Czech firms received less in new loans than paid more interest to banks in 1991. This implies that banks were operating on the basis of commercial objectives rather than political ones. In addition, the drop in the ratio of Hungarian firms' borrowing and interest due sharply declined in 1992, suggesting that banks provided firms with less new loans than they collected in interest. This result indicates the absence of soft budget constraints that could be seen through the flows of funds running into banks from low profitable firms *(Bonin & Schaffer 1994)*. They also argued that Polish and Hungarian firms still tend to have rather moderate ratios of debt to total assets and low ratios of bank debt to total assets.

It was argued that short-term debt was significantly dominant in the ratio of debt to total assets in CEECs. This might be because short-term credit provides creditors with more opportunities to review investment decisions, refuse to roll over or grant extra loans, and adjust interest rates to account for risk *(Baer & Gray 1995)*. Since the market for long-term assets may typically thin in TEs, doubled with the lack of creditors' frequent involvement in roll-over decisions, the long-term credit is inflexible and uncommon in firm financing. *(Baer & Gray 1995)* also indicated a substantial amount of short-term debt on firms' books from the various types of creditors. A significant concentration of the short-term debt on firms' balance sheet caused a market-based constraint on the managerial behavior. A survey on 200 firms in Poland in 1992 showed that the ratio of total debt to total assets was 0.41, and the percentage of total debt owed to banks was 0.24, in which short-term debt occupied 86% while long-term debt was just only 14%. Similarly, the Hungarian data from a survey of tax returns on 57000 firms, in which 603 were loss-makers, revealed that the total debt/total assets ratio reached 0.43, in which short-term and long-term debts approached 80% and 20%, respectively.

Another strand of empirical literature focuses on the analysis of the determinants that directly affect the target levels of leverage by firms in TEs. *Delcoure (2006)* provides a series of references on such determinants of firms' capital structure as taxes and bankruptcy *(Modighani & Miller 1963*), signaling costs *(Ross 1977)*, institutional and historical characteristics of financial markets *(Rajan & Zingales 1995, Booth et al., 2001, Mcclure et al., 1999, and Wald 1999)*, and agency and moral hazard costs *(Jensen & Meckling 1976, Myers 1977, and Stulz 1990)*. *Rajan and Zingales (1995)* examined the determinants of capital structure choice of public firms in G7 countries and found that variables such as firm size, asset tangibility, firm growth opportunities and profitability found to have correlation with leverage in the U.S were

also correlated with leverage of firms in other G7 countries. *Wald (1999)* investigated the determinants of firms' capital structure in France, Germany, Japan, UK, and US in the spirit of extending *Rajan and Zingales (1995)'* model as a function of firm size, risk, investments, non-debt tax shield, sales growth, profitability, and inventories. In addition to his cross-country comparison which is in favor of Rajans and Zingales (1995)' findings, he discovered that differences in capital structure are the result of differences in institutional structures, in bankruptcy and moral hazard costs, and information asymmetries across countries.

Though there have been a majority of empirical studies on the impact of firms' capital structure choices on the optimal leverage in developed countries[10], little work has been recognized in developing and transition economies. *Booth et al., 2001* used a sample of 10 developing countries to test the explanatory power of capital structure models applied across countries with different institutional structures and provided evidence that firms in developed and developing countries have the same capital structure choices, but pervasive differences in institutional structure across countries show the presence of specific country factors.

Cornelli et al., 1996 provided an empirical study on the impact of the determinants of firms' capital structure on the allocation of bank credit in Poland and Hungary in 1992. They tested the impact of exogenous variables such as tangibility, firm size, profitability, and a dummy variable to control for state ownership on the target leverage as an endogenous variable and found evidence of credit rationing and lending bias in both Poland and Hungary. More recently, *Jelic at el., 1999*, using firm-level data in 3 advanced TEs such as Czech Republic, Poland and Hungary to run a series of cross-section regressions, with the same variables as in *Cornelli et al., (1996)'* work, provided support for the hypothesis that the ratio of debt to total assets is likely to be low in TEs. However, their cross-section comparison found no evidence for the lending bias hypothesis. They interpreted the results as evidence of an improvement in financial intermediation in these countries, particularly regarding the bias towards state-owned enterprises.

[10] *In addition to empirical studies by Rajan and Zingales 1995, Wald 1999, there are some in this scenario such as Hodder and Senbet 1990, Ozkan 2001, Chuil et al., 2002, Bevan and Danbolt 2002.*

While many existing empirical researches of firms' capital structure choices have focused on the static relationship between leverage and its determinants[11], there has been another strand of empirical literature providing a dynamic approach to modeling firms' capital structure, which has received much attention in recent empirical researches. *Nivorozhkin (2005)* provides a series of references to *Shyam-Sunder & Myers 1999, Baker & Wurgler 2002, Roberts 2002, Fama & French 2002, and Frank & Goyal 2003,* who show evidence that firms' levels of leverage tend to adjust slowly towards their targets. In his papers (2003, 2005), he focused on a sample of firms in five EU accession countries of central and Eastern Europe and the former Soviet Union in order to make a comparison of the determinants of firms' target capital structure and the speed of leverage adjustments. His findings on the average levels of debt/equity ratios of firms in advanced TEs confirm the earlier results of those observed for firms in several EU countries. He concluded that the speed of adjustments by firms' capital structure in TEs tends to have the same pace as that of their counterparts.

Little work has focused on the determinants of firms' capital structure choices in Asian TEs. An empirical study by *Chen (2004)* who used a sample of panel data to explore the determinants of Chinese-listed firms' capital structure choices over the period of 1995-2000 indicated that the capital structure decisions of Chinese firms pursue a "new pecking order" model, with such determinants as retained earnings, equity, and the long-term debt. The author explained this finding as persistent constraints on institutional structures, legal framework, and financial resources of the banking system in China.

3. Research methodology

3.1. Description of the sample

This study uses a sample of 159 Vietnamese non-financial firms listed on the two Securities Trading Centers: Ho Chi Minh City Securities Trading Center (HOSTC) and Hanoi Securities Trading Center (HASTC). The latter officially operated on 28/7/2005 with only 10 small and medium-sized listed companies (excluding one due to missing data) in which nearly half of state ownerships are dominant, the rest includes insiders and outsiders of the companies. Since these companies have just been trading for a year, their financial statements including balance sheets, income statements and financial ratios show recent years (2004-2006).

[11] *Rajan & Zingales 1995, Mackie-Mason 1995, Graham 1996, Berger et at., 1997, Moh'd et al., 1998, Friend & Lanf 1998, and Titman & Wessels 1988.*

Ho Chi Minh City Securities Trading Center (HOSTC) started its official operation on 28/7/2000. Until now it has had around 109 companies trading their daily stocks. In general, state shareholders in these companies occupy a smaller amount of stocks than those in enterprises whose stocks are listed in Hanoi Securities Trading Center. Besides stocks held by State, insiders, outsiders, and foreigners, there are a small number of shares which may be kept as Treasury stocks. Annual reports with balance sheets, income statements and statements of cash flows are publicly disclosed to investors. Although the government has been creating more favorable for these companies to attract foreign investors, the law in which bans them not to own more than 49% of total outstanding shares discourages potentially foreign strategic investors to participate in Vietnam capital market. Furthermore, all almost privatized enterprises are small and medium-sized while the huge strategic giants such as General corporations (Vietnam Airline, Telecommunications, Electric power, …) remain state-owned.

The dataset contains the audited financial and accounting information of 159 listed companies spanning from 1998-2006. Listed firms in our sample do not very much represent the leading industrial force in Vietnam since the General Corporations of state ownership are on the way to partial equitization until 2010. While most of the listed companies are small and medium-sized, many equitized securities with sufficient qualifications are being traded in the unregulated free markets rather than listed on both HOSTC and HASTC. This is because their perceived costs arising from disclosure requirements and higher standards of corporate governance exceed their perceived benefits of listing *(Chun et al., 2003)*. As a result, the sample might not do well in capturing the aggregate leverage in the country.

Financial companies (banks, insurance firms, investment trusts) are not included in the sample because their balance sheets have a different structure from those of non-financial firms. Since new firms entered the market and some old firms missed data, we set up an unbalanced panel of 159 non-financial firms over the period 1998-2006, totaling 559 effective observations.

3.2. Measurement of variables

3.2.1. Measure of leverage

The choice of leverage proxies regarding the usage of book versus market data for its measurement is a great concern. Although the use of market values to analyze the capital structure choice is preferable since they provide better descriptions of future cash flows and their risks, the dramatic fluctuation in the market values makes it difficult for empirical researchers

and policy-makers of finance to implement their tasks *(Nivorozhkin 2003)*. This might be because of a small fraction of firms' frequently traded assets and debt. Furthermore, for non-listed companies the absence of market values is prevailing except a market value of equity, thus calculating the quasi-market values of leverage is the best selective choice. *Rajan & Zingales (1995) and Booth et al., (2001)* use both market values and book values in their measurement while *Delcoure (2006) and Nivorozhkin (2003, 2005)* apply book values due to data limitations. This study, following *Titman & Wessels's (1988)* approach, uses 3 financial leverage measures in the book values: (1) overall leverage is defined as the ratio of book value of total debt to total assets, (2) long-term leverage is calculated by the ratio of book value of long-term debt to total assets, and (3) short-term leverage is computed by the ratio of book value of short-term debt to total assets.

3.2.2. Possible factors affecting leverage

Firms' financial statements are independently audited according to international accounting standards (IASs) since all companies in the sample are listed on stock exchanges in Vietnam. Though there are differences between a market-economy model and a central-planning model of public accounting, the Vietnamese government has non-stop attempted to have taken various steps in reducing this gap with a view to being in line with IASs, which reflex the accuracy, extent, and interpretability of accounting procedures, policies as well as items relating to assets and liabilities from firm's balance sheet. Based on the detailed guidelines by the previous empirical studies in the context of developed, emerging and TEs about the selection of possible determinants affecting Vietnamese-listed firms' leverage, we come up with a function of the target leverage as an endogenous variable and tangible assets, trade credit, profitability, firm size, the lagged bank debt, and ownership as exogenous variables.

** Tangibility*

Insert Table 1 here

According to the trade-off theory *(see Table 1 for details)*, firms could use their tangible assets as collateral to provide creditors with security in the event of bankruptcy. In the case of no close ties to lenders, collateral might play a positive role in obtaining capital for newly-established businesses. Thus, the increasing tangibility in total assets should be positively correlated with the more availability of collateral. This is in line with the previous studies by *Rajan & Zingales (1995)* in developed countries *and Chen (2004)* in TEs, who discovered a

positive correlation of tangibility with target leverage. In addition to the positive role of collateral in gaining funds for firms' investment, significant collateral values of assets might reduce the agency costs of debt regarding the incentive of shareholders of leveraged firms to invest sub-optimally for expropriating wealth from the firms' bondholders *(Jensen & Meckling 1976 and Myers 1977)*. However, in Vietnam like other TEs, the importance of tangible assets as collateral might be limited due to a number of factors. *Nivorozhkin (2005)* provide an excellent description of these constraints as (i) underdeveloped and inefficient legal systems that may hamper the establishment of enforceable debt contracts, and (ii) thin and illiquid secondary markets for firms' assets, which might cause uncertainty about their "recoverable" market value. For this reason, one might expect a negative correlation between tangibility and leverage[12]. This study is expected to find a positive sign and the ratio of the sum of fixed assets and inventories to total assets could be measured as a proxy for tangibility, as suggested by *(Chen 2004)*.

** Trade credit*

In addition to the use of debt financing, firms in TEs may be financed by their suppliers. *Nivorozhkin (2003, 2005)* makes a reference to a theoretical and empirical study by *Rajan & Petersen (1996)* who show strong evidence that, when bank credit is scarce and costly for many enterprises, firms might explore more external financing resources such as trade credit for their investment projects. Some evidence also indicates that firms in TEs provides their customers with more trade credit when they have better access to loans from financial institutions (*Nivorozhkin 2003, 2005)*. However, *Croitoru & Schaffer (2002)* find that firms in TEs imposed hard budget constraints on each other due to the credit unavailability. For this reason, a further shift of soft budget constraint would be away from trade credit towards bank credit. Furthermore, *Perotti & Carare (1997)* argued that firms faced with a large amount of trade arrears might get better access to bank debt. Thus, we are motivated to include this variable as the ratio of trade credit to total assets, as suggested by *Nivorozhkin (2003, 2005)*, to control for the impact of trade credit on the target levels of debt. We expect a positive sign for this variable.

** Profitability*

[12] *Cornelli et al., (1998) and Nivorozhkin (2003) found a negative correlation between target leverage and tangibility, while Nivorozhkin (2005) presented mixed results.*

According to theories of corporate capital structure, the choice of a firm's leverage is related to its profitability. The pecking order hypothesis suggested by *Myers & Majluf (1984)* relies on the presence of asymmetric information between the insiders and outsiders of the firm to predict that leverage is lower for profitable firms and higher for firms with more investments. In contrast, the static tradeoff model of capital structure predicts a positive correlation on the basis of the presence of tax shields since the higher profitability implicitly leads to more income to shield. *Nivorozhkin (2003, 2005)* argues that tax shields are really significant for firms with higher and stable income. Thus, TEs characterized by higher economic uncertainty might have low tax advantages of debt for firms. This study defines the ratio of pre-tax profit to total assets as a proxy for firm profitability and expects to find a positive sign.

* *Firm size*

Much evidence shows that a firm's size is one of the target leverage choices. *Rajan & Zingales (1995)* argue that larger firms tend to reduce the probability of insolvency due to their diversification, and have better access to debt from financial institutions than smaller firms. However, the pecking order model indicates that larger firms have the ability to issue more equity and enjoy lower information asymmetries with financial markets. *Delcoure (2006)* claims that weakness in ownership by larger firms might result in less control over managerial decisions; thus firms' managers may influence debt ratios to protect their personal investments in the firm *(Friend & Lang 1988)*. In TEs, banks faced with firms that may be too large or too political to fail are likely to provide them with more favorable treatments by establishing a higher level of leverage in the firm. Moreover, banks are reluctant to cut off their large clients due to political opposition to layoffs *(Perotti 1993)*. Thanks to its important role in dealing with unemployment, a larger firm might have more opportunities to participate in the government-led restructuring programs and enjoying some form of guarantees on their debt financing *(Nivorozhkin 2005)*. This study anticipates the natural logarithm of total assets as a proxy for firms' size and predicts a positive sign.

* *Bank debt*

Much theoretical evidence shows that banks in transition were characterized by the burden of non-performing loans on their books since they were expected to favor state-owned enterprises *(e.g., Perotti 1993, Berglof & Roland 1995, Gorton & Winton 1998,)*. While *Perotti (1993)* argued that banks had an economic incentive to fund their former debtors, though less

efficient and more risky, since they gain the potential repayments of the previous debts, *Gorton & Winton (1998)* indicated that the massive assets by banks were tied up in bad loans to loss-making state-owned firms, so banks were reluctant to continue extending their funds to these firms and simply quietly rolled over the loans with a hope that the government would come in with bailouts since both banks and firms are state-owned. Though there was much theoretical literature on NPLs in transition, to my knowledge, few empirical studies have focused on the relationship between bank borrowing and bank debt by firms *(e.g., Carare 1995, Perotti & Carare 1997)*. This study fills in this gap by investigating the correlation between leverage and bank debt by firms and expects to find a positive sign.

* *Firm ownership*

Nivorozhkin (2005) argues that a significant concentration of a firm's ownership might have an impact on the levels of financial leverage of the firm. Evidence from TEs shows that financial leverage tends to be negatively related with higher ownership concentration *(e.g., Hussain & Nivorozhkin 1997)*. They interpret this result as evidence of an increase in equity capital to satisfy firms' need for long term financing, given the absence of markets for long-term debt and the supply-side imperfections in the credit markets in TEs. Besides, state ownership of firms in TEs is often large and pervasive in the largest firms, and bank credit expanded to them might be politically motivated *(Jelic et al., 1999)*. It is therefore essential to control for state ownership regarding the impact of firms' size on the credit supply. As suggested by *Nirovozhkin (2005)*, we include 4 dummy variables regarding different levels of state ownership and types of ownership.

- The variable *Own-A* takes the value of 1 for firms with a state ownership between 50-100%, and 0 otherwise (this kind of firm has government-controlling stakes and operates under the government control);
- The variable *Own-B* takes the value of 1 for firms with a state ownership between 25-50%, and 0 otherwise;
- The variable *Own-C* takes the value of 1 for firms with a state ownership between 0-25%, and 0 otherwise.

The dummy variable *Own-A* is expected to find a positive correlation between the target leverage and concentration of the state ownership, which provides support the second hypothesis.

- The variable *FOR* takes the value of 1 for firms with a foreign ownership between 50-100%, and 0 otherwise. The purpose of including this variable is to control for the impact of foreign ownership on the leverage targets of firms since many TEs enjoy significant inflows of foreign direct investment (FDI), and Vietnam is not an exception. Why sell firms to foreigners? – this is due to *(i)* the desire by the state to gain a satisfactory selling price when the availability of capital is abroad, *(ii)* the improvement of firms' performance and the corporate governance, *(iii)* the introduction of operational expertise within firms, and especially *(iv)* the cutting of the links between the state and the corporate sector in order to relieve the burden of the state budget for bailouts and create a competitive environment within firms *(Weill 2003)*. Therefore, we expect a decline in the leverage targets of firms as the presence of foreign strategic investors is involved.

* *Industrial dummies*

Leverage might be affected by the nature of business of firms in various industries, so we include dummy variables, IND1-IND11, to control for the impact of industrial classification on the degrees of target leverage ratios.

3.3. Summary statistics and correlation matrix of selected variables

Insert Tables 2 - 5 here

Table 2 in the appendices shows the summary statistics of dependent and explanatory variables including mean, standard deviation, minimum and maximum, while Tables 3-5 present correlation matrices of three different degrees of leverage. We observe that most cross-correlation terms for the explanatory variables are very small except the positive correlation between tangibility and trade credit, thus our regressions might not be suffered from the problem of multicolliearity among the explanatory variables. In addition, leverage is positively significant with tangibility and lagged bank debt, suggesting that (i) tangible assets may play a positive role in lending decisions for both current and investment capital, and that (ii) these decisions are likely to be dependent on the potential repayments of the previous debt. Trade credit is also considered as a main source of short-term capital for firms during the sample period.

3.4. Regression models and robustness

3.4.1. Regression models

The employment of data across 159 firms and years of 1998-2006 allows us to specify the basic (unbalanced) panel regression models as follows:

$$LEV_{it} = \alpha_i + \beta_1 TANG_{it} + \beta_2 TRADE_{it} + \beta_3 PRO_{it} + \beta_4 SIZE_{it} + \beta_5 BDEBT_{it-1} + \sum_{j=1}^{4} \beta_j Ownership_{jit} + \sum_{k=1}^{11} Industry_{kit} + u_{it}$$

$$with \quad u_{it} = \mu_i + v_{it}$$

Where $i = 1, 2, ..., 159$ indexes cross-sectional dimension and $t = 1998, ..., 2006$ denotes the time dimension; $TANG$ is tangible assets, defined as the ratio of the sum of fixed assets and inventories to total assets; $TRADE$ is trade credit, measured as the ratio of trade credit to total assets, PRO is firm profitability, measured as the ratio of pre-tax profit to total assets, $SIZE$ is firm size, defined as the natural logarithm of total assets, $BDEBT$ is bank debt owed by firms, computed as the ratio of bank debt to total assets. The vector of ownership dummy variables include $OwnA$ taking the value of 1 for firms with state ownership between 50-100%, and 0 otherwise; $OwnB$ taking the value of 1 for firms with state ownership between 25-50%, and 0 otherwise; $OwnC$ taking the value of 1 for firms with state ownership between 0-25%; and $Foreign$ taking the value of 1 for firms foreign ownership between 50-100%, and 0 otherwise. The industrial dummies consist of IND1-IND11.

The pooled error term u_{it} are comprised of 2 components: μ_i denotes the unobservable individual effect and v_{it} denotes the remainder disturbance. Unlike the previous empirical studies using 3 estimation methods[13] – *Pooled OLS, fixed effects, and random effects* – our research focuses on a panel random effects method that enables us to avoid the problem of collinearity because of the inclusion of the dummy variables in our regression estimation. The main benefit from applying a panel random effects technique is that it allows for random disturbances that may arise from measurement problems *(Fries & Taci, 2004)*, and for exogeneity of all regressors with the random individual effects while the fixed effects model allows for endogeneity of all the regressors with these individual effects *(Mundlak, 1978)*. Since bank debt might be endogenously related to leverage, we use two-stage least square (2SLS) method in order to avoid the problem of endogeneity.

The application of a panel 2SLS EGLS (Cross-section random effects) method in the regressions for 3 different degrees of leverage gives us consistent, efficient and unbiased estimators except estimates from the long-term leverage regression. It shows the problem of autocorrelation since Durbin-Watson statistic is quite low (1.3290), thus we use the generalized

[13] *Delcoure (2006) and Chen (2004) used 3 estimation methods – Pooled OLS, fixed effect, and random effects.*

differenced method *(see Appendix 1)* to get BLUE estimators for the long-term leverage equation. As a result, we obtain BLUE estimators for the three different degrees of leverage in Table 6.

Insert Table 6 here

It can be seen from Table 6 that the coefficients of *TANG*, *TRADE*, and *PRO* are positively and highly significant at the 1% level in all degrees of leverage with an exception of *TRADE* in the long-term leverage equation where it is not statistically significant though producing a positive value. The coefficients of *SIZE* are found positive and significant in the long-term leverage equation while they are not statistically significant in both overall and short-term leverage equations. The positive impacts of lagged bank debt variables are found in the overall and short-term leverage regressions, but not in long-term leverage equation. As unexpected, the dummy variable *OwnA* representing for the government-controlling stakes is not statistically significant though producing a positive value in the long-term leverage equation, suggesting a rejection of the second hypothesis. Likewise, the positive correlation of the trade credit and lagged bank debt with the overall and short-term leverage provides support for the first hypothesis. Amazingly, there is no significantly industry effect on the target leverage.

3.4.2. Robustness of the regression results

** Hausman test*

Insert Tables 7-9 here

In order to investigate the robustness of these results, we reduce the estimation equation sequentially by dropping the insignificant dummy variables, as suggested by *Weller 2001*, and re-estimate the regressions using the three different methods – Pooled OLS, fixed effects, and random effects *(see Delcoure 2006 and Chen 2004)*. We report the estimation results in Table 7, 8, and 9 for the overall, long-term, and short-term leverage regressions, respectively. In the overall leverage regression, we reject the pooled OLS model since it shows autocorrelation. All of the two remaining models (fixed and random effects) are statistically significant and they produce quite similar results for tangibility, trade credit, and profitability, but different in the lagged bank debt. The fixed effects model has a slightly statistical disadvantage over the random effects one, since R-squared for the fixed effects model is quite high, showing the problem of collinearity and the Hausman statistic indicates a non-rejection of the null that the random effects estimator is consistent.

Likewise, the Hausman statistics for the long-term and short-term leverage equations show a non-rejection of the null hypothesis that random effects estimators are consistent. Again, while the pooled OLS model for the long-term leverage equation seems to provide BLUE estimators, it might be suffered from the problem of autocorrelation in the short-term leverage model due to the relatively low Durbin –Watson statistic (=0.591280). However, all the three different models in the long-term leverage equation produce similar results for tangibility, profitability, and size. In short, the results of the selected random effects model in all three different degrees of leverage in Table 7, 8 and 9 confirm our findings in Table 6.

** Chow (1960) test for poolability across time*

Since our sample is running from 1998 to 2006, a period when the securities market in Vietnam was officially established on 28 July, 2000, we split our sample into sub-samples: one period of 1998-2000 and the other is 2001-2006. Then, we re-estimate two sub-regressions and test for the stability of coefficients in these two sub-regressions using Chow (1960)' test. In other words, we can use Chow's test for poolability across time (1998-2006) under the null hypothesis as $\beta_i = \beta$ for $i = 1998,1999,...,2006$ *(See Appendix 2)*. The results show that Chow's test statistics are significant at the 5% levels for all different levels of leverage and suggest a rejection of poolability across time. Thus, we might conclude that there are statistically significant differences between the coefficients within two sub-samples.

** Testing for changes in leverage*

Insert Tables 10-12 here

We run regressions across time (2003-2006) to capture changes in leverage. As suggested by *Rajan & Zingales (1995)*, we lag both leverage and explanatory variables 4 periods (a period after the securities market was established in 2000) to allow for slow adjustments and avoid the problem of endogeneity. The dependent variable represents for the change in leverage; independent variables are the difference in tangible assets, trade credit, profitability, size, and bank debt of each enterprise:

$$\Delta LEV_i = \delta + \gamma_1 \Delta TANG_i + \gamma_2 \Delta TRADE_i + \gamma_3 \Delta PRO_i + \gamma_4 \Delta SIZE_i + \gamma_5 \Delta BDEBT_i + \varepsilon_i$$

Where

ΔLEV is the yearly difference in leverage scaled by total assets, $\Delta TANG$ is the difference in the sum of fixed assets and inventories scaled by total assets, $\Delta TRADE$ is the difference from year to year in trade credit scaled by total assets, ΔPRO is the annual change in the pre-tax profit scaled

by total assets, $\Delta SIZE$ is the difference in the size of enterprises, and $\Delta BDEBT$ is the yearly change in bank debt scaled by total assets. The results of the cross-section regressions are reported in Tables 10, 11, & 12 for the overall, long-term and short-term leverage, respectively.

** Testing for macroeconomic effects on leverage*

Insert Table 13 here

Existing literature on capital structure shows that leverage might be significantly affected by capital market developments, macroeconomic aggregates, and institutional characteristics of a country. Thus, we are motivated to test the impact of various macroeconomic characteristics[14] of a country on the mean value of leverage for firms each year, as suggested by *Nivorozhkin (2005)*. To avoid the problem of collinearity, we run separate regressions for grouped explanatory variables using OLS estimation and report the results in Table 13.

We found a positive correlation of leverage with domestic credit to both private (DCPS) and state (DCSS) sectors as percentages of GDP, suggesting that an increase in the credit flows to the economy could lead to a rise in the aggregate leverage level of firms. The negative but insignificant effect of the equity market capitalization as a proportion of GDP (MCAP) on the aggregate leverage ratio implies that firms might display less reliance on debt financing since they may issue more equity for their investment capital when securities markets are more developed. This finding is consistent with those reported by *Booth et al., (2001)* and *Nivorozhkin (2005)*. Firms also display less reliance on debt financing when there are more inflows of gross foreign direct investments (GFDI) into a country.

The correlations of the aggregate leverage ratio with bank liquid reserves to total assets ratio (BLR) and the proportion of non-performing loans in total loans (NPL) are found positive and negative, respectively. This result confirms earlier findings by *Demirguc-Kunt and Maksimovic (1996)* and *Nivorozhkin (2005)* that leverage is positively correlated with indicators of banking sector development and bank solvency. The negative relationships of leverage with current account balance as a proportion of GDP (CAB) and the ratio of gross foreign direct investment inflows to GDP (GFDI) show that leverage is negatively related to the portion of domestic investment financed by foreigners' savings. Also, inflation and interest rates negatively affect the degree of firms' leverage, resulting in a decline in tangible assets by firms in relation to the aggregate leverage ratio.

[14] *Macroeconomic variables are derived from the 2006 IMF report.*

4. Empirical results and discussion

4.1. Regression results

We first observe that the results obtained from the robust equations *(Hausman test)* confirm our previous results. The random effects models for the overall (Table 7), the long-term (Table 8) and the short-term (Table 9) leverage equations provide similar results to those of the overall, long-term, and short-term leverage regressions in Table 6. While the coefficients of tangibility and profitability are statistically significant for all leverage regressions, the coefficients of trade credit and lagged bank debt are only statistically significant for the overall and short-term leverage equations. The coefficient of firm size is also found significant in the overall long-term leverage equation only. The significant exception is that the coefficient of Own A with state ownership between 50-100% is positive though insignificant in the long-term leverage equation.

The changes in leverage do not confirm our previous results. While tangible assets used as collateral to secure firms' borrowing increased both overall and short-term leverage in 2005-2006, they reduced short-term leverage in 2003. Similarly, trade credit increased both overall and short-term leverage in 2003-2006, but reduced long-term leverage during the period 2004 - 2006. Regarding firm profitability, more profitable firms reduced their debt in both 2003 and 2004. Large firms tend to reduce their short-term leverage in 2004. Amazingly, firms faced with a sizable quantity of bank debt tend to increase more long-term leverage in 2003, 2004 and 2006.

From the above-mentioned results, we find the following relationships between the dependent and explanatory variables:

- *There is a positive correlation between tangibility and leverage during the sample years (1998-2005), but a negative relationship in short-term leverage equation in 2003;*
- *A positive correlation of trade credit with overall and short-term leverage during the sample years, but a negative correlation between trade credit and long-term leverage during the period of 2004-2006 exists;*
- *There is a positive relationship between profitability and leverage during the sample years, but a negative relationship during 2003-2004;*
- *A positive correlation of a firm's size with long-term leverage is found, but a negative correlation in short-term equation exists in 2004 as well;*

- *There exists a positive relationship of lagged bank debt with overall and short-term leverage during the sample years, and with long-term leverage in 2003, 2004 and 2006;*
- *Coefficients of firm's state ownership between 50-100% are found to be positive in long-term leverage equation, but negative in short-term leverage equation.*

4.2. Interpretation

4.2.1 Overall, long-term, and short-term leverage

Figure 1 shows a significant difference among the ratios of firms' overall, long-term, and short-term leverage degrees in both HOSTC and HASTC. The higher short-term leverage than the long-term leverage indicates that Vietnamese listed companies might prefer short-term debt to long-term debt.

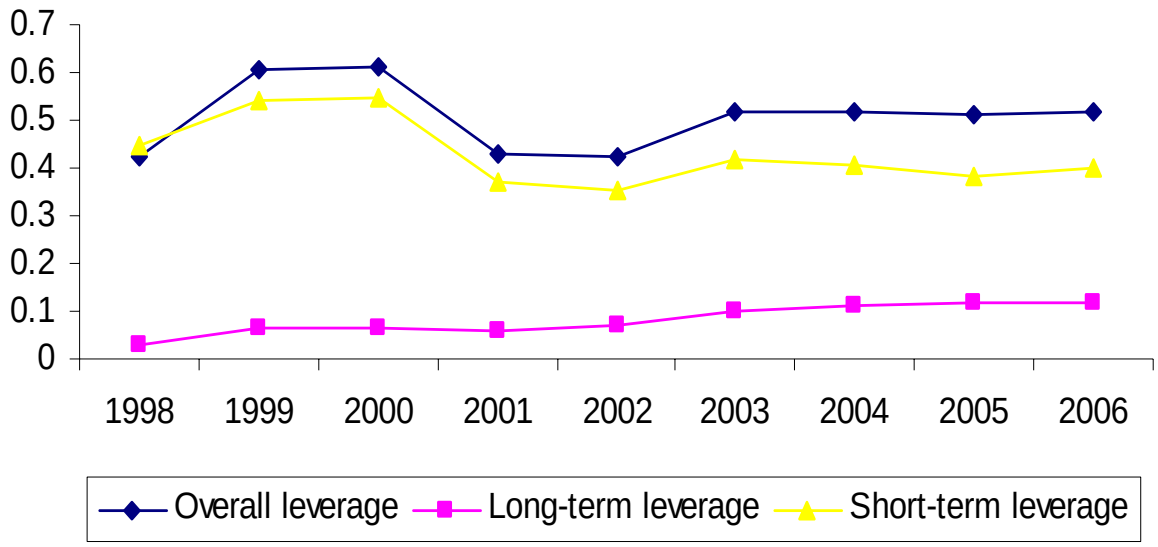
Insert Tables 14 - 16 here

The average debt ratio for listed firms in Vietnam is 51%, in which the average long-term debt ratio just accounts for 10.3% and the average short-term debt ratio prevails 40.2% *(see Tables 14-16)*. This ratio should be lower than that in most developed countries *(Rajan and Zingales, 1995 reported 66% in G7 countries)* and be equal in developing countries *(Booth et al., 2001 reported 51% in 10 developing countries)*. This result is consistent with the hypothesis that the ratios of debt to total assets are likely to be low in TEs *(McKinnon 1991, Mayers 1990)*. However, it is much higher than those in some transition economies such as Czech Republic, Russia and China. *Delcoure (2006)* reported the average debt ratio of 43% and 34% for Czech Republic and Russia, respectively, while *Chen (2004)* provided 46% for China.

It can also be seen from Figure 1 that there is a significant difference between the average long-term and short-term leverage degrees by listed firms in Vietnam. The average long-term leverage level is only 10.3% in Vietnam in comparison with that of 41% in G7 countries and 22% in developing countries, and even lower in some TEs such as Czech Republic (16%), Slovakia (18%), Poland (21%), Russia (25%), but higher than China (7%)[15]. The substantially low amount of the long-term leverage implies that listed firms in Vietnam may heavily rely on share capital rather than debt. Their short-term working sources of capital might be financed by bank loans and equity is the crucial source of capital for long-term investments.

[15] *Delcoure (2006) and Chen (2004)*

Figure 1: Average Leverage Ratios (book value)



The absence of the long-term debt leverage might be explained by the fact that the Vietnamese bond market are in a very early stage of development. According to *Chun et al., (2003)*, there are 60 types of bonds listed on HOSTC with a total value of VND5,561 billion ($360 million) as June of 2003, approximately 1.04% of GDP. Among them, VND5,444 billion is government bonds and a limited amount of corporate bonds. Such a limit and a prohibition of bond transactions on the over-the-counter (OTC) markets hamper Vietnamese listed firms from raising long-term capital. Like in China, the lack of legal framework to govern share transactions in secondary markets in Vietnam and the inefficient corporate governance structure also intensifies the problem (*Chen 2004)*. While listed firms' trading activities in the secondary markets are quite low[16], many unlisted securities are traded in the unregulated free markets due to their higher costs of disclosure requirements and higher standards of corporate governance than their benefits of listing. Due to the uncertainty of economic conditions in TEs like Vietnam, the absence of legal framework to protect shareholders' rights as well as the inefficiency of corporate governance which could create more favorable conditions for firm's managers to maximize their own benefits or to engage in the asset-stripping behavior, short-term funding

[16] *Chen (2004) argued that the capital gains from the secondary share trading are usually around 6 to 8 times of the IPO prices.*

with its lower default risk enables suppliers of funds to monitor and control firms' borrowing more effectively *(Chen 2004, Delcoure 2006)*.

4.2.2. Tangibility

The coefficient of tangibility variable is highly positively significant at the 1% level in all levels of leverage during the sample years except in 2003, suggesting that tangible assets play an important role in lending decisions. This finding is in line with the results of the previous studies by *Rajan & Zingales (1995)* in developed countries, and *Chen (2004)* and *Delcoure (2006)* in transition economies. It is also consistent with corporate capital structure hypotheses such as the pecking order model in terms of asset mispricing and the tradeoff model in terms of financial distress and bankruptcy costs. The agency theory also predicts a positive correlation between tangibility and a firm's leverage *(Jensen & Meckling, 1976)*. This is because tangible assets used to secure a firm's debt-issuing activities help reduce the agency cost. However, while earlier findings by *Booth et al., (2001)* in developing countries, *Jelic at el,. (1999)* and *Nivorozhkin (2005)* in EU accession countries indicate mixed effects of tangibility on the debt target across countries; *Cornelli (1996)*, *Hussain & Nivorozhkin (1997), and Nivorozhkin (2002, 2003)* discovered a negative effect of tangibility on the debt targets. They interpreted this finding as "maturity matching" on firms' books where there is a match between current assets and short-term debt, and a match between fixed assets and long-term debt[17]. Thus, the existence of tangible assets as collateral does not affect the overall leverage. However, the reported negative relationship between short-term leverage and tangibility in 2003 indicates that tangible assets remain a poor source of collateral in TEs and this result confirms earlier studies such as *Cornelli et al,. (1996), Nivorozhkin (2002, 2004, 2005)*.

4.2.3. Trade credit

Trade credit seems to affect the overall, long-term, and short-term leverage differently. Trade credit has a positively significant impact on the total and short-term debt as expected, but not significant for the long-term debt[18] equation except during the period 2004-2006 (it produces

[17] *In other words, long-term debt might be used for investment in fixed assets.*

[18] *The insignificance of trade credit on the long-term debt is due to the absence of the long-term debt financing in Vietnam where listed firms are financed by high cost equity on account of inefficient corporate governance, undeveloped bond markets, and incomplete institutional structure and legal system governing the banking industry (Delcoure 2006).*

a negative correlation with long-term leverage during this period). A higher proportion of trade credit on the Vietnamese listed firm's books could lead to a rise in their total and short-term debt. This suggests that firms use more short-term sources of capital obtained from financial institutions to offset trade credit since trade credit might be more closely related to firms' production and distribution process, and often harder to avoid the supplier-customer relationships *(Nivorozhkin 2003)*. This result provides support for the first hypothesis that banks in TEs are likely to lend to firms faced with a sizable quantity of trade arrears. However, the reported negative relationship between trade credit and long-term leverage during the period 2004-2006 suggests a substitution between bank credit and trade credit in TEs. In other words, firms increased short-term financing from their suppliers and reduced long-term borrowing during 2004-2006. This is in line with empirical studies by *Nirovozhkin (2003, 2005)* that found a negative effect of trade credit on a firm's leverage target. He argued this negative relationship as a result of a decline in bank credit, and then reduced firms' debt-equity ratios. He also examined the robustness of the result by the inclusion of the ratio of net trade credit to total sales[19] as an explanatory variable and found a negative coefficient as well. He concluded that firms with better access to bank credit might use less but expand more of trade credit as a proportion of their sales relative to other firms.

4.2.4. Profitability

The average size of profitability coefficients is about +1.5, +0.15, and +1.37 for the overall, long-term, and short-term leverage models, respectively; showing that a 10% difference in profitability is related to a 15%, 1.5% and 13.7% increase in the corresponding overall, long-term and short-term leverage ratios. The reported positive relationship between profitability and leverage degrees might be explained by the fact that the listed firms would be taking advantages of their investment opportunities to maximize their profits, since profitability is possibly correlated with growth opportunities *(Booth et at., 2001)*.

Unlike state-owned General Corporations that typically receive subsidies from the state budget and are on the way to partial equitization till 2010, most listed firms in Vietnam are small and medium-sized enterprises (SMEs) but have a clear orientation on profit maximization. The reported positive relationship seems to indicate that profitable firms listed on HOSTC and

[19] *This ratio is defined as the difference between trade credit and trade debt (receivables) to revenues.*

HASTC issued less equity and used more short-term debt financing. Since both the amount of internally generated funds and the quality of investment opportunities might be proxied for profitability for small firms, more profitable firms with fewer investment opportunities reduce their equity issues substantially, thus leading to a more positive relationship between leverage and profitability *(Rajan & Zingales 1995)*. Reducing the correlation of leverage with profitability may occur when small firms' profitability is related to investment opportunities since more profitable firms might have an economic incentive to issue more equity.

Another possible explanation about the positive effect of profitability on firms' debt ratios is that the quality of financial management of the Vietnamese listed firms shows signs of improvement. The agency theory *(e.g., Jensen 1986)* also predicted a positive correlation between leverage and profitability. It argued that debt could be used as a disciplining tool to enforce firms' managers to increase profit maximization for shareholders rather than build their empires. In the circumstances where information asymmetries are prevailing, more profitable firms with a higher proportion of leverage ratios may signal quality financial management. Therefore, a decline in agency costs of equity by the rise in firms' leverage ratios is the best selective solution to more profitable firms' management *(Jensen & Meckling 1976)*.

Last but not least, the positive correlation between leverage and profitability confirms the fact that the Vietnamese listed companies have been enjoying the privilege from the government under the form of tax relief which they have a 50% reduction on corporate taxes in the first two years after listing[20]. This finding is in line with the static tradeoff model of capital structure, suggested by *Miller (1977)* that focuses on the proportion that the target debt ratio of firm is determined by the tradeoff between higher bankruptcy costs[21] and current tax shield benefits of debt.

By contrast, the negative effect of profitability on the Vietnamese listed companies' debt during the period 2003-2004 seems to support the pecking order model, suggested by *Myers & Majluf (1984)* that leverage is lower for profitable firms and higher for firms with more investments. This is totally consistent with an earlier finding by *Chen (2004)* who uncovered a negative correlation between leverage and profitability in Chinese listed firms. The author

[20] *Listed Vietnamese firms will lose the tax relief on Jan. 1, 2007. The purpose of removing the tax relief is in line with the development of the stock market in the coming time (Truong 2006).*

[21] *The higher degree of corporate indebtedness implies the higher bankruptcy costs.*

interpreted the negative relationship as a limit of the tradeoff model applied to China since state ownership are still prevailing in listed firms and banks as well.

4.2.5. Firm size

The coefficient of firm size is positively significant at the 1% level in long-term leverage equation, but it is not statistically significant in overall and short-term leverage equations. The reported positive impact of firm size on the long-term leverage in the Vietnamese listed firms might be interpreted by the fact that size is closely associated with tangibility or may serve as a stability proxy for creditors *(Nivorozhkin 2003, 2005)*. In TEs, large firms may play a positive role in lending decisions. Large firms are often either the likely targets of government bailouts or engage in some form of government-sponsored investment programs[22] because they are too big or too political to fail. However, the listed firms in Vietnam neither represent for the overall leverage in the country nor enjoy the above privileges since most of them are small and medium-sized, with state ownership of less than 50% and no golden shares at all[23]. For this reason, a possible explanation for such a positive relationship of firm size with long-term leverage is that these listed SMEs find it difficult to get access to capital markets for equity since the stock market haven't really yet been established as a place for raising capital. More seriously, the Vietnamese listed firms' seasoned equity offering is quite limited. These firms are allowed to offer seasoned equity only after one year of listing. Furthermore, the low trade activities by listed firms in the secondary market and the denomination of individual retail investors in the current capital market also intensify the problem. According to *Chun et al., (2003)*, among over 15,000 trading accounts opened by investors, there are only 130 accounts opened by institutional investors. These problems may result in the underdevelopment of Vietnamese securities market, which in turn causes impediments to listed firms' capital mobilization for equity.

This result confirms the tradeoff model of corporate capital structure and some previous studies such as *Rajan & Zingales (1995)* and *Wald (1999)* in developed countries, *Booth et al., (2001)* in developing countries, and *Cornelli (1996)* and *Nivorozhkin (2003, 2005)* in TEs. The tradeoff model argues that large firms are expected to have a higher debt capacity and are more

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[22] *State-owned General Corporations on the way to equitization themselves are the important targets of government bailouts and are more likely to engage in the investment programs sponsored by the government.*

[23] *Golden shares are shares with control restrictions, normally the veto right to major strategic decisions, defined by Tian (2006).*

diversified, thus less prone to bankruptcy risk. *French & Lang (1988)* find that managers of larger firms often issue debt to reduce the risk of personal loss because shareholders of large firms have less control over individual managers. This result confirms the agency theory suggested by *Jensen (1986*) that shareholders of large firms should be able to issue more long-term debt since they use debt as a control device on firms' management behavior on account of more dilute ownership.

By contrast, the negative correlation between short-term leverage and size in 2004 seems to be in line with the pecking order theory that, due to the low information asymmetries between insiders within a firm and the capital market, large firms are likely to issue more equity for their long-term investments, thus reducing their debt capacity. *Chen (2004)* also found a negative relationship between size and long-term debt in the Chinese listed firms. The author interpreted the negative relationship either as a result of information asymmetries between insiders in Chinese listed firms and their capital market or as having better access by large firms to capital market for equity due to their reputation in the markets and the attraction of capital gains in the secondary markets.

4.2.6. Lagged bank debt

The positive effect of the lagged bank debt on overall and short-term leverage provides support for the lending bias hypothesis that the increase in new bank loans to SOEs is correlated with the past level of bank debt. Excessive lending by banks in TEs to troubled SOEs might be explained by the fact that either banks were reluctant to cut off their former clients due to political opposition to restructuring or layoffs *(Perroti 1993)*, or massive assets by banks were tied up in bad loans to these firms *(Gorton & Winton 1998)*. The deterioration in business performance of SOEs is a major cause of the rise in NPLs within the banking system, which may, in turn, trigger a financial distress. Once a banking crisis was perceived to be systemic due to a large number of bad loans on banks' balance sheets, bank regulators were in practice unwilling to close problematic banks; instead, regulators allowed them to continue in operation in order to avoid negative externalities such as credit crunches, premature liquidation of profitable projects, and financial contagion to healthy banks, which were caused by large numbers of bank closures *(Mitchell 2001a)*. Consequently, regulators were forced to come in banks with bailouts which, in turn, created the problem of moral hazard. *Mitchell (2001a)* wonders if regulators can induce revelation by banks of their bad loans simply by offering

recapitalization to the banks, assuming that bank managers who accept recapitalization are not dismissed. *Aghion at al. (1999)* show that insolvent banks will reveal their bad loans if they are recapitalized and bank managers are not dismissed. However, in many cases, solvent banks also have an incentive to overstate their levels of bad debts in order to qualify for recapitalization *(Mitchell, 2001a)*. *Mitchell (1997)* analyzes the effect of regulators' inability to commit not to rescue banks when a situation labeled "too-many-to-fail" occurs[24]. Her concept is different from that of "too-big-to-fail", which can explain why regulators tend to rescue individual, large banks in a financial distress[25]. She also argues that insolvent banks have incentives to reveal their bad loans when they believe that too-many-to-fail will be triggered; however, solvent but troubled banks now have an incentive to roll over their bad loans, thereby lowering their expected net worth in the expectation of being recapitalized.

Unlike state-owned General Corporations, firms in our sample are not the likely targets of government bailouts, for which banks resort to be responsible. The reported positive relationship of lagged bank debt with overall and short-term leverage might be because of the availability of tangible assets by firms, which may serve as a stable proxy for lenders. Additionally, the changes in long-term leverage/total assets equations across years show that the lending behavior by banks towards long-term loans is also biased in 2003, 2004, and 2006. We interpret this lending bias behavior as a consequence of banks' increasing efforts to pursue the target of credit growth by granting long-term loans to listed firms, which are in turn used by firms to finance their short-term activities.

4.2.7. State ownership

The coefficient of Own A with state ownership between 50-100% is not statistically significant in all leverage equations though it produces a positive value in long-term leverage equation. This may be explained by the fact that the number of listed firms with a state ownership percentage more than 50% in our sample is not prevailing. Our inability to get access to state-owned General Corporations' financial statements due to the lack of publicly

[24] *Enough banks found to be in trouble, so costs of closing banks is higher than that of rescuing them.*

[25] *The concept of "too-big-to-fail" cannot explain why governments in some countries (Norway, Sweden, Japan, Chile, and in TEs such as Hungary, Czech Republic, Poland, Bulgaria) have chosen to rescue all or most of the banks in financial systems.*

informational disclosure is a great concern. Hence, we fail to show the explanatory power of ownership with the government-controlling stakes (over 50%) regarding all degrees of leverage, and conclude that data on Vietnamese listed firms do not provide support for the second hypothesis.

The reported positive and negative effects of Own A on long-term and short-term debt equations, respectively, suggest that an increase in state ownership concentration (e.g., decline in independence) on the Vietnamese listed firms might result in a rise in long-term debt and a decline in short-term debt. The implication behind this story is that listed firms with the government-controlling stakes may use less short-term than long-term borrowing, given that their incapacity of getting access to the capital market, because Vietnam's securities market has not really yet been set up as a place for capital mobilization, is a possible explanation for this issue. Bond markets that help the listed firms raise the long-term debt for their investment projects are in a very stage of development. As end of June 2003, there were only two joint-stock companies issuing convertible bonds, and bond transaction in the over-the-counter (OTC) market is not allowed in Vietnam *(Chun et al., 2003)*. As a result, firms with the government-controlling stakes resort to heavily rely on long-term bank loans for their investments.

Regarding various types of ownership, this result seems to support for earlier findings by *Firth (1995) and Berger et al., (1997)* who also found a positive correlation between debt and ownership by large external shareholders. However, *Jelic et al., (1999)* discovered both positive and negative coefficients of state ownership for short-term debt ratios and for total and long-term debt ratios, respectively. They interpreted the negative relationship as a sign of banks increasing monitoring efforts and the positive correlation as a favor of banks increasing new loans to SOEs with a hope of gaining higher inherited levels of long-term debt. In a same vein, *Nivorozhkin (2005)* uncovered that, in Estonia and Bulgaria, debt ratios were quite lower in firms with a shareholder retaining the ownership stake over 49.9% than in firms with the largest shareholders holding stakes more than 24.9 but less than 49.9%.

Regarding management ownership of equity, a number of empirical studies focusing on US data such as *Jensen et al., (1992), Bathala et al., (1994)* and *Firth (1995)* found a negative correlation between leverage and management ownership. *Jensen & Meckling (1976)* argue that an increase in management ownership of equity is likely to reduce agency costs arising from the

separation of ownership from control, and to encourage firms' managers to become increasingly risk-averse, thus having greater incentives to decrease the demand for debt.

5. Conclusion and policy implications

This paper investigates the lending behavior by banks and firm financing in Vietnam. Data on 159 listed firms on HOSTC and HASTC in Vietnam spanning from 1998 to 2006 suggest that, on average, the leverage of Vietnamese listed firms remained lower than in developed countries and equal to developing countries, and higher than in some TEs such as Czech Republic, Russia and China. A substantially lower level of long term debt in Vietnamese listed firms than those in developed and TEs may show an indication that firms prefer equity to debt. While short-term debt financed by bank loans serves firms' short-term activities, long-term debt could be considered as a crucial source of capital to finance their long-term investment projects.

Our results on leverage are consistent with those reported by *Perotti & Carare (1997)* that banks in TEs prefer to lend to firms with large trade arrears. Listed firms use more short-term debt to offset trade credit since either trade credit is closely associated with their production or firms impose hard budget constraints on each other. Thus, a further shift of soft budget constraints might be away from trade credit towards bank credit. However, the results from changes in the long-term leverage/total assets equation show that firms increased short-term financing form their suppliers and reduced long-term borrowing from financial institutions during 2004-2006. This is in line with early empirical studies by *Nevorozhkin (2003, 2005)* that there is a substitution between bank credit and trade credit among firms in TEs. Firms with better access to bank credit use less but extend more of trade credit to other firms.

There are signs that more profitable firms are increasing their borrowing from financial institutions. This indicates some improvements in the allocation of credit by banks among Vietnamese listed firms. Better firms issued less equity and used more bank debt to satisfy their needs. Given an underdeveloped securities market and bond markets in an embryonic stage, bank borrowing might be perceived to be a crucial source of capital followed by trade credit, retained earnings, new equity insurance, and possible new debt insurance. This evidence is completely not consistent with those reported by *Chen (2004)* in China and *Delcoure (2006)* in CEECs that retained earnings is the quickest and easiest source of capital followed by new equity insurance, bank borrowing, and possible new debt insurance. However, the findings obtained from changes in leverage/total assets equations during the period 2003-2004 suggest

that leverage is lower for profitable firms and higher for firms with more investments *(Myers & Majluf 1984)*.

We also provide strong evidence for the lending bias hypothesis that banks are more likely to lend to their former clients since they may get the potential repayments of the previous debt *(Perotti 1993)*. The results derived from changes in the long-term leverage/total assets equation across years indicate the lending bias behavior by banks towards long-term loans in 2003, 2004 and 2006. As unexpected, the insignificance of the dummy Own A with all degrees of leverage rejects our hypothesis that commercial banks in Vietnam prefer to expand their loans to SOEs. Interestingly, the effect of Own A on long-term leverage producing a positive value though insignificant allows us to conclude that listed firms with the government-controlling stakes may use less short-term borrowing than long-term borrowing.

Regarding tangibility, our results are in line with those suggested by *Rajan & Zingales (1995)* in developed countries, and *Chen (2004)* and *Delcoure (2006)* in transition economies, who argued that the role of tangible assets could be perceived as collateral in lending decisions. While *Booth et al., (2001)* in developing countries, *Jelic at el,. (1999)* and *Nivorozhkin (2005)* in EU accession countries show mixed results, *Cornelli (1996)*, *Hussain & Nivorozhkin (1997), and Nivorozhkin (2002, 2003, 2004, 2005)* interpreted the negative effect as "maturity matching" of current assets with short-term debt and of fixed assets with long-term debt. However, our results derived from changes in the short-term leverage/total assets equation in 2003 indicate that tangible assets remain a poor source of collateral in TEs.

The positive effect of Vietnamese listed firms' size on overall and short-term leverage indicates that larger firms have limited access to capital markets of equity and bonds, given that bond markets are in very early stage of development and the securities market has not really yet been a place for raising capital due to a limited number of listed firms (only 53 as end of October 2006) and the significant constraint of the legal system governing stock trading transactions in the secondary market. Many privatized firms with sufficient qualifications are illegally trading their shares in the "unregulated free markets" on account of the lower perceived benefits of listing than the perceived costs arising from higher standards of corporate governance and disclosure requirements *(Chun et al., 2003)*.

A remarkable difference between capital structure decisions of Vietnamese listed firms and firms in developed countries and other TEs is that listed firms in Vietnam[26] have a substantially lower amount of long-term debt (only 10.3%) and use more short-term debt than long-term debt. It is the difference that capital structure hypotheses applied to Western settings are likely to restrict their explanatory power in Vietnam. Although certain specific-firm factors related to leverage from modern finance theory are portable in Vietnam even if there are some indications of profound institutional distinctions between Vietnam and Western countries, the modern theories of corporate capital structure derived from the fundamentally institutional assumptions supporting the Western models could not explain the capital structure choices of Vietnamese firms. Unlike the capital structure choices of Chinese listed firms *(retained earnings, equity, then debt)*, the capital structure decisions of Vietnamese listed firms appear to pursue "a modified pecking order" – *bank borrowing, trade credit, retained earnings, equity and market debt.*

Our findings imply that the roles of firm-specific factors correlated with firm's leverage might be undermined by such institutional differences as ownership concentration and the agency problems inheriting from state ownership, corporate governance structure of listed firms, and the legal framework supervising the banking sector, securities markets and firms' operations. Our results show some improvements in the bank-firm relationship in Vietnam. On the one hand, the pecking order model[27] constrains its explanatory power in Vietnam since the effect of profitability and firm size on leverage in our study produces a positive value. These constraints might be explained by the fact that the role of the banking sector as financial intermediation could be found in Vietnam where larger listed firms heavily rely on debt financing rather than on equity even if the former is binding. On the other hand, the capital structure of Vietnamese listed firms has some firm-specific factors similar to those in Western countries. We interpret these similarities as a "possible" sign of a market-based economy. This possibility is more likely to occur when all strategically state-owned General Corporations

[26] *We mention "listed firms" all the time because they do not represent for leverage of the country.*

[27] *The pecking order model argues that firms retain financial slack derived from internally generated funds in order to be able to subsidize projects with positive net present value. Thus more profitable firms will have a lower debt/asset ratio. Regarding firm size, the pecking order hypothesis states that larger firms exhibit lower information asymmetries with financial markets, thus issuing more equity relative to small firms.*

possessing a huge number of workers and typically receiving subsidies from the state budget will be privatized unit 2010. Our inability of getting access to their financial statements because of the lack of publicly informational disclosure could be seen as a limit in this paper. However, this study contributes to the finance literature as groundwork to explore the lending behavior by banks and Vietnamese listed firms' financing on which a more detailed analysis could be based. Further research is needed to focus on the analysis of the degrees of bank borrowing among small and medium-sized enterprises in Vietnam.

Policy implication

The selective approach to reform the SOE sector in Vietnam is equitization. The equitization program on a pilot basis was initiated in 1992. As end of 1997, there were only 25 firms actually equitized. In 1998, the government took a further reform of SOEs by issuing Decree 44/1998/ND-CP in the spirit of providing a new and comprehensive framework for the equitization process. The purpose of Decree 44 was to raise capital from domestic and foreign sources, to develop and improve the competitiveness of enterprises, and to change the structure of SOEs.

All SOEs may be equitized except enterprises producing explosives, radioactive, or toxic chemicals, printing money, and operating in the main components of communication networks. In "strategic" enterprises, the government continues to hold dominant shares and the sale of shares is eligible to all legal entities, citizens, and foreign residents with some limitations. Foreign investors can purchase up to the overall limit of 30% and a maximum of 10 shares (face value of VND100,000) to employees at a discount rate of 30%. No legal entity and individuals can hold more than 10% and 5% of the shares, respectively, in equitized enterprises with controlling or special state shares. However, legal entities and individuals may hold up to 20% and 10%, respectively, in equitized enterprises without controlling state shares.

Decree 44 allows equitized enterprises to continue receiving preferential tax, trade policy treatment, and bank credit on the same preferential terms as SOEs *(IMF 1999)*. Some initial achievements of the equitization program made a great contribution to the development of the stock market. As of July 20, 2000, Ho Chi Minh City Securities Trading Center (HOSTC) was officially opened and only had 2 listed firms[28] eligible to trade their stocks on. All securities are

[28] *Initially, two equity issues were listed, Refrigeration Electrical Engineering Joint Stock Corporation ('REE') and Saigon Cable and Telecommunication Material Joint Stock Company ('SACOM')*

denominated in Vietnamese Dong and their par valued is standardized at VND10,000 for equities and VND100,000 for bonds. The number of listed firms was increased by 21 in June 2003 and 36 (of which there is one investment fund) in June 2006 on HOSTC. In the mean time, Hanoi Securities Trading Center (HASTC) was also established by June 2006, with only 10 listed companies.

During the period of 1993-2005, there have been around 2540 SOEs to be equitized, with the state holding up 46.5% on average, management and employees up 38.10%, and the portion of outsiders of 15.4% *(Ho 2005)*. Despite a large number of equitized enterprises, most of them are not eligible for listing, while many with sufficient qualifications are trading their stocks in the "unregulated free markets" *(Chun et al., 2003)*. This reflects the lack of reliable (audited) financial accounts of firms *(IMF 1999)* and of the legal system governing firms' operations and the securities markets *(Chen 2004)*. Moreover, the majority of equitized SOEs are small and medium-sized, with capital accounts of merely 6-7% of total state capital in SOEs, and the state continues to be dominant in most equitized firms *(Nguyen 2004)*. She made a reference to *Forde (2000)* that the private is not entirely private and the public is not entirely public in Vietnam.

Therefore, the best selective solution to the above problems is to equitize all strategically state-owned General Corporations and attract strategic foreign investors who will make a great contribution to privatized firms' operations. Accordingly, great efforts by regulators on the development of the Vietnam's capital market such as increasing supply of and demand for securities, strengthening market intermediaries and regulatory framework, improving market infrastructure, and building human resource and capacity, as suggested by *Chun et at., (2003)*, will be made.

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APPENDICES

Appendix 1: Resolving autocorrelation for the long-term leverage equation

In order to avoid the problem of endogeneity, we estimate the long-term regression using a Panel 2SLS EGLS (Cross-section random effects) method and obtain Durbin-Watson statistic of 1.3290. This might show strong evidence of autocorrelation that might arise from omitted variables, misspecification or systematic errors in measurement. In order to get BLUE estimators, we resolve the problem of autocorrelation using the *generalized differenced approach*.

Our regression model is given as

$$LTLEV_{it} = \alpha_i + \beta_1 TANG_{it} + \beta_2 TRADE_{it} + \beta_3 PRO_{it} + \beta_4 SIZE_{it} + \beta_5 BDEBT_{it-1} + \sum_{j=1}^{4} \beta_j Ownership_{jit} + \sum_{k=1}^{11} Industry_{kit} + u_{it}$$

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

The estimate of the ρ coefficient is calculated by regressing Resid01, which comes from the residuals of the original regression, on Resid01(-1). The result provides us with $\rho = 0.7460$. By the application of the generalized differencing approach, we transform the selected variables for the first observations in the sample of 1998-1998 as follows:

$$LTLEV = \left((1-\rho\,\hat{}\,2)\hat{}\,(0.5)\right) * \left(\frac{LTLEV}{TA}\right)$$

$$TANG = \left((1-\rho\,\hat{}\,2)\hat{}\,(0.5)\right) * \left(\frac{Fixed\ assets + Inventories}{TA}\right)$$

$$TRADE = \left((1-\rho\,\hat{}\,2)\hat{}\,(0.5)\right) * \left(\frac{Trade\ credit}{TA}\right)$$

$$PRO = \left((1-\rho\,\hat{}\,2)\hat{}\,(0.5)\right) * \left(\frac{Profit\ before\ tax}{TA}\right)$$

$$SIZE = \left((1-\rho\,\hat{}\,2)\hat{}\,(0.5)\right) * Log\left(total\ assets\right)$$

$$BDEBT = \left((1-\rho\,\hat{}\,2)\hat{}\,(0.5)\right) * \left(\frac{bank\ debt}{TA}\right)$$

Then the variables for observations 1999 to 2006 are transformed as

$$LTLEV = \left(\frac{LTLEV}{TA}\right) - \rho * \left(\frac{LTLEV}{TA}\right)(-1)$$

$$TANG = \left(\frac{Fixed\ assets + Inventories}{TA}\right) - \rho * \left(\frac{Fixed\ assets + Inventories}{TA}\right)(-1)$$

$$TRADE = \left(\frac{Trade\ credit}{TA}\right) - \rho * \left(\frac{Trade\ credit}{TA}\right)(-1)$$

$$PRO = \left(\frac{Profit\ before\ tax}{TA}\right) - \rho * \left(\frac{Profit\ before\ tax}{TA}\right)(-1)$$

$$SIZE = Log\left(total\ assets\right) - \rho * Log\left(total\ assets\right)(-1)$$

$$BDEBT = \left(\frac{Bank\ debt}{TA}\right) - \rho * \left(\frac{Bank\ debt}{TA}\right)(-1)$$

Finally, we estimate the generalized differenced equation with newly-created variables for the whole sample (1998-2006) to obtain the results for the long-term leverage regression in Table 6.

Appendix 2: Chow's test for poolability across time for three different degrees of leverage

Case 1: Overall leverage equation

Our basically overall leverage model is given as

$$\Delta LEV = \delta + \gamma_1 + \gamma_2 + \gamma_3 + \gamma_4 + \gamma_5 + \varepsilon_i$$

$$LEV_{it} = \alpha_i + \beta_1 TANG_{it} + \beta_2 TRADE_{it} + \beta_3 PRO_{it} + \beta_4 SIZE_{it} + \beta_5 BDEBT_{it} + u_{it} \qquad (1)$$

Where $i = 1, 2, ..., 159$ $(N = 159)$ indexes cross-sectional dimension and $t = 1998, ..., 2006$ $(T = 9)$ denotes the time dimension. We use Chow's test for poolability under the null hypothesis as

$H_0 : \beta_i = \beta$ *for* $i = 1998, ..., 2006$

$$F = \frac{\frac{(RRSS - URSS)}{(T-1)K'}}{\frac{URSS}{T(N-K')}} \sim F\left[(T-1)K', T(N-K')\right]$$

The restricted residual sum of squares $(RRSS = 12.65659)$ is obtained from the pooled OLS overall leverage regression (1), and the unrestricted residual sum of squares $(URSS = 4.574263)$ is derived from the sum of the RSS from 9 OLS cross-section regressions, one for each year *(see Baltagi 2005, page 57 for details)*. $K' = 6$ is the number of explanatory variables plus an intercept. Chow's test for poolability across time giving an observed *F-statistic* of 15.481, which is distributed as $F(48,1377)$, is significant at the 5% level and suggests a rejection of poolability across time.

Case 2: Long-term leverage equation

Our basically overall leverage model is given as

$$LTLEV_{it} = \alpha_i + \beta_1 TANG_{it} + \beta_2 TRADE_{it} + \beta_3 PRO_{it} + \beta_4 SIZE_{it} + \beta_5 BDEBT_{it} + u_{it} \qquad (2)$$

$H_0 : \beta_i = \beta$ *for* $i = 1998, ..., 2006$ $F = 5.2016$ (Reject H_0)

Case 3: Short-term leverage equation

Our basically overall leverage model is given as

$$STLEV_{it} = \alpha_i + \beta_1 TANG_{it} + \beta_2 TRADE_{it} + \beta_3 PRO_{it} + \beta_4 SIZE_{it} + \beta_5 BDEBT_{it} + u_{it} \qquad (3)$$

$H_0 : \beta_i = \beta$ *for* $i = 1998, ..., 2006$, $F = 8.5595$ (Reject H_0)

Table 1: Summaries of capital structure theories and some their empirical evidence

Determinants	Predicted sign by theories	Empirical evidence
Tangibility	Trade off (+) Pecking order (+)	Chung (1993), Walsh & Ryan (1997), Chen (2004), and this study
	(-)	Cornel et al., (1996), Nivirozhkin (2003, 2005), this study
Trade credit	(-)	Nivorozhkin (2003, 2005) This study
	(+)	This study
Profitability	Pecking order (-)	Gordon (1995), Rajan & Zingales (1995), Wald (1999), Shyam-Sunder & Myers (1999), Chen (2004), Delcoure (2006), this study
	Trade off (+)	This study
Size	Tradeoff, signaling (+)	Rajan & Zingales (1995), Wald (1999), Nivorozhkin (2003, 2005), this study
	Pecking order (-)	Titman & Wessels (1988), Chen (2004), this study
Lagged bank debt	(+)	This study
	(-)	This study
Ownership	(+)	Berger et al., (1997), Firth (1995), Jelic (1999)[29], this study
	(-)	Jensen et al., (1992), Bathala et al., (1994), Firth (1995), Nivorozhkin (2005), Jelic et al., (1999), this study

[29] *Jelic et al., (1999) reported positive coefficients for short-term debt ratios and negative coefficients for total- and long-term debt ratios.*

Table 2: Summary statistics of selected variables

Table shows the mean, standard deviation, minimum and maximum of size and some selected financial ratios of the non-financial listed firms in Vietnam: overall leverage (LEV), measured as the ratio of total liabilities to total assets; long-term leverage (LTLEV), defined as the ratio of total long-term liabilities to total assets; short-term leverage (STLEV), defined as the ratio of total short-term liabilities to total assets; tangibility (TANG), measured as the ratio of the sum of fixed assets and inventories to total assets; trade credit (TRADE), measured as the ratio of trade credit to total assets; profitability (PROF), defined as the ratio of pre-tax profit to total assets; firm size (SIZE) is the natural logarithm of total assets in billion dong; and lagged bank debt (BDEBT), measured as the ratio of bank debt to total assets. Own A takes the value of 1 for firms with state ownership between 50% and 100%, 0 otherwise; Own B takes the value of 1 for firms with state ownership between 25% and 50% , 0 otherwise; Own C takes the value of 1 for firms with state ownership between 0 and 25%, and FOR takes the value of 1 for firms with foreign ownership between 50-100%. The industry dummies include IND1 to IND11.

Variable	Count	Mean	SD	Minimum	Maximum
LEV	559	0.51	0.43	0.04	7.50
LTLEV	559	0.10	0.14	0.00	0.72
STLEV	559	0.40	0.42	0.01	7.76
TANG	559	0.54	0.28	0.01	4.62
TRADE	559	0.09	0.13	0.00	1.75
PRO	559	0.12	0.20	-0.20	2.63
SIZE	559	11.74	1.23	8.63	16.19
BDEBT	559	0.23	0.30	0.00	4.19
OWNA	559	0.23	0.42	0.00	1.00
OWNB	559	0.25	0.43	0.00	1.00
OWNC	559	0.35	0.47	0.00	1.00
FOR	559	0.02	0.14	0.00	1.00
IND1	559	0.05	0.22	0.00	1.00
IND2	559	0.06	0.24	0.00	1.00
IND3	559	0.10	0.30	0.00	1.00
IND4	559	0.21	0.40	0.00	1.00
IND5	559	0.18	0.39	0.00	1.00
IND6	559	0.09	0.29	0.00	1.00
IND7	559	0.04	0.20	0.00	1.00
IND8	559	0.01	0.11	0.00	1.00
IND9	559	0.08	0.27	0.00	1.00
IND10	559	0.05	0.21	0.00	1.00
IND11	559	0.01	0.11	0.00	1.00

Table 3: Correlation Matrix of Overall Leverage

	LEV	TANG	TRADE	PROF	SIZE	BDEBT	OWNA	OWNB	OWNC	FOR	IND1	IND2	IND3	IND4	IND5	IND6	IND7	IND8	IND9	IND 10
LEV	1.00																			
TANG	0.66***	1.00																		
TRADE	0.69***	0.44***	1.00																	
PRO	0.25	0.20	0.01	1.00																
SIZE	0.04	-0.03	-0.07	-0.19	1.00															
BDEBT	0.59***	0.46***	0.43***	-0.11	0.14	1.00														
OWNA	-0.05	0.09	-0.04	-0.04	0.20	0.01	1.00													
OWNB	-0.07	-0.04	-0.08	-0.02	-0.17	-0.11	-0.32	1.00												
OWNC	0.10	-0.03	0.07	0.07	-0.01	0.06	-0.41	-0.44	1.00											
FOR	0.003	0.03	-0.02	-0.04	0.14	0.02	-0.08	-0.08	0.19	1.00										
IND1	-0.02	-0.11	0.002	0.01	-0.03	-0.006	-0.09	-0.14	0.29	-0.03	1.00									
IND2	-0.09	0.03	-0.04	-0.02	-0.15	-0.06	0.31	-0.05	-0.16	-0.03	-0.06	1.00								
IND3	-0.03	0.03	0.04	-0.03	0.09	-0.02	-0.06	-0.09	0.07	-0.05	-0.08	-0.09	1.00							
IND4	-0.01	-0.03	-0.001	0.01	-0.01	-0.02	-0.19	0.11	0.11	0.13	-0.12	-0.13	-0.17	1.00						
IND5	0.14	0.11	0.07	-0.09	0.08	0.21	0.11	-0.04	0.07	0.02	-0.11	-0.12	-0.16	-0.25	1.00					
IND6	-0.01	0.03	-0.07	-0.05	0.10	0.02	0.22	-0.07	-0.08	0.03	-0.07	-0.08	-0.10	-0.16	-0.15	1.00				
IND7	-0.03	0.01	-0.01	0.09	-0.06	-0.002	0.007	0.15	-0.08	-0.03	-0.05	-0.05	-0.07	-0.11	-0.10	-0.06	1.00			
IND8	0.01	0.02	0.07	-0.006	0.09	-0.002	0.004	0.13	-0.08	-0.01	-0.02	-0.03	-0.04	-0.06	-0.05	-0.03	-0.02	1.00		
IND9	0.07	0.01	-0.04	0.14	-0.03	-0.10	0.007	-0.10	0.10	-0.04	-0.07	-0.07	-0.10	-0.15	-0.14	-0.09	-0.06	-0.03	1.00	
IND10	-0.04	-0.09	-0.02	0.02	0.02	-0.12	-0.08	0.31	-0.17	-0.03	-0.05	-0.06	-0.07	-0.11	-0.11	-0.07	-0.04	-0.02	-0.06	1.00
IND11	-0.11	0.03	-0.07	-0.02	-0.15	-0.09	-0.06	0.20	-0.08	-0.01	-0.02	-0.03	-0.04	-0.06	-0.05	-0.03	-0.02	-0.01	-0.03	-0.02

*Notes: *, **, *** denote an estimate significantly different from zero at 10%, 5%, and 1% level, respectively.*

Table 4: Correlation Matrix of Long-term Leverage

	LTLEV	TANG	TRADE	PROF	SIZE	BDEBT	OWNA	OWNB	OWNC	FOR	IND1	IND2	IND3	IND4	IND5	IND6	IND7	IND8	IND9	IND 10
LTLEV	1.00																			
TANG	0.30**	1.00																		
TRADE	0.02	0.62***	1.00																	
PRO	0.08	0.23	0.05	1.00																
SIZE	0.09	-0.13	-0.13	-0.18	1.00															
BDEBT	0.35**	0.49***	0.54***	-0.01	-0.01	1.00														
OWNA	0.09	0.04	-0.02	-0.06	0.06	-0.004	1.00													
OWNB	-0.08	-0.006	-0.01	0.003	-0.07	-0.03	-0.32	1.00												
OWNC	-0.02	-0.005	0.01	0.04	0.07	0.03	-0.41	-0.44	1.00											
FOR	-0.05	0.04	-0.005	-0.07	0.08	0.003	-0.08	-0.08	0.19	1.00										
IND1	-0.04	-0.01	-0.01	0.04	0.004	-0.004	-0.09	-0.14	0.29	-0.03	1.00									
IND2	0.01	0.02	-0.03	-0.01	-0.13	-0.03	0.31	-0.05	-0.16	-0.03	-0.06	1.00								
IND3	0.04	-0.004	0.03	-0.009	0.03	0.002	-0.06	-0.09	0.07	-0.05	-0.08	-0.09	1.00							
IND4	-0.06	-0.01	0.003	-0.01	0.02	-0.005	-0.19	0.11	0.11	0.13	-0.12	-0.13	-0.17	1.00						
IND5	0.04	0.01	0.006	-0.01	-0.004	0.06	0.11	-0.04	0.07	0.02	-0.11	-0.12	-0.16	-0.25	1.00					
IND6	0.09	0.02	-0.03	-0.05	0.05	0.02	0.22	-0.07	-0.08	0.03	-0.07	-0.08	-0.10	-0.16	-0.15	1.00				
IND7	0.01	-0.001	-0.001	0.05	0.03	0.01	0.007	0.15	-0.08	-0.03	-0.05	-0.05	-0.07	-0.11	-0.10	-0.06	1.00			
IND8	-0.03	0.01	0.04	-0.01	0.06	0.05	0.004	0.13	-0.08	-0.01	-0.02	-0.03	-0.04	-0.06	-0.05	-0.03	-0.02	1.00		
IND9	0.01	0.008	-0.001	0.04	0.03	-0.02	0.007	-0.10	0.10	-0.04	-0.07	-0.07	-0.10	-0.15	-0.14	-0.09	-0.06	-0.03	1.00	
IND10	-0.07	-0.03	0.001	0.01	0.02	-0.05	-0.08	0.31	-0.17	-0.03	-0.05	-0.06	-0.07	-0.11	-0.11	-0.07	-0.04	-0.02	-0.06	1.00
IND11	-0.02	0.01	-0.01	-0.002	-0.06	-0.02	-0.06	0.20	-0.08	-0.01	-0.02	-0.03	-0.04	-0.06	-0.05	-0.03	-0.02	-0.01	-0.03	-0.02

*Notes: *, **, *** denote an estimate significantly different from zero at 10%, 5%, and 1% level, respectively.*

Table 5: Correlation Matrix of Short-term Leverage

	STLEV	TANG	TRADE	PROF	SIZE	BDEBT	OWNA	OWNB	OWNC	FOR	IND1	IND2	IND3	IND4	IND5	IND6	IND7	IND8	IND9	IND 10
STLEV	1.00																			
TANG	0.59***	1.00																		
TRADE	0.77***	0.44***	1.00																	
PRO	0.23	0.20	0.01	1.00																
SIZE	-0.03	-0.03	-0.07	-0.19	1.00															
BDEBT	0.47***	0.46***	0.43***	-0.11	0.14	1.00														
OWNA	-0.12	0.09	-0.04	-0.04	0.20	0.01	1.00													
OWNB	-0.02	-0.004	-0.08	-0.02	-0.17	-0.11	-0.32	1.00												
OWNC	0.14	-0.03	0.07	0.07	-0.01	0.06	-0.41	-0.44	1.00											
FOR	0.02	0.03	-0.02	-0.04	0.14	0.02	-0.08	-0.08	0.19	1.00										
IND1	0.01	-0.11	0.004	0.01	-0.03	-0.006	-0.09	-0.14	0.29	-0.03	1.00									
IND2	-0.08	0.03	-0.04	-0.02	-0.15	-0.06	0.31	-0.05	-0.16	-0.03	-0.06	1.00								
IND3	-0.03	0.003	0.04	-0.03	0.09	-0.02	-0.06	-0.09	0.07	-0.05	-0.08	-0.09	1.00							
IND4	0.004	-0.03	-0.001	0.01	-0.01	-0.02	-0.19	0.11	0.11	0.13	-0.12	-0.13	-0.17	1.00						
IND5	0.09	0.11	0.07	-0.09	0.08	0.21	0.11	-0.04	0.07	0.02	-0.11	-0.12	-0.16	-0.25	1.00					
IND6	-0.05	0.03	-0.07	-0.05	0.10	0.02	0.22	-0.07	-0.08	0.03	-0.07	-0.08	-0.10	-0.16	-0.15	1.00				
IND7	-0.01	0.01	-0.01	0.09	-0.06	-0.002	0.007	0.15	-0.08	-0.03	-0.05	-0.05	-0.07	-0.11	-0.10	-0.06	1.00			
IND8	0.03	0.02	0.07	-0.006	0.09	-0.002	0.004	0.13	-0.08	-0.01	-0.02	-0.03	-0.04	-0.06	-0.05	-0.03	-0.02	1.00		
IND9	0.06	0.01	-0.04	0.14	-0.03	-0.10	0.007	-0.10	0.10	-0.04	-0.07	-0.07	-0.10	-0.15	-0.14	-0.09	-0.06	-0.03	1.00	
IND10	0.001	-0.09	-0.02	0.02	0.02	-0.12	-0.08	0.31	-0.17	-0.03	-0.05	-0.06	-0.07	-0.11	-0.11	-0.07	-0.04	-0.02	-0.06	1.00
IND11	-0.09	0.03	-0.07	-0.02	-0.15	-0.09	-0.06	0.20	-0.08	-0.01	-0.02	-0.03	-0.04	-0.06	-0.05	-0.03	-0.02	-0.01	-0.03	-0.02

*Notes: *, **, *** denote an estimate significantly different from zero at 10%, 5%, and 1% level, respectively.*

Table 6: Panel 2SLS EGLS (Cross-section random effects) results

	Overall leverage			Long-term leverage (1)			Short-term leverage		
Variable	Coefficient	t-value	Prob.	Coefficient	t-value	Prob.	Coefficient	t-value	Prob.
TANG	0.3819	4.05***	0.0001	0.1422	5.63***	0.0000	0.2181	2.47**	0.0140
TRADE	1.4289	13.80***	0.0000	0.0105	0.10	0.9187	1.6521	17.09***	0.0000
PRO	1.5014	11.65***	0.0000	0.1536	3.30***	0.0011	1.3716	12.14***	0.0000
SIZE	0.0006	0.02	0.9786	0.0284	2.93***	0.0037	-0.0342	-1.43	0.1516
BDEBT(-1)	1.0014	3.48***	0.0006	0.1690	1.10	0.2704	1.1046	3.83***	0.0002
OWNA	-0.0772	-0.65	0.5112	0.0097	0.38	0.7035	-0.0446	-0.37	0.7088
OWNB	0.1039	1.01	0.3101	0.0100	0.47	0.6342	0.1770	1.70*	0.0898
OWNC	0.0832	0.87	0.3838	0.0207	0.96	0.3354	0.1204	1.24	0.2135
FOR	0.0702	0.45	0.6466	-0.0272	-0.88	0.3784	0.1837	1.16	0.2463
Intercept	-0.3363	-1.26	0.2065	-0.0820	-2.44**	0.0152	0.0131	0.04	0.9609
R-squared	0.8833			0.2245			0.8693		
F-stat.	257.3			30.8			268.4		
	[0.0000]			[0.0000]			[0.0000]		
D-W	1.8477			2.1245			2.0572		
VIF	8.568			1.2894			7.6511		
Instrument rank	21.00000			21.00000			21.00000		

Notes: *, **, *** *denote an estimate significantly different from zero at 10%, 5%, and 1% level, respectively. The regressions are estimated using* Panel 2SLS EGLS (Cross-section random effects) *method in the context of Wallace and Hussain estimator of component variances with total panel (unbalanced) observations of 241 (loss of degree of freedom due to the lagged bank debt). The instrument list is comprised of the second lag bad debt, BDEBT(-2) and all other explanatory variables. Alternatively, we can substitute CASH (-1) for the second lagged bank debt as an instrument variable and obtain 400 observations. In this sense, the results remain unchanged except for the short-term leverage equation.*
(1) The long-term leverage regressions are estimated using the transformed variables. F-Statistics are reported in squared brackets.

Table 7: Three different estimators of overall leverage equation

Dependent variable: Overall leverage			
Independent variables	Fixed effects	Random effects	Pooled OLS
TANG	0.378337 (3.261098)***	0.383228 (4.501455)***	0.416257 (5.934340)***
TRADE	0.892677 (4.305343)***	1.435611 (15.35959)***	1.413366 (17.18703)***
PRO	1.666227 (12.37320)***	1.480110 (12.10988)***	1.148075 (8.752947)***
SIZE	0.041479 (0.961414)	-0.002822 (-0.130955)	-0.002932 (-0.205234)
BDEBT(-1)	0.381297 (0.903552)	1.001445 (3.905310)***	0.846393 (5.223976)***
Intercept	-0.548203 (-1.133556)	-0.206241 (-0.849941)	-0.130386 (-0.788190)
Total panel (unbalanced) observations	241	241	241
R-squared	0.959043	0.874837	0.848357
F-statistic	47.49543 [0.000000]	303.5642 [0.000000]	202.3474 [0.000000]
Durbin-Watson stat.	2.030959	1.717572	0.761418
Hausman statistic chi2(5) = 7.167045. Fail to reject H_0 at all significant levels. H_0: RE estimator is consistent			

Notes: *, **, *** *denote an estimate significantly different from zero at 10%, 5%, and 1% level, respectively. The regressions are estimated using* Panel two-stage least square (2SLS) method *for three different estimators of overall leverage equation – Pooled OLS, fixed and random effects. The instrument list is comprised of the second lag bad debt, BDEBT(-2) and all other explanatory variables.*

Table 8: Three different estimators of long-term leverage equation

Dependent variable: Long-term leverage			
Independent variables	Fixed effects	Random effects	Pooled OLS
TANG	0.111280 (2.709106)***	0.141864 (5.698271)***	0.141864 (5.454420)***
TRADE	-0.047910 (-0.690355)	0.035651 (0.332234)	0.035651 (0.318017)
PROF	0.189857 (2.785013)***	0.142870 (3.102927)***	0.142870 (2.970140)***
SIZE	0.030121 (1.871589)*	0.024866 (2.773264)***	0.024866 (2.654585)***
BDEBT(-1)	0.017727 (0.064841)	0.200194 (1.233425)	0.200194 (1.180642)
Intercept	-0.090700 (-1.786239)*	-0.088123 (-3.284250)***	-0.088123 (-3.143704)***
Total panel (unbalanced) observations	241	241	241
R-squared	0.484141	0.158048	0.158048
F-statistic	18.85019 [0.000000]	35.62449 [0.000000]	35.51947 [0.000000]
Durbin-Watson stat.	2.721562	2.020912	2.020912
Hausman statistic chi2(5) = 4.928447. Fail to reject H_0: RE estimator is consistent			

Notes: *, **, *** *denote an estimate significantly different from zero at 10%, 5%, and 1% level, respectively. The regressions are estimated using* Panel two-stage least square (2SLS) method *for three different estimators of long-term leverage equation – Pooled OLS, fixed and random effects. The instrument list is comprised of the second lag bad debt, BDEBT(-2) and all other explanatory variables.*

Table 9: Three different estimators of short-term leverage equation

Dependent variable: Short-term leverage			
Independent variables	Fixed effects	Random effects	Pooled OLS
Tangibility	0.260701 (2.651640)***	0.226444 (2.797822)***	0.290104 (4.129388)***
Trade credit	0.978809 (5.570551)***	1.647185 (18.56330)***	1.625423 (19.73488)***
Profitability	1.427762 (12.51095)***	1.340422 (12.35503)***	1.008404 (7.676097)***
Size	0.001982 (0.054209)	-0.038586 (-1.740510)*	-0.023707 (-1.656809)*
Bank debt (-1)	0.551679 (1.542634)	1.083331 (4.125032)***	0.746653 (4.601187)***
Intercept	-0.112603 (-0.274750)	0.186641 (0.753481)	0.113492 (0.684995)
Total panel (unbalanced) observations	241	241	241
R-squared	0.970932	0.860304	0.849673
F-statistic	53.11411 [0.000000]	318.3888 [0.000000]	232.2877 [0.000000]
Durbin-Watson stat.	2.334069	1.889362	0.591280
Hausman statistic chi2(5) = 8.492731. Can't reject H_0 : RE estimator is consistent			

Notes: *, **, *** *denote an estimate significantly different from zero at 10%, 5%, and 1% level, respectively. The regressions are estimated using* Panel two-stage least square (2SLS) method *for three different estimators of short -term leverage equation – Pooled OLS, fixed and random effects. The instrument list is comprised of the second lag bad debt, BDEBT(-2) and all other explanatory variables.*

Table 10: Changes in the ratio of overall leverage to total assets $\Delta\left(\frac{overall\ leverage}{Total\ assets}\right)$ across years (2003-2006)

Years	$\Delta TANG$	$\Delta TRADE$	ΔPRO	$\Delta SIZE$	$\Delta BDEBT$	intercept	Count	R^2	D-W	$F.stat$
2006-2005	0.191766	1.173186	0.012744	0.036126	0.451951	-0.044606	159	0.974203	1.944316	1155.575
	(3.503085)***	(16.11687)***	(0.288910)	(1.178199)	(7.883387)***	(-5.328470)				[0.000000]
2005-2004	0.271656	0.377362	-0.365250	0.012096	0.029810	-0.021250	71	0.194179	1.997891	3.132623
	(2.747946)***	(1.578959)	(-1.227800)	(0.386100)	(1.069808)	(-1.478726)				[0.013542]
2004-2003	-0.081079	0.472450	-0.963665	0.148712	0.393453	-0.018084	50	0.680269	1.691929	18.72313
	(-1.138517)	(3.457046)***	(-4.738351)***	(3.257496)***	(4.712448)***	(-1.639724)				[0.000000]
2003-2002	-0.025089	0.041693	-0.586169	0.364233	-0.081419	-0.029674	36	0.755830	2.167828	18.57307
	(-0.241627)	(0.196281)	(-3.088993)***	(5.485679)***	(-0.521046)	(-2.863140)				[0.000000]

Notes:, **, *** denote an estimate significantly different from zero at 10%, 5% and 1%, respectively. The dependent variable is the change in overall leverage/total assets ratios for the corresponding years. The probability of F-statistic is reported in square brackets and t-value is in parentheses. $\Delta TANG$ is the change in the ratios of the sum of fixed assets and inventories to total assets, $\Delta TRADE$ is the change in trade credit/total assets ratios, ΔPRO is the change in pre-tax profit/total assets ratios, $\Delta SIZE$ is the change in the size of enterprises, and $\Delta BDEBT$ is the change in bank debt/total assets ratios.*

Table 11: Changes in the ratio of long-term leverage to total assets $\Delta\left(\frac{long-term\ leverage}{Total\ assets}\right)$ across years (2001-2005)

Years	$\Delta TANG$	$\Delta TRADE$	ΔPRO	$\Delta SIZE$	$\Delta BDEBT$	intercept	Count	R^2	D-W	$F.stat$
2006-2005	-0.023116	-0.546946	-0.042091	0.012624	0.361077	-0.002436	159	0.370087	2.229006	17.97815
	(-0.480024)	(-7.711751)***	(-0.832226)	(1.125916)	(8.389884)***	(-0.203215)				[0.000000]
2005-2004	-0.124840	-0.349495	-0.256579	0.050795	-0.012531	-0.050160	71	0.186120	1.796390	2.972878
	(-1.456652)	(-1.893333)*	(-1.350986)	(2.679019)***	(-0.529760)	(-2.892278)				[0.017723]
2004-2003	0.056990	-0.227901	-0.269864	-0.026687	0.320545	0.005338	50	0.700017	1.812088	20.53496
	(0.782157)	(-2.595728)**	(-2.626015)***	(-1.195792)	(4.538870)***	(0.361269)				[0.000000]
2003-2002	0.048166	0.083778	-0.266167	0.036114	0.244554	-0.004315	36	0.495156	1.722731	5.884867
	(0.790342)	(0.581475)	(-1.252547)	(1.650981)*	(2.512169)**	(-0.330724)				[0.000665]

Notes:, **, *** denote an estimate significantly different from zero at 10%, 5% and 1%, respectively. The dependent variable is the change in long-term leverage/total assets ratios for the corresponding years. The probability of F-statistic is reported in square brackets and t-value is in parentheses. $\Delta TANG$ is the change in the ratios of the sum of fixed assets and inventories to total assets, $\Delta TRADE$ is the change in trade credit/total assets ratios, ΔPRO is the change in pre-tax profit/total assets ratios, $\Delta SIZE$ is the change in the size of enterprises, and $\Delta BDEBT$ is the change in bank debt/total assets ratios.*

Table 12: Changes in the ratio of short-term leverage to total assets $\Delta\left(\frac{short-term\ leverage}{Total\ assets}\right)$ across years (2001-2005)

Years	$\Delta TANG$	$\Delta TRADE$	ΔPRO	$\Delta SIZE$	$\Delta Baddebt$	intercept	Count	R^2	D-W	$F.stat$
2006-2005	0.200514 (2.650191)***	1.556581 (15.47171)***	0.016462 (0.270017)	0.008880 (0.209541)	0.188620 (2.380469)**	-0.029883 (-2.582809)	159	0.957323	2.115889	686.4115 [0.000000]
2005-2004	0.180875 (2.305046)**	0.223973 (1.180643)	-0.235952 (-0.999246)	-0.102485 (-4.121277)***	0.051728 (2.338742)**	0.020603 (1.806209)	71	0.308714	2.153345	5.805529 [0.000172]
2004-2003	0.115635 (1.119567)	0.842411 (4.250155)***	-0.328322 (-1.113096)	0.076029 (1.148278)	0.039612 (0.327125)	-0.017770 (-1.110913)	50	0.419263	2.175456	6.353167 [0.000161]
2003-2002	-0.226861 (-1.831315)*	0.464909 (1.834472)*	-0.375544 (-1.658774)*	0.293576 (3.705989)***	0.104163 (0.558717)	-0.029485 (-2.384463)	36	0.722678	2.287305	15.63546 [0.000000]

Notes:, **, *** denote an estimate significantly different from zero at 10%, 5% and 1%, respectively. The dependent variable is the change in short-term leverage/total assets ratios for the corresponding years. The probability of F-statistic is reported in square brackets and t-value is in parentheses. $\Delta TANG$ is the change in the ratios of the sum of fixed assets and inventories to total assets, $\Delta TRADE$ is the change in trade credit/total assets ratios, ΔPRO is the change in pre-tax profit/total assets ratios, $\Delta SIZE$ is the change in the size of enterprises, and $\Delta Baddebt$ is the change in bank debt/total assets ratios.*

Table 13: Unbalanced Panel OLS regressions of mean values of leverage

Variable	Model I Coefficient (t-value)	Model II Coefficient (t-value)	Model III Coefficient (t-value)	Model IV Coefficient (t-value)	Model V Coefficient (t-value)
DCPS	0.0454 (2.691276)***				
GFDI	-4.1407 (-18.10942)***		-3.4879 (-10.94232)***	-4.0700 (-17.45791)***	-3.4944 (-10.42071)***
MCAP	-0.0557 (-0.250006)			-0.0809 (-0.362704)	-0.1372 (-0.616608)
BLR		0.6970 (7.463894)***			
DCSS		0.8414 (13.76569)***	0.3225 (3.791890)***		0.2421 (2.721093)***
CAB		-0.0023 (-2.930223)***			
INFL			-0.0020 (-4.904018)***		
NPL				-0.1569 (-1.946109)*	
INT					-0.0023 (-1.865115)*
R-squared	0.378568	0.305067	0.401276	0.374725	0.379484
F-Stat.	112.6997 [0.000000]	81.21288 [0.000000]	123.9903 [0.000000]	110.8700 [0.000000]	84.70140 [0.000000]
D-W	2.451660	2.533337	2.455084	2.451748	2.423243
Count	559	559	559	559	559

Notes: *, **, *** *denote an estimate significantly different from zero at 10%, 5%, and 1% level, respectively. The probability of F-test is in square brackets and t-statistics are in round brackets. The dependent variable is the mean ratio of total liabilities to total assets (LEV). The explanatory variables include domestic credit to private sector, % of GDP (DCPS); gross foreign direct investment inflows, % of GDP (GFDI); market capitalization of listed companies, % of GDP (MCAP); the ratio of bank liquid reserves to bank assets (BLR); domestic credit to state sector, % of GDP (DCSS); current account balance, % of GDP (CAB); inflation, annual % (INFL); non-performing loans to total bank loans ratio (NPL); and the lending rates (INT). The models are estimated using OLS estimation. The sample includes 159 listed companies during the period of 1998-2006.*

Table 14: Overall leverage ratios

Ratios	1998	1999	2000	2001	2002	2003	2004	2005	2006	All year
Mean	0.424	0.604	0.613	0.428	0.421	0.517	0.520	0.512	0.517	0.510
Median	0.492	0.455	0.488	0.408	0.446	0.516	0.529	0.521	0.483	0.504
SD	0.236	0.943	0.828	0.193	0.204	0.232	0.211	0.223	0.597	0.436
Minimum	0.054	0.053	0.061	0.055	0.076	0.069	0.059	0.058	0.046	0.046
Maximum	0.725	4.637	4.217	0.818	0.809	0.981	0.928	0.947	7.505	7.505
Count	10	21	22	29	36	51	72	159	159	559

Table 15: Long-term leverage ratios

Ratios	1998	1999	2000	2001	2002	2003	2004	2005	2006	All year
Mean	0.031	0.064	0.065	0.056	0.068	0.099	0.113	0.118	0.115	0.103
Median	0.007	0.022	0.015	0.018	0.027	0.050	0.060	0.047	0.046	0.044
SD	0.051	0.129	0.137	0.087	0.087	0.132	0.141	0.162	0.160	0.146
Minimum	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Maximum	0.141	0.579	0.628	0.373	0.325	0.682	0.715	0.725	0.670	0.725
Count	10	21	22	29	36	51	72	159	159	559

Table 16: Short-term leverage ratios

Ratios	1998	1999	2000	2001	2002	2003	2004	2005	2006	All year
Mean	0.445	0.539	0.548	0.370	0.352	0.416	0.404	0.380	0.398	0.402
Median	0.504	0.450	0.449	0.370	0.325	0.403	0.415	0.390	0.323	0.379
SD	0.212	0.826	0.705	0.196	0.201	0.226	0.213	0.206	0.623	0.427
Minimum	0.032	0.050	0.047	0.044	0.068	0.010	0.052	0.036	0.021	0.010
Maximum	0.718	4.058	3.588	0.806	0.801	0.888	0.867	0.874	7.766	7.766
Count	10	21	22	29	36	51	72	159	159	559