THE IMPACTS OF FINANCIAL DEVELOPMENT ON ECONOMIC ACTIVITIES IN VIETNAM

By

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ABSTRACT

This thesis examines the impacts of financial development on economic activities in Vietnam at both the macro and the micro level in three core chapters. The first core chapter examines the role of financial development in growth and sources of growth in Vietnam by using the provincial panel data. It shows that financial development has a positive influence on the efficiency of using savings, on the quantity and quality of investment, on productivity, and hence growth. It also finds that there is an indirect impact of financial development on growth mainly through increasing the quality of foreign direct investment rather than the quantity.

The following chapter analyses the determinants of household financial development and its role in economic activities of Vietnamese households by using the Household Data Survey. It suggests that the social relationship, location, fixed assets, household size, education, age and Kinh group are the key determinants of household financial development. Moreover, financial development contributes to household income through improving the level of savings and investment, labour productivity and reducing the problem of asymmetric information. Financial development is positively related to household welfare.

The final core chapter looks at the impacts of financial development on firm performance in Vietnam by using the Firm Data Survey. It suggests that around 80.7% of Vietnamese firms lie between 0% and 20% in the efficiency scores derived from the DEA technique for 1,886 firms. Financial development plays a key role in firm performance. Smaller firms benefit more from the higher level of financial development.

DECLARATION

I assure that this thesis does not contain any material which has been accepted for the award of another degree or diploma in any university or another tertiary institution, and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

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Nguyen Dinh Phan (Phan Dinh Nguyen)

07th December, 2008

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CHAPTER I

INTRODUCTION

The relationship between financial development and economic activities has been analysed by many papers, but the issue is inconclusive. Many researchers such as Goldsmith (1969), King and Leveine (1993), Levine (1992, 1993, 1997, 1998, 1999), Guiso et al. (2004), and Hasan et al. (2006) argue that financial development plays an important role in economic activities, while others such as Lucas (1988), Loayza and Ranciere (2001) do not accept the role of the financial system in economic activities. They argue that problems can occur and lead to economic difficulties if there are financial crises. Financial crises in Argentina in the late 1990s and Asia during the period 1997-1999 are clear evidence of those difficulties. Therefore, it is necessary to have more research to clarify the link between financial development and economic activities.

Moreover, studies regarding the link between financial development and economic activities have a number of limitations in the existing literature. At the macro level, the impacts of financial development on economic growth and its sources of growth have been examined, but some channels of transmission from financial development to growth such as the efficiency of investment, the efficiency of using savings, and information technology have not been analysed. The existing literature has not clarified the role of financial development in foreign direct investment (FDI). In addition, the existing literature has not estimated the simultaneous impacts of financial development on economic activities. Current

measures of financial development have also not captured the role of financial system appropriately. The existing literature has paid little attention to the analysis of determinants of financial development.

At the micro level, only a few papers such as Guiso et al. (2004), Lanot and Lawrence (2005), and Antzoulatos and Tsoumas (2005), have looked at the role of financial development at the household level. There are so many aspects mentioned above through which financial development can have an influence on economic activities, but these papers analyse only some aspects. The use of data envelopment analysis (DEA) to analyse firm efficiency in conjunction with the analysis of the impacts of financial development on firm efficiency has been paid little attention. The interaction between financial development and firm size on firm efficiency has not been examined.

Regarding studies about Vietnam, the link between financial development and economic activities has been studied qualitatively and quantitatively by some researchers such as Duong and Izumida (2002), and Quach and Mullineux (2006), but these studies have only examined the impact of borrowing on income and expenditure. They have neglected an analysis of the impact on savings, investments, productivity and technology. The simultaneous impact of financial development has not been examined. In addition, these studies have not used alternative measures of financial development. The measure used in these studies, borrowing, has reflected only partly the role of the financial system. These studies have neglected the impact of both financial development environment and network on economic activities.

Therefore, this thesis examines the nexus between financial development and economic activities in Vietnam at both the macro and the micro level. The main goals of this thesis are to analyse the two central following issues:

1. How financial development has taken place in Vietnam?
2. Has financial development had any impacts on economic activities in Vietnam? If yes, through which channels has financial development influenced economic activities in Vietnam?

In order to answer these questions, I start in chapter 2 with the impacts of financial development on economic growth and sources of growth at the provincial level in Vietnam. This chapter examines the role of financial development in economic growth and sources of economic growth in Vietnam by using data from 62 provinces during the period 1997-2004. This chapter expands the literature by using a measure of investment efficiency and by constructing a new measure of savings efficiency to examine the impact of financial development on the efficiency of using saving and on the efficiency of investment. This chapter also contributes to the existing literature as it clarifies the role of financial development in efficiency of investment by looking at the progress of information technology, which helps to reduce the problem of asymmetric information. In this chapter, I find that financial development impacts positively on the efficiency of using savings, on the quantity and quality of investment, on productivity, and hence on economic growth. I also find that there is an indirect impact of financial development on economic growth

mainly through increasing the quality of foreign direct investment rather than quantity.

However, this chapter has a number of limitations. Firstly, it has not examined the simultaneous impact of financial development on economic activities. Secondly, it has only employed the measures of financial development used in the existing literature. Finally, this is a study about the link just at the macro level.

In order to overcome the three limitations, I begin in chapter 3 with the impacts of financial development on Vietnamese household economic activities. This chapter analyses the determinants of household financial development and its role in economic activities of Vietnamese households by using 1,685 households from the Vietnam Living Standard Survey conducted in 2004. This chapter expands the existing literature by constructing a set of new financial development measures and analysing the simultaneous impact of financial development on economic activities at the household level. It is shown that the social relationship, location, fixed asset, household size, education, age of households and Kinh group[1] are the key determinants of household financial development. Moreover, financial development has a positive effect on household income through improving the level of saving and investment, and labour productivity and reducing the problem of asymmetric information. Financial development is shown to plays a positive role in household economic welfare.

Chapter 3 gives a solution to the limitations in chapter 2, but it has not examined the impact of financial development on firm performance, especially firm

[1] Vietnam has 54 different ethnic minority groups. The Kinh people (or Viets) account for nearly 90 percent of Vietnam's total population. Major ethnic minority groups include the Tay, Thai, Muong, H'Mong, Dao and Khmer.

efficiency. Hence, I continue in chapter 4 with the impacts of financial development on Vietnamese firm performance, to clarify the role of financial development in economic activities. This chapter looks at the impacts of financial development on firm performance in Vietnam by using data from 4,099 firms from the Firm Data Survey conducted by the General Statistics Office of Vietnam in 2002. This chapter contributes to the existing literature by employing the data envelopment analysis (DEA) to calculate firm efficiency and then analysing the impact of financial development on firm performance. It is shown that 80.7% of Vietnamese firms lie between 0% and 20% in the efficiency scores derived from the DEA technique for 1,886 firms. The DEA technique gives a better measure of firm performance, in which financial development plays a key role in firm performance. Smaller firms benefit more from the higher level of financial development.

Finally, the thesis ends in chapter 5 with the conclusions. This chapter summarizes the findings, gives some policy implications and points out some weaknesses needing further research.

CHAPTER II

THE IMPACTS OF FINANCIAL DEVELOPMENT ON GROWTH AND SOURCES OF GROWTH AT THE VIETNAMESE PROVINCIAL LEVEL

I. INTRODUCTION

While most studies in the existing literature support the role of financial development in economic growth, there are many competing ideas regarding the role of financial development. Levine (1992, 1997) and Patrick (1994) argue that financial development plays an important role in economic growth by facilitating the mobilization of capital and increasing the quality and perhaps the level of investment. In contrast, Lucas (1988) states that economists 'badly over-stress' the role of financial factors in economic growth.[2] Loayza and Ranciere (2001) present the case that the financial system could cause economic recessions because financial crises often lead to economic slowdowns. Therefore, this chapter attempts to clarify the role of financial development in economic growth by looking at the Vietnamese provincial panel data evidence for 62 provinces during the period 1997-2004.

The advance in the studies regarding the relationship between financial development and economic growth has come from three views: the neo-classical growth theories mostly based on the seminal work of Solow (1956, 1957); the new endogenous growth theories developed by Romer (1986) and Lucas (1988); and the research in legal view at the end of 1990s. However, there are two concerning issues that have not been dealt with in these studies. Firstly, some channels of transmission

[2] As stated by Levine (1997)

from financial development to economic growth, such as efficiency of investment, have been mentioned in theories but have not been analysed by econometric evidence. The efficiency of using savings has been not mentioned in the literature. Secondly, previous research, such as Hasan and Mingming (2006), has considered the role of international finance in economic growth, but has not analysed the role of financial development in foreign direct investment (FDI). In order to contribute to the existing literature, this chapter also addresses the indirect impact of financial development on economic growth through three main channels: the efficiency of using savings, the quantity and the quality of investment, and the productivity. In addition, the progress of information technology, and the quantity and the quality of FDI are the indirect influences of financial development on economic growth, are considered in this chapter.

The chapter's findings suggest that an increase in the level of financial development accelerates the efficiency of using savings, the total productivity, capital and efficiency of investment, leading to economic growth in Vietnam. Financial development also has an indirect effect on the efficiency of investment through improving the information technology which helps to decrease the problem of asymmetric information. In addition, the channel of transmission from financial development to economic growth is mainly through accelerating the quality of foreign direct investment rather than its quantity.

In this chapter, I present the literature in section II which describes the measurement of financial development, and the link between financial development and economic growth. Section III provides overview of the development of the financial system, and a qualitative assessment of its impacts on economic growth and

on sources of growth in Vietnam. Section IV uses the quantitative method (pooled OSL, random and fixed effect, and IV regressions) to model the impacts of financial development on economic growth and sources of economic growth, and then employs the data collected to run the model to give the estimated results and discussion. I conclude this chapter in section V.

II. LITERATURE REVIEW

1. Measurement of Financial Development

There are many quantitative indicators designed to measure the extent of financial development in relation to economic development. Initially, the indicators of the ratio of M1/GDP and M2/GDP are used as indicators of financial development. Although the data is easy to collect, these indicators might be a poor proxy in many developing countries with less developed financial systems. This is because cash dominates in these economies and hence leads to biased ratios. Thus, Levine (1997) uses the ratio of M3/GDP to measure the financial depth. However, this ratio still presents problems since M3 contains M1 and M2, which do not reflect correctly the level of financial development.[3] For instance, financial services, information processing, and risk management are not reflected in this ratio. Kar and Pentecost (2000) point out that the broad money stock covers a big part of currency outside the banking system in developing countries. In some cases, an increase in this ratio shows a bigger use of currency than bank deposits. Thus, the sound measure of financial development should not include the currency in circulation.

In order to overcome these problems, Kar and Pentecost (2000) employ the ratio of bank deposit liabilities to income (BDY). Beck, Levine and Loayza (1999)

[3] M1 = currency in circulation + demand deposit. M2 = M1 + time deposit. M3 = M2 + financial claims (bonds and shares for instance).

use the ratio of private credit to GDP (PC/GDP), namely, the value of credits of financial intermediaries to the private sector divided by GDP. This ratio states more appropriately the role of the financial sector in allocating funds to the private sector. Nevertheless, these ratios do not capture the role of the stock market, which is a very important channel of mobilizing savings for investment. Thus, Khan and Senhadji (2000) use stock market capitalization to measure financial depth.

In addition, in developing countries with low levels of financial development, governments or official banks sometimes provide cheap and abundant credit without appraising the efficiency of financed projects. Consequently, increasing liquid liabilities might not make economic growth improve due to the collapse of many of these projects. Rioja and Valev (2002) assume that commercial banks would be better at appraising the effectiveness of projects, and then prove the relative importance of commercial banks versus central banks in allocating savings. Therefore, they use another indicator, Commercial versus Central bank (CCB), which is defined as commercial bank assets divided by commercial bank plus central bank assets.

The indicators above are the provincial and national measures of financial development, at the firm level researchers either use the ratio of loan to income, or the level of loan and access to credit as financial development indicators. Guiso et al. (2002) estimate the conditional probability of being rejected for a loan as an indicator of financial underdevelopment. In order to find their indicator of financial development, they first compute their indicator of financial development as $\left[1 - \frac{\text{Conditional Probability of Rejection}}{\text{Max (Conditional Probability of Rejection)}}\right]$. Then, they normalise their

indicator of financial development by defining it as $\left[1 - \frac{\text{Regional Effect}}{\text{Max (Regional Effect)}}\right]$ using the coefficients on regional dummies.[4] They use this normalised measure as their indicator of financial development. The value of this measure is between 0 and 1. The value of this measure is zero in the region with the maximum value of the coefficient on the regional dummy (the least financially developed region).

2. The role of financial development in growth and sources of growth

Goldsmith (1969) assesses whether financial development exerts a causal influence on economic growth by using the data of 35 countries during the period 1860-1963. He uses the value of financial intermediary assets divided by GDP as a measure of financial development. He concludes that the financial intermediary size relative to the size of the economy increases as countries develop. He presents a positive correlation between financial development and economic growth. However, the study has a number of limitations. Firstly, the research has just a limited number of countries. Secondly, it does not systematically control other factors affecting economic growth. In addition, it does not identify the direction of causality. Thirdly, the measure of financial development in that paper can be an inappropriate proxy for the functioning of the financial system (King and Levine, 1993 and Levine, 1997). Finally, the results of both the theoretical background and the empirical evidence are still primary and rough (Eschenback, 2004).

[4] They use the following subsets: households that have received a loan, households that have been turned down for a loan, households that are discouraged from borrowing to run an OLS regression to get the coefficient on the regional dummies. Their regression function, y = f(regional dummies, age, gender, kind of job, income, household size, number of income recipients in the household, a control for the percentage of bankruptcies in the area). Where y = 1 if a household is a credit constrained or households that have been turned down for a loan, households that are discouraged from borrowing, and zero otherwise.

King and Levine (1993) overcome the shortcomings of Goldsmith (1969) by using the data of 77 countries during the period 1960-1989 and constructing additional measures of financial development[5] to show the strong positive relationship through three growth indicators[6]. They state that financial development is a good predictor of subsequent rates of economic growth, capital accumulation and productivity growth. Although these results would have resolved the limitations of Goldsmith (1969), there still remain some problems. Firstly, the study does not formally analyse the causal relationship. Secondly, it focuses on only one segment of the financial system, namely banks, even though it improves the measure of financial development (Levine and Zervos, 1998).

As an improvement to the previous study, Levine and Zervos (1998) employ cross-section data of 42 countries from 1976 to1993. They construct numerous measures of stock market development[7] for their analysis of the relationship between financial development and economic growth. The results show the following points. Firstly, initial levels of stock market liquidity and banking development are positively and significantly correlated with economic growth. Secondly, there are no tensions between the market based and the bank based systems. Thirdly, the impacts of stock markets and banks on growth contribute through productivity growth rather than capital accumulation. Finally, the relationship between the stock market size[8] and capital accumulation, productivity and economic growth is not significantly correlated.

[5] There are additional measures of financial development in King and Levine (1993): DEPTH: Liquid liabilities of the financial system divided by GDP; Bank: bank credit divided by bank credit plus central bank domestic assets; PRIVY: credit to private sector divided by GDP.
[6] Real per capita GDP growth, real per capita capital growth and productivity growth
[7] Turnover ratio, for instance, measured by total value of shares traded divided by the value of shares listed on stock exchanges.
[8] Market capitalization/GDP

However, the critique of Arestis and Demetriades (1997) for King and Levine (1993)'s work does not end. Arestis and Demetriades (1997) state that using the cross-section data to estimate growth equations might have limited evidence to show the direction of causality.

In response to this critique, Levine (1998, 1999), Levine, Loyaza and Beck (2000) use measures of legal origin as instrumental variables procedures and Generalized Method of Moments dynamic panel techniques to present the strong positive relationship and causal relationship between financial development and economic growth. In addition, Levine and Zervos (1998) continue to receive critiques from Drifill (2003) and Manning (2002). They point out that implications of Levine and Zervos (1998) for the impact of financial development on economic growth is in question since a number of results pivot including outliers and regional dummy financial variables, which are insignificant for Asian Tigers. They also state that using the longitudinal scope of panel data is limited since Levine et al. (2000) use a panel consisting of only five-year averages. This is not a large sample and may lead to estimation bias (Trew, 2006).

Regarding the empirical studies about this relationship in Vietnam, I can see the following major problems. Although there have been a series of studies about the role of finance in economic growth in Vietnam, there have not been any papers which analyse systematically by employing econometric tools over each level of the whole country, province, industry and firm. Previous authors, such as Hien (1994), Hideto (1997), Harvie and Hoa (1997), Duc (1998) and Ruth (2002), mainly employ the qualitative method to analyse the relationship. A small number of authors such as Duong and Izumida (2002) study this relationship at the microfinance level, carrying

out a micro-econometric analysis of a household survey. This study was conducted for just three provinces, Ninh Binh, Quang Ngai and An Giang with only a very small sample of 300 households surveyed. This might lead to a biased conclusion since the sample could not stand for the whole country trend. Therefore, it is necessary to clarify the relationship in the case of Vietnam by looking at some additional channels of transmission from financial development to economic growth, constructing and using some new measures. These will be clearly analysed in the next sections.

3. The problem of endogeneity

The problem of endogeneity has also been paid much attention in the literature. Researchers have used several ways to resolve this problem. To cope with this problem, a series of researchers, such as King and Levine (1993), and Carlin (2002), have employed instrument variables in the estimation method of the Two Stage Least Squares and Three Stage Least Squares. Recently, researchers have increasingly used the GMM method.

The literature has used the following instrument variables to analyse the link between financial development and economic growth. King and Levine (1993) use the initial values of income, the initial rate of secondary school enrolment, the initial ratio of government expenditure to GDP, the initial openness measured by the value of exports plus imports divided by GDP, the initial value of financial indicator and inflation in the previous decade. Beck et al. (2000) employs the legal origin as instrument variables. Carlin and Mayer (2002) considers the legal origin, population and the rule of law as instrument variables. The level of social capital, the level of judicial inefficiency, usury and the ratio of local banking lending to total lending in

the province, and the length of trials, and pending trials, are treated as instrument variables by Guiso (2002).

III. OVERVIEW OF FINANCIAL DEVELOPMENT AND ITS IMPACTS ON GROWTH AND SOURCES OF GROWTH IN VIETNAM

1. Financial development in Vietnam

Any analysis of the financial system in Vietnam should be divided into two periods: before, and after, 1988. Financial repression existed in Vietnam before 1988, followed by the financial liberalization since then. Therefore, each period has its own financial development scenario as follows.

1.1. Financial development in Vietnam in the Centrally Planned Period

In the era of the centrally planned period, the financial system of Vietnam was very much repressed. Financial activities were strongly regulated by the government in the period 1975-1988. The government controlled entry into the financial markets. The financial system could be described as a mono-bank, where the State Bank of Vietnam (SBVN) functioned both as a central bank and a commercial bank. This bank was the only source of short-term loans.

The Bank for Foreign Trade and the Bank for Investment and Development complemented SBVN in supplying long-term loans for foreign trade, commerce and infrastructure. There were hence only three banks in the financial system in this period. This information shows that the level of financial development at this period was very low.

1.2. Financial development in Vietnam since 1988

The Vietnamese government announced its open and renovation policy in 1986, but financial liberalization only really started in 1988. The policy of financial

liberalization has been bringing about significant achievements in the financial system.

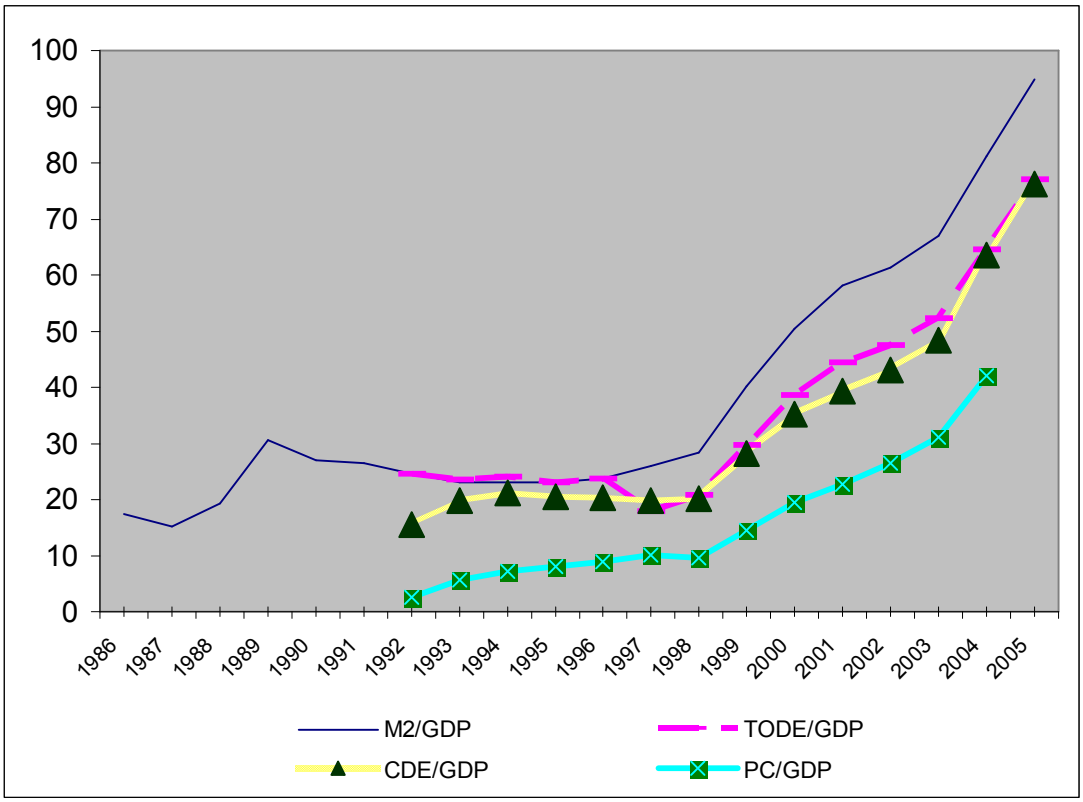


Figure 2.1: Financial Development Trend in Vietnam since 1986

Notes: TODE = total deposit; CDE = credit to the economy; PC = private credit.

Source: World Bank (1990), IMF (1999, 2002 and 2006)

Figure 2.1 shows that the level of financial development in Vietnam has been improving since 1986. All financial development indicators increase sharply during the period 1986-2005. The M2/GDP ratio increased from 17% in 1986 to 95% in 2005. The TODE/GDP went up from 25% in 1992 to 75% in 2005. The CDE/GDP also presented a big jump from 15% in 1992 to 76% in 2005. There is also a significant improvement in the PC/GDP ratio, in which the ratio soared from 3% in 1992 to 42% in 2004. However, these are just general trends. It is necessary to analyse all financial development indicators in detail during this period.

The M2/GDP ratio in 1989 increased sharply to 31% from 19% in 1988, but then gradually declined. It resumed the upward trend in 1996 and has soared since 1998. Meanwhile, the TODE/GDP and CDE/GDP ratios reduced during the period 1997-1999, but since then both have increased very rapidly. The questions raised here are why these events happened and what factors could have caused these events. This can be explained as follows.

A sudden increase in the M2/GDP ratio in 1989 might be clarified by four factors. Firstly, private credit cooperatives were established and operated. These credit cooperatives attracted a huge amount of households' savings by offering high deposit interest rates. Secondly, there were positive real interest rates after many years of negative real interest rates. These positive interest rates encouraged people to save in the form of bank deposits since they could incur costs of holding money and assets if they still kept dollars, dong, gold or other precious metals. Thirdly, people had more savings. Finally, the Vietnamese dong reached a stable value and appreciated against the US dollar (USD), gold and other precious assets, as a result of a sharp reduction in inflation from 394% in 1988 to 34.7% in 1989.[9]

The collapse of most credit cooperatives and the confidence crisis in 1990 explained the gradual decrease in M2/GDP during the period 1990-1995. Fundamental problems of the credit cooperatives became clear, typified by the fragility that the Thanh Huong Company scandal revealed. When the collapse of credit cooperatives happened, a confidence crisis followed in the banking system. Therefore, people switched to holding assets in the form of USD, gold and other precious metals.

[9] See table 2.5 and table 2.6 in the appendix.

The Asian financial crisis, which took place in late 1997, could explain why the TODE/GDP ratio reduced very quickly. The high interest rates and some scandals relating to banking operations, namely the Tamexco and Epco/Minhphung cases, caused a slight decline in CDE/GDP ratio. These cases made commercial banks and bank cadres implement strict banking regulations, and lending practices were tightened.

There are a number of reasons which explain why all financial development indicators have been showing the steep upward trends since 1998. Firstly, the Vietnamese economy suffered deflation during the period 1999-2000, and followed by a period of low inflation as a result of weak demand.[10] So the government carried out many cheap credit programs with easy borrowing conditions. Secondly, people became richer providing increased savings for investment. In addition, the government has been providing favourable conditions for expatriate Vietnamese to come back and transfer money to their relatives and friends.[11] This in turn has resulted in the economy having more funds for investment. Finally, the government strongly liberalized the financial sector. This policy has encouraged foreign banks and financial institutions to participate in the Vietnamese financial sector. Furthermore, financial liberalization has been successful in mobilizing saving and allocating funds for investment.

In summary, the Vietnamese financial system has been developing rapidly since the policy of financial liberalization took place in 1988. However, the level of financial development remains low, compared to other countries with the same level of per capita income. Vietnam remains an under-banked country (World Bank,

[10] Inflation rate in Vietnam: 1999: -0.2; 2000: -0.5 (See table 2.6).
[11] Before 1986 the Vietnamese overseas could not invest in or come back Vietnam. However, they have been being treated as foreign investors and partly Vietnamese citizens since 1986.

1995). The financial sector is underdeveloped, over-regulated and non competitive (Viet, 1997). The capital market has just started and is relatively small.

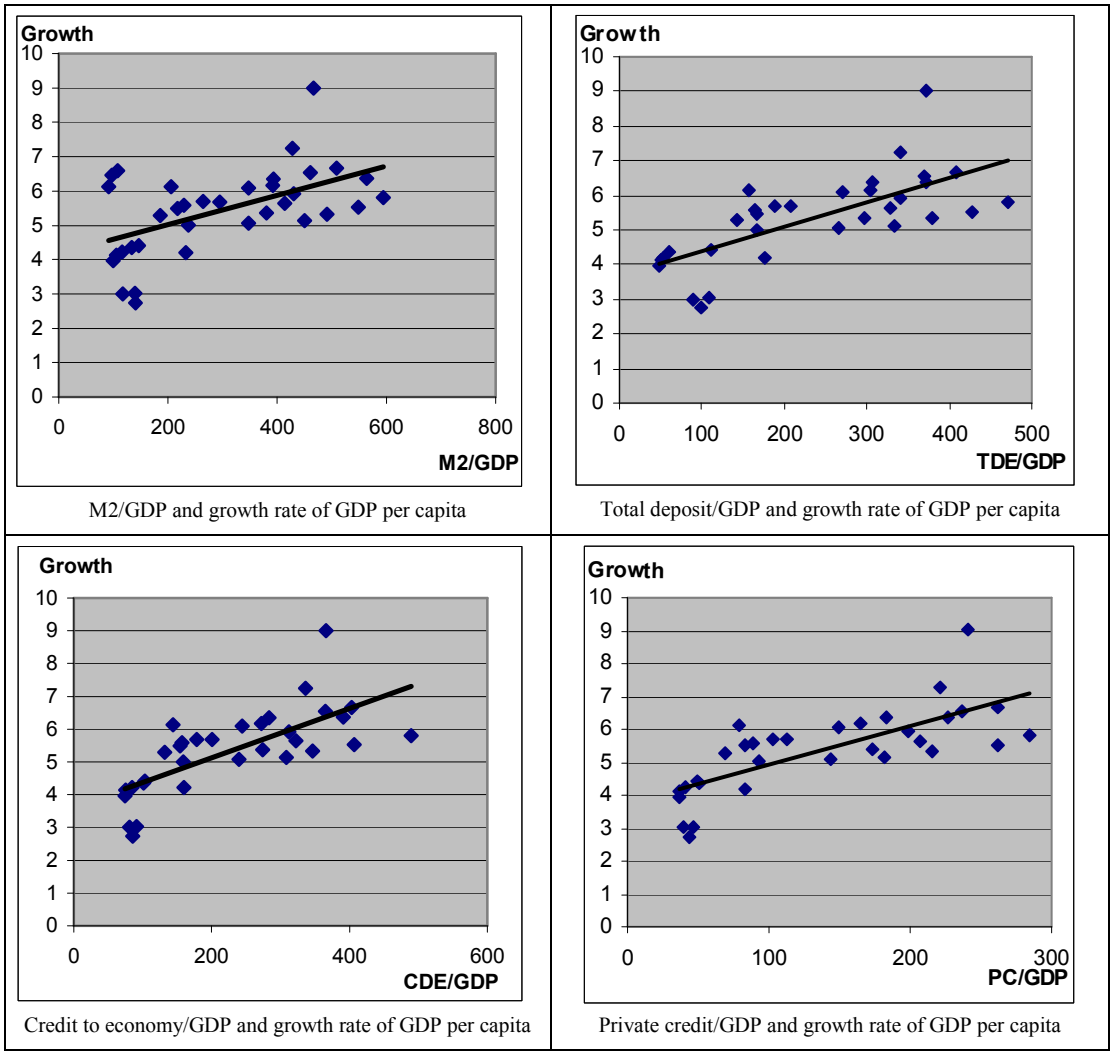
2. The impacts of financial development on growth and sources of growth in Vietnam

2.1. The impacts on economic growth

Table 2.7 and table 2.8 in the appendix show that financial intermediation has played a key role in the Vietnamese economy. The financial sector has been increasing its contribution to GDP. The share of the financial sector in GDP has increased from 0.8% in 1986 to 2.4% in 1996. The growth rates of the financial sector were high during the period 1986-1996. However, during the period 1995-2005, the growth rates declined, to only 0.37% on average. The financial sector is ranked 13th in the 20 sectors contributing to GDP as shown in table 8 in the appendix.

Figure 2.2 shows the simple relationship between four financial development indicators and the rate of GDP per capita growth during the period 1998-2005.[12] Any improvement in financial development has had a strong influence on economic growth during this time as shown in all four of the graphs. Intuitively, financial development could influence economic growth in Vietnam because it would improve mobility of savings, investment in terms of both quality and quantity and productivity. This will be analysed in the following sections.

[12] I use quarterly data to present the relationship.



M2/GDP and growth rate of GDP per capita

Total deposit/GDP and growth rate of GDP per capita

Credit to economy/GDP and growth rate of GDP per capita

Private credit/GDP and growth rate of GDP per capita

Figure 2.2: **Financial Development and Economic Growth between 1998 and 2005**

Source: General Statistics Office Data, IMF (1999, 2002 and 2006)

2.2. The impacts on savings mobilization

The savings mobilization has increased very quickly since financial liberalization occurred in 1988.[13] Savings mobilization increased annually by 47.3% during the period 1992-1997 and 33.5% on average during the period 1998-2005. Funds mobilized as percentage of GDP also increased sharply from 18.1% in 1991 to 77% in 2005. Funds channelled to the banking system were almost lower than the

[13] See table 2.1.

gross savings of the economy during the period 1991-1998, but larger than those during the period 1999-2005.

Table 2.1: Fund Mobilization by the Banking System the Period 1991-2005.[14]

(Unit: %)

Year	1991	1992	1993	1994	1995	1996	1997
Growth rate	100	195	113.8	159.4	166.7	120.7	128.1
As compared with GDP	18.1	15	13.8	17.7	23	25	28
As compared with gross savings	119.9	88.2	55.4	69.4	84.9	89.6	103.7

Note: The rate of growth is calculated in nominal terms, which equals the nominal value of the current year mobilized funds divided by the nominal value of the previous year mobilized funds; gross savings equals national savings plus foreign savings and equals gross investment.
Source: World Bank (1996), Vietnam Economic Times, No.1, 1998 and Reviews 1997, No.12 945).

Year	1998	1999	2000	2001	2002	2003	2004	2005
Growth rate	137	163	144	124	116	127	125	132
As compared with GDP	21	30	39	44	48	52	65	77
As compared with gross savings	88	133	131	142	143	151	182	210

Note: Data is calculated in the real term.
Source: The author's calculation based on data from IMF (2002, 2006)

In general, the economy had not mobilized all savings during the period 1991-1998. Funds mobilized in 1995 were 40% of the country's potential, according to Vietnam Economic Time No.1, 1998. The remainder of savings was held in the form of gold, precious metals, real estate and foreign currencies.[15] The reason for this problem was that the level of financial development was still low. Specifically, state owned commercial banks issued bonds to mobilize funds. These banks mobilized 3,806 billion dong this way (Hideto Sait, 1997 and Vietnam Economic Review No.12, 45-p.22, 1997). However, these mobilized funds were just short term, since bonds issued had short-run maturity. This is due to the lack of a secondary market and the underdeveloped financial system. Fortunately, the financial sector has much

[14] Fund mobilization is defined as total deposits at the banking system.
[15] Vietnam Economic Time No.1, 1998.

improved since then. The stock market has operated since 2000. Tools for mobilizing funds have been increasing. The financial market has become more open and hence there is a higher level of financial development, leading to improvement in savings mobilization.

2.3. The impacts on investment

2.3.1. The impacts on the quantity of investment

Table 2.2: Long Term Loans and Foreign Currency Loan in the Period 1989-1996

Unit: billion VND

Year	1989	1990	1991	1992	1993	1994	1995	1996
Long run loan	850	1,390	1,553	2,530	5,730	7,719	13,661	15,618
% of total loan	21.35	24.34	15.45	16.76	24.72	27.96	32.99	30.79
Growth rate (%)		63.53	11.73	62.91	126.48	34.71	76.98	14.33
Short run loan	3,132	4,320	8,489	12,563	17,450	19,902	27,742	35,101
% of total loan	78.65	75.66	84.55	83.24	75.28	72.04	67.00	69.21
Growth rate (%)		37.93	96.50	47.99	38.89	14.05	39.39	26.53
Total loans	3,982	5,710	10,051	15,093	23,180	27,621	41,403	50,719
Growth rate (%)		43.39	76.02	50.16	53.58	19.16	49.89	22.50
Foreign currency loan	661	842	1,715	3,543	4,869	5,493		
% of total loan	16.60	14.74	17.06	23.47	21.01	19.89		
Growth rate (%)		27.38	103.68	106.59	37.43	12.82		

Note: The data for 1994 is at the end of September 1994.
Source: OECF (1996), Kazuyuki Mori (1997) and calculated from their data.

Both short term and long term loans increased sharply from 1989 to 1996 (see table 2.2). The rate of growth in long term loans went up more than that of short term loans in spite of the dominance of the latter. The share of foreign currency loans was fairly large and increased over this period. This was good for economic growth in the period. However, the high ratio of foreign currency loan resulted from the low level of domestic savings. Many businessmen borrowed from abroad through deferred payment on purchases of foreign goods, typically in the Minhphung/Epco case. This

kind of borrowing led to difficulties for the banking system because these borrowers could default, and hence threaten economic growth.

Long term loans were relatively low in the banking system during the period 1989-1996 (see table 2.2). Long term loans as a percentage of total loans were 21.4% in 1989 and 30.8% in 1996, the percentage of short term loans was 78.7% in 1986 and 69.2% in 1996. This was one of the obstacles for long term investment and hence for economic growth between 1989 and 1996. The low level of financial development, leading to the problem of asymmetric information best explain this.

Table 2.3: Credit Operation during the Period 2002-2005

NOTE:
This table is included on page 22 of the print copy of the thesis held in the University of Adelaide Library.

Source: SBVN (2006)

All banks depended on their evaluation of collateral rather than the prediction of the borrowers' ability to repay in allocating loans. Specifically, all banks required firms to have collateral when they borrowed because banks found it hard to evaluate

borrowers. Banks evaluated the value of collateral assets at a discounted level (around 50%) and lent only 80% of the discounted value of collateral assets (Viet, 1997). Another problem in the financial sector was that around 90% of credit was M2. The State Bank of Vietnam was thus cautious in expending credits because it was afraid of inflation. This was a waste of capital since banks faced an excess of funds (in mid-1996, around 2,800 billions VND) while firms were short of funds. If Vietnam had had a good financial market, especially a stock market, this problem would have been resolved since banks would have been able to diversify risks and investment opportunities by buying financial assets neutral from accelerating inflation. In turn, firms would have also been able to borrow by issuing bonds or shares to finance their investments. Therefore, long-term loans would have increased and hence economic growth would have improved.

Table 2.3 shows that the loan structure has been improved. The rate of loan growth was fairly high (26.2% per annum) between 2002 and 2005. The ratio of long-term loans to total loans has improved, resulting from the operation of the stock market from 2000. The ratio of long-term loans to total loans occupied more than 42 percent in total loans. The loan growth rate has been higher in the private sector than in the state sector. Loans to state-owned enterprises as a percentage of total loans decreased from 65.5 % in 2002 to 43.3% in 2005. This shows that a serious problem of moral hazard in the state sector has declined gradually. There is a good trend in the financial sector. Competition has been becoming stronger in the banking system. Market share of state-owned banks has reduced from 78.1% in 2002 to 71% in 2005 while that of private banks has increased, especially joint stock banks. Joint venture banks and foreign banks have increased their market share from 8.57% in 2002 to

9.4% in 2005. Joint stock banks have also increased their market share from 9% in 2002 to 15% in 2005. This means that the better level of financial development has improved funds allocations, and hence economic growth, during the period 2002-2005.

2.3.2. The impacts on the quality of investment

The smaller ISOR and ICOR[16] give more efficiency of mobilizing and using capital, since the economy needs less saving or investment in order to obtain the same percentage growth. Normally, the higher level of financial development creates a lower ISOR and ICOR. CIE (1997) suggests that the better efficiency of the financial sector in Vietnam strongly improved the competitiveness of Vietnam's industry and commercial enterprises. The financial sector helped the successful restructuring of the industrial sector and others in the Vietnamese economy. Thus, this promoted economic growth.

Table 2.4 shows that the Vietnamese economy has been one of the fastest growing countries in the South East Asian since it commenced its renovation policy, combining low ICOR and ISOR. The average rate of economic growth has been more than 7.5% in the period 1989-1999 and 7.3% in the period 2000-2005. The average ICOR and ISOR lie between 3.0 during the period 1989-1999 and 4.4 during the period 2000-2005. Meanwhile ICOR was 4.3, 5.8, 4.4, 4.3 and 3.9 in Thailand, Philippines, Korea, Malaysia and Indonesia respectively between 1978 and 1996 (data for South East Asian Countries calculated from Corsetti, 1998). This is because the better level of financial development has helped Vietnam to release constraints on self-finance for investment, eliminating credit rationing to the state budget and to

[16] ISOR is the incremental savings output ratio. ICOR is the incremental investment output ratio.

enterprises. In addition, the development of the financial sector in Vietnam has improved the ability of private sector and households to access loans from the banking system. Another reason is that Vietnam has fully changed from the command economy, the least incentive system, to the market economy, the incentive system, and thus low ICOR and ISOR in the period 1989-1999. The period 2000-2005 has shown an increase in ICOR and ISOR because the Vietnamese economy has returned to be a more normal situation. The low ICOR and ISOR means that Vietnam has reached a high rate of growth originating from a more intensive use of existing production capacity as much as from the creation of new production capacity (Jansen, 1997).

Table 2.4: ICOR and ISOR of Vietnam, 1989-2005

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Investment/GDP	11.2	12.9	17.6	21.0	27.0	30.9	35.1	37.2	27.6	28.7	19.0
GDP growth	8.0	5.1	6.0	8.6	8.1	8.8	9.5	9.3	8.8	5.8	4.8
ICOR	1.4	2.5	2.9	2.4	3.3	3.5	3.7	4.0	3.1	4.9	3.9
Savings/GDP							11.9	15.9	19.8	19.1	26.5
ISOR							1.3	1.7	2.3	3.3	5.5

Source: World Bank (1994, 1995, 1997b, 1998a, 1998b, 1999b), IMF (2003)

Year	2000	2001	2002	2003	2004	2005	Average 1989-1999	Average 2000-2005
Investment/GDP	29.6	31.2	33.2	34.6	35.5	36.6		
GDP growth	6.7	6.8	7.04	7.3	7.7	8.4	7.5	7.3
ICOR	4.4	4.6	4.7	4.7	4.6	4.4	3.2	4.5
Savings/GDP	31.7	33.2	32.0	29.7	31.7	32.2		
ISOR	4.7	4.9	4.5	4.1	4.1	3.8	2.8	4.35

Note: ICOR = (Investment/GDP)/GDP growth; ISOR = (Savings/GDP)/GDP growth. These indicators are calculated by the author.
Source: IMF (2006) and the Vietnamese government website: http://www.chinhphu.vn.

However, both ICOR and ISOR have increased over the period (see table 2.4). The Asian financial crisis was the worst time for mobilizing and using capital since ISOR was 5.5 in 1999 and ICOR was 4.9 in 1998. These were the highest ratios

during the period 1989-2005. The efficiency of investment and productivity have been improved but there are still problems because of the low level of financial development and monopoly (Leung, 1996). The financial sector has remained rudimentary so that information collected has been limited. This led to inaccurate forecasts by investors for the future actions in the following years, 1996 to 1998. Over-investment between 1996 and 1998 in real estate, steel, sugar, cement and construction materials is evidence of this poor forecasting as it caused a big surplus in the market and resulted in deflation for the economy from 1999 to 2000.

Another problem was that bad loans in the banking system were very high during the period 1996-2001.[17] This is because Vietnam has a serious problem of asymmetric information in which lenders have found it very hard to understand borrowers' financial situations and the efficiency of their investment projects due to the bad accounting and auditing system. In addition, state owned banks have been sometimes forced to lend to poor performing state owned enterprises. Thus, the problem of moral hazard has been still serious in the state sector. Furthermore, corruption in the banking system such as Namdinh Textile Union, Tamexco and Minh phung/Epco cases, has also contributed to the large number of bad loans. Normally, borrowers have to pay a kickback of 6.5% to bank brokers in order to borrow from banks. The more borrowers pay, the higher the chance of getting loans. Thus, bankers have given loans to bad borrowers in many cases. Finally, crop failures had forced farmers to delay loan payment (World Bank, 1997). Fortunately, there has been a reduction in bad loans since 2002. The ratio of non-performing loans/total loans has reduced to the low level of 3.2% in 2005 (see table 2.3). As

[17] Non-performing loan/total loans in Vietnam: 1996: 9.3%, 1997: 12.4%, 1998: 12%, 1999: 12.1%, 2000: 9.7%, 2001: 8.5% (IMF, 2002, 2003).

shown in figure 2.1, all financial indicators have soared since 2002. This is perhaps the reason why the efficiency of loans has been improved.

In summary, financial development has contributed to economic growth in Vietnam through improving funds mobilization, investment and productivity during the period 1988-2005. ISOR and ICOR are the two important indicators which reflect the efficiency of funds mobilizing and the use of these funds for economic growth. However, this is only a qualitative analysis of the role of financial development in economic growth. It is necessary to have empirical evidence to support this argument. Therefore, this chapter builds an econometric model to analyse in more detail and to provide good evidence in order to confirm the role of financial development in economic growth and sources of growth.

IV. MODELLING THE IMPACTS OF FINANCIAL DEVELOPMENT ON GROWTH AND SOURCES OF GROWTH IN VIETNAM

1. Theoretical model

In order to show the impact of financial development on economic growth, the AK model is used here as follows:

$$Y_t = A_t K_t \quad (1)$$

where Y_t is total output at time t; K_t is capital at time t and A_t is the current level of technology at time t.

It is assumed that the marginal product of capital equals the total factor productivity, A_t and $Y_t = C_t + S_t$, i.e. output can be consumed or saved. It is also assumed that the depreciation of capital stock is at a constant rate, δ. If K denotes capital stock and I denotes investment, then

$$I_t = K_{t+1} - (1-\delta) K_t \quad (2)$$

At the equilibrium output, national savings equals investment, i.e.

$$I_t = \eta_t S_t \tag{3}$$

where η_t expresses the ability of the financial sector to intermediate funds and is $0 \leq \eta_t \leq 1$. This means that only part of savings can be transferred to investment. This is because people can keep their savings such as gold and foreign currencies at home due to a lack of confidence in their home countries' financial system or a limited investment ideas. The higher η_t leads to more efficient allocation of resources.

Equation 1 tells us that the growth rate of output $g_t = \frac{Y_{t+1}}{Y_t} - 1$ relies on K_t. The capital and output have the same rate of growth at the steady state. Let s denote the share of savings to income ($s_t = \frac{S_t}{Y_t}$), and rearranging equation 2 by substituting (3) gives as follows:

$$\eta_t S_t = K_{t+1} - (1-\delta)\, K_t \tag{4}$$

since $s_t = \frac{S_t}{Y_t} \Rightarrow S_t = s_t Y_t = s_t A_t K_t$. Replacing this result into equation 4 yields:

$$\eta_t s_t A_t K_t = K_{t+1} - (1-\delta)\, K_t \tag{5}$$

and $\frac{Y_{t+1}}{Y_t} - 1$ $(g_t) = \frac{K_{t+1}}{K_t} - 1$ (k_t) at the steady state. Dividing both sides of equation 5 by K_t gives:

$$\eta_t s_t A_t = \frac{K_{t+1}}{K_t} - 1 + \delta \tag{6}$$

$$g_t = \eta_t s_t A_t - \delta \tag{7}$$

Hence, based on equation 7, financial development may impact on economic growth by increasing the share of savings to income, s_t; growing the total productivity, A_t; improving the quality of intermediation, η_t; and savings lost in transition, δ.

2. Model for estimation

Most studies have used the model structure of the AK type. Romer (1986), Roubini and Sala-i-Martin (1992), for instance, use the AK model of endogenous growth to re-examine financial repression. Partly based on the AK model, King and Levine (1993) develop the Schumpeterian model of technological progress. King and Levine (1993) build a regression model which shows the impact of financial development on economic growth, and sources of growth (productivity growth, capital growth, private saving). Their model shows that besides financial development, terms of trade, real interest rate, government savings, old dependency ratio, young dependency ratio and urbanization ratio, that initial real GDP per capita, education, government consumption, inflation, the open degree of the economy are determinants of economic growth and sources of growth.

Unlike the previous models, this model does tell us through which channels financial development can influence economic growth. This model covers many sources of economic growth but still has some shortcomings. Firstly, factors explaining the economic growth have not been fully covered. Foreign investment, for instance, has not been included in the model, despite it being one of the most important sources of economic growth, especially in the case of Vietnam. Secondly, the efficiency of savings and investment, two of the channels of transmission from financial development to economic growth, have not been analysed quantitatively so

far. Therefore, in order to take these channels into account and give an additional factor, which can explain the sources of economic growth, I build the following estimation models to estimate the relationship in the case of Vietnam.

$$Y_i = \alpha + \beta X_i + e_i \quad (8)$$

where Y_i includes the economic growth rate; the incremental saving output ratio (ISOR); rate of capital growth; the growth rate of the incremental investment output ratio (ICOR); the information technology measured by number of phones per population; and productivity growth. X_i includes the indicator of financial development, namely the credit to the economy as percentage of GDP and the number of financial institutions per million population; an indicator to measure openness of the economy, rate of exports plus imports to GDP; initial real GDP per capita; education; government consumption; inflation; and foreign direct investment. e_i is the error term.

In summary, I develop the previous estimation model and obtain the four following differences. Firstly, my new model captures the role of international finance in economic development. Secondly, including FDI in the model helps to identify which channel, quantity or quality of FDI or both, financial development has a more indirect influence on economic growth. Thirdly, my model identifies two additional channels, savings and investment, through which financial development can influence the efficiency of savings and the efficiency of investment. Finally, the influence of information technology is another channel through which financial development can affect the efficiency of investment since better information technology can help reduce the problem of asymmetry. This is because lenders can be able to know more borrowers. More importantly, this model captures

characteristics of the Vietnamese economy more appropriately. This is because the contribution of FDI to economic growth is very meaningful. FDI has a significant role in domestic savings, gross national investment, foreign exchange earnings, and national budget and hence economic growth (Mai, 2000). FDI is positively related to technological spillover effects and thus productivity (Thuy, 2007).

3. Data and proxies

The chapter studies the relationship between financial development and economic growth using data from 62 Vietnamese provinces over the period 1997-2004 for the total credit as a percentage of GDP as a financial development indicator and the period 2000-2004 for the alternative financial development indicators at the financial institution level.

However, because of the problem of data availability, data used in this chapter is collected from many sources: the General Statistical Office of Vietnam, newspapers, internet and reports from the State Bank of Vietnam. Data for 2004 are available only in a few provinces. Outliers and missing values are removed out of the sample in each regression.

Because of problems of data availability in Vietnam and of measures used in the existing literature, total credit/GDP, the number of financial institutions per million population, turnover of financial institutions/GDP, and total assets of financial institutions/GDP are used in this paper.

The number of financial institutions per unit of population is used because it might present the degree of competition in the financial system. The greater density of financial institutions means a higher level of competition which in turn implies better financial services, including the level and quality of credit.

Following Rousseau and Wachtel (2002), and Shan and Jianghong (2006), total credit/GDP is employed to proxy for financial development. This is a useful indicator of financial development since credit may reflect funds mobilization to facilitate transactions and reduce transaction costs, finance for producers and consumers, and fulfil the means of exchange function of money. In addition, changes in financial services such as a sharp increase in the use of credit cards and internet banking, resulting from technological advances and financial reforms, might facilitate bigger amounts of credit being generated by the financial system (Shan and Jianghong, 2006). Moreover, total credit/GDP measures the general level of the financial system in the economy (Rousseau and Wachtel, 2002).

Productivity is derived from a simple production function as follows: $Y = AK^{\alpha}L^{1-\alpha}$. Dividing both sides by $K^{\alpha}L^{1-\alpha}$ yields: productivity $= \frac{Y}{K^{\alpha} L^{1-\alpha}}$.

King and Levine (1993) take the values of α between 0.2 and 0.4 for their experiment and find that there are no important influences in their results. Hence, they choose their results with α =0.3. Following King and Levine (1993) and Beck et al. (2000), it is assumed that α is 0.3.

I use ICOR and ISOR[18] as a measure of savings and investment efficiency in which they are calculated by the savings and investment/GDP ratio divided by the annual rate of GDP growth. Smaller ICOR and ISOR factors, hence, give more efficient investment and savings. I build the indicator, ISOR, to see the efficiency of using savings for economic growth.

[18] ICOR = Incremental capital output ratio. ISOR = Incremental savings output ratio.

ISOR is a better indicator than ICOR because it reflects more appropriately how effectively the financial system uses savings for growth. A higher level of savings can lead to a better level of investment, but there is a gap between savings and investment. Savings have not been fully mobilized in Vietnam due to the weakness of the financial system. People have had limited ideas about the use of their savings because the financial system has not had or not provided good financial advice or options. Therefore, they use their savings to buy precious assets like gold or foreign currencies or buy land and houses as speculation.

Because of the problem of data availability, I calculate provincial savings as follows: Provincial savings = $\frac{National\ savings}{National\ GDP}$ provincial GDP. I use the number of phones per population to proxy for information technology.

4. Estimation results and discussion

This chapter employs alternative financial indicators to estimate the impacts. This chapter also uses the alternative methods of estimation in panel data, which depend on tests for each method. The GLS is used to resolve the autocorrelation and heteroscedasticity if they are present. The LM test is presented in order to choose the Pooled OLS and the random effect method. The Hausman test is used to justify the reason why the random effect or the fixed effect approach is employed. The VIF method is also used to detect the problem of multicollinearity for OLS estimations. There are no signals for this problem in the regression results. IV- regressions are employed to resolve the problem of endogeneity, in which regional dummies, education, provincial population and labour, lags of inflation and openness are used as instrumental variables. The results are as follows:

4.1. The impacts on economic growth

Table 2.9-1 and table 2.9-2 in the appendix report the regression results and show several methods of estimation in panel data. The two tables present the evidence as to why FDI should be included in the estimation equations since the results give higher R-square and are significant with expected signs. The equation 6 in the GLS method is the best one in terms of R-square and in resolving the problem of heteroscedasticity. The equation is therefore used to analyse the impact of financial development on economic growth.

Consistent with the results pointed out by Levine (1997, 1999), the results in table 2.9-1 and table 2.9-2 show that both coefficients of financial development are statistically significant at 5 percent or even better. All coefficients have positive signs. This means that the relationship between financial development and economic growth is positive. The interesting point here is that the positive impact of FDI on economic growth is clear since all coefficients of FDI are positively significant equation 3 in both table 2.9-1 and table 2.9-2. This confirms that FDI is an important determinant of economic growth.

It would be interesting to disentangle the impacts of financial development on volume and quality of FDI in these results. The method of Gregorio and Guidotti (1995) is applied to capture the indirect impact of financial development on growth through encouraging FDI. If the coefficient of financial development increases greatly when FDI is excluded in the regression equation, then it can be concluded that the main channel of transmission from financial development to growth is the volume of FDI. Using equations 5 and 6 in both tables, the coefficient of financial development increases enormously (59.91% in table 2.9-1 and 70.97% in table 2.9-2)

if FDI is included in the model. Thus, it is concluded that the impact of financial development on growth is mainly through increasing the quality of FDI.

In all equations, the human capital, openness and government consumption are significantly related to economic growth at 1 percent and 10 percent respectively. Inflation has different signs between table 2.9-1 and table 2.9-2, but only the latter is positively significant at 1 percent. It appears that inflation encourages economic growth during the period 2000-2004. This may be because the Vietnamese economy had suffered deflation and very low inflation[19] after the Asian financial crisis took place in the late 1997, due to weak demand. Therefore, inflation promotes economic growth during that time. The negative correlation between inflation and economic growth can reflect simply that inflation is a proxy of financial repression (Gregorio, 1995). Based on this argument, inflation is a proxy of financial liberalization in the case of Vietnam. That is reasonable since Vietnam has been carrying out its financial liberalization since 1988.

4.2. The impacts on savings

Table 2.10-1 and table 2.10-2 in the appendix tell that equation 4 and equation 6 respectively are the best estimations, leading to the following interpretation. Firstly, table 2.10-1 shows that the financial development indicator is almost not significant but has the expected sign. In contrast, this indicator is significant at 1% and has the expected sign in table 2.10-2. This leads to a conclusion that financial development increases efficiency of using savings for economic growth in Vietnam. Secondly, all other coefficients have the expected signs and are significant at 1 percent at least in one table. Among these coefficients, the

[19] The inflation rate in Vietnam: 1998: 8.6%; 1999: -0.2%; 2000: -0.5%; 2001: 0.7%; 2002: 4.0%; 2003: 2.9%; 2004: 9.5% (IMF, 2002 and 2006)

coefficients of schooling and openness are negatively significant in both tables. This confirms that improving human capital and implementing the open policy of Vietnam helped to increase the efficiency of using savings. This reflects the success of the renovation policy of Vietnam which started in 1986. Finally, the estimated results reflect that government consumption, inflation and FDI play a key role in improving the use of savings in Vietnam.

4.3. The impacts of investment

4.3.1. The impacts of capital growth

Both table 2.11-1 and table 2.11-2 in the appendix show that equation 6 and equation 4 respectively give the best estimation result because they have a better R-square, and there appear no problems with autocorrelation and heteroscedasticity. Furthermore, there is no evidence of multicollinearity, which make the regression results robust.

Financial development and FDI foster capital growth since these coefficients are positively significant at 10 percent and 1 percent respectively. While FDI shows a slight impact on capital growth, financial development presents a very strong influence on capital growth. This confirms the strong positive effects of financial development on capital growth. This reflects how Vietnam has been successfully encouraging foreign investment, especially FDI, since the late 1980s. FDI has contributed to capital growth during the period 1995-2006 and played an important role in economic growth (Nguyen, 2006).

Schooling and openness are not significant but government expenditure has its positive sign and significantly at 1 percent in table 2.11-2. This means that government spending promotes capital growth by nearly 0.3 percent if it increases by

1 percent. In addition, inflation discourages capital growth since it presents its negatively significant sign at 5 percent.

4.3.2. The impacts on investment efficiency

The estimated results appear to show that there is no multicollinearity in the OLS estimation. Again it can be seen in both table 2.12-1 and table 2.12-2 in the appendix that equation 4 and equation 6 are the best estimations, which have the best fit and neither autocorrelation nor heteroscedasticity exists.

It is not surprising that financial development strongly improves the efficiency of investment since the estimated coefficient is negatively significant at 1 percent. However, government expenditure and education cause deterioration in the efficiency of investment during the period 2000-2004. This is because the economy had weak demand in the period and the government carried out a lot of credit programs in order to increase the demand. The source of credit was very cheap with easy borrowing conditions. The easy borrowing conditions, which provided abundant credit without carefully appraising the efficiency of investment[20], also corruption could have led to the inefficiency of investment. In addition, the ratio of school enrolment increased due to the government support during the period. Meanwhile, the average growth rate in the period 2000-2004 was somehow lower than that in the period 1989-1999 (as shown in table 2.4).

Inflation appears to have no impact on the efficiency of investment, but human capital and openness prove their heavily positive influence on the efficiency of investment since their estimation coefficients are negatively significant at 1 percent and 10 percent respectively in table 2.12-1. Therefore, domestic human

[20] Consistent with Rioja and Valev (2002)'s argument.

capital improves efficiency of investment by around 7.4 percent as there is an increase of 1 percent in domestic human capital. In addition, the strongly positive impact of openness on the efficiency of investment shows that the openness policy of the Vietnamese government, started in 1986, was appropriate. This evidence has become especially apparent in the early 1990s onwards. This policy has helped Vietnam to learn, adopt and attract foreign technology, which in turn fostered efficiency of investment and hence economic growth.

The estimated coefficient of foreign direct investment is positively significant at 10% in equation 2, table 2.12-1. This coefficient is positive but not significant in table 2.12-2. This means that there has been inefficiency with using the FDI in the Vietnamese economy. The reason is that the government has introduced a policy of import substitution and thus has maintained the very high rate of protection. All protected industries have become inefficient and provided low returns to the economy. They have not been competitive in the world market. For instance, 15 FDI automobile assembly ventures were approved and eight had moved on to operation. However, the market in Vietnam is too small for the automobile assembly to have high return. These investments have been inefficient and wasteful of FDI sources (World Bank, 1999).

4.3.3. The impacts on information technology

The evidence from table 2.13-1 and table 2.13-2 in the appendix shows that equation 6 gives the best estimation results with expected signs and significant coefficients. All coefficients are positively significant at 1 percent except FDI and inflation. Both tables indicate that a 1 percent increase in the level of financial development can improve information technology by around 0.0005 percent, other

things being equal. The positive correlation between financial development and information technology supports the hypothesis that financial development can positively affect the efficiency of investment, hence economic growth, by reducing the problem of asymmetric information. This also reflects that the financial system has been faced with a problem of providing timely and accurate data for risk management. This is because the financial system has not been able to control the integrity of data due to underdeveloped and substandard information technology systems. Thus, growth in the information technology has largely contributed to the efficiency of the financial system, leading to improvement in the efficiency of using funds mobilized for investment.

As can be seen in both tables, human capital, government expenditure and openness encourage the adoption of information technology since all coefficients are positively significant at 1 percent. The evidence from these tables also shows that inflation and FDI indicate their positive relationship with information technology. This shows that Vietnam has been successful in attracting foreign investment in order to improve its infrastructure. This evidence also represents the fact that foreign investors have been interested in investing in information technology such as mobile phone and home telephone networks.

4.4. The impacts on productivity

In table 2.14-1 in the appendix the best estimation is equation 4 in the GLS method. This is because this equation shows the highest R-square without heteroscedasticity. Although table 2.14-2 in the appendix does not show much difference between the Pooled OLS, 2SLS and the GLS method, equation 6 is still

preferred because of the higher R-square. In addition, the estimated results do not show any evidence of a multicollinearity problem.

Financial development has a positive impact on productivity growth in both table 2.14-1 and table 2.14-2. That is consistent with the results shown by Levine et al. (1997, 1999). Openness and human capital strongly accelerate productivity growth. The only surprise is that inflation in table 2.14-1 deteriorates productivity growth but seems to improve it in table 2.14-2. As mentioned in section 2.4-1, since I use a different period of time and different indicators, this may lead to a different sign of the coefficient. The only explanation I can offer is that the Vietnamese economy suffered from very weak demand during the period 1999-2004 as a result of the 1997-1998 Asian financial crisis.

Government consumption and FDI have positive signs but only FDI seems to be statistically significant. This tells us that while government spending gives us a signal for encouraging productivity as it goes up, FDI seems to confirm its positive role in productivity growth. This supports the hypothesis that FDI could transfer technology, increase competition and labour skills, hence productivity in Vietnam.

V. CONCLUSION

I use the pooled OLS, fixed and random effect, IV-regressions, and GLS in the panel data technique to examine the impact of financial development on economic growth in Vietnam through four main channels: savings, productivity, investment, and efficiency of investment. In all estimations, I find that financial development has strong positive effects on economic growth, the efficiency of using savings, the total productivity, the capital accumulation and the efficiency of investment, in the case of Vietnam. The financial development has a positive role in

improving the efficiency of investment through increasing the level of information technology, which can reduce the level of asymmetric information. Unlike the previous studies, I analyse an additional factor, international finance, and find that the role of international finance is also important to economic growth. International finance plays a positive role in economic growth through improving productivity, the efficiency of using savings and capital accumulation. The indirect impact of financial development on economic growth is mainly through increasing the quality of foreign direct investment.

Education and openness have promoted economic growth and productivity, and improved use of savings for investment and the progress of information technology between 1996 and 2004. Government consumption shows its positive role in economic growth, the efficiency of using savings, capital accumulation and the progress of information technology. It also presents its negative role in the efficiency of investment during the period 2000-2004. Inflation shows an interesting point as it improves economic growth, the efficiency of using savings, the progress of information technology during the period 2000-2004 while it plays a negative role in productivity between 1997 and 2000, and a positive role during the period 2000-2004.

My estimations are robust and persuasive since specification tests are applied to show the robustness of the results. These results support the hypothesis that a better financial system can lead to better economic signals, through increasing the productivity, the capital accumulation, the efficiency of investment and the efficiency of using savings for economic growth.

APPENDIX

Table 2.5: Inflation and Interest Rate in Vietnam, 1933-1987

NOTE:
This table is included on page 42 of the print copy of the thesis held in the University of Adelaide Library.

Source: Luoc (1992)

Table 2.6: Inflation in Vietnam, 1989-2005

Unit: %

Year	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Inflation rate	394	34.7	67.5	67.6	17.6	5.2	14.4	12.7	4.5
Year	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Inflation rate	6.0	8.6	-0.2	-0.5	0.7	4.0	2.9	9.5	7.0

Source: - 1998-2004: IMF (2002 and 2006); 1988-1997: World Bank (1999); 2005: GSOVN (2006)

Table 2.7: Contribution of the financial sector to GDP

NOTE:
This table is included on page 42 of the print copy of the thesis held in the University of Adelaide Library.

Note: The financial sector includes banking and insurance industry.

Source: World Bank (1997)

Table 2.8: The Share in GDP by Sector
(As a percentage of GDP)

Share in GDP	Ranking	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Manufacturing industry	1	15.46	16.06	16.75	17.45	17.99	18.82	19.60	20.43	21.22	21.83	22.78
Agricuture	2	22.32	21.35	20.72	20.29	20.44	19.91	19.01	18.49	17.77	17.14	16.29
Domestic trade and maintaining services	3	17.18	17.24	17.05	16.83	16.39	16.31	16.33	16.36	16.28	16.29	16.27
Construction	4	7.46	7.92	8.15	7.67	7.50	7.55	7.96	8.22	8.47	8.57	8.76
Minining and quarrying industry	5	5.29	5.50	5.75	6.20	6.71	6.73	6.56	6.19	6.13	6.19	5.76
Transport, storage and communications	6	4.01	3.94	3.97	3.90	3.96	3.92	3.91	3.91	3.84	3.86	3.90
Real estate, renting and business activities	7	4.98	4.83	4.79	4.78	4.65	4.47	4.32	4.18	4.10	3.97	3.77
Hotels and restaurants	8	3.45	3.47	3.44	3.40	3.32	3.24	3.23	3.23	3.17	3.18	3.43
Education	9	3.56	3.52	3.49	3.52	3.44	3.35	3.31	3.34	3.35	3.35	3.34
Electricity, gas and water supply	10	1.73	1.86	1.98	2.10	2.16	2.32	2.45	2.55	2.66	2.76	2.86
State management, security and military activities	11	3.61	3.53	3.40	3.34	3.01	2.93	2.88	2.80	2.74	2.70	2.67
Aquiculture	12	2.69	2.56	2.39	2.36	2.34	2.44	2.55	2.51	2.52	2.54	2.60
Financial intermediation	13	2.01	2.05	1.98	1.98	2.08	2.06	2.05	2.05	2.06	2.07	2.09
Individual and public services	14	1.99	2.04	2.19	2.22	2.17	2.10	2.06	2.03	2.01	1.97	1.95
Health and social work	15	1.54	1.51	1.45	1.46	1.45	1.44	1.42	1.43	1.44	1.44	1.44
Foresty	16	1.23	1.14	1.06	1.01	0.99	0.93	0.87	0.82	0.77	0.72	0.67
Science and technology activities	17	0.61	0.59	0.57	0.57	0.49	0.57	0.60	0.61	0.61	0.61	0.60
Cultural and sports activities	18	0.56	0.56	0.57	0.58	0.59	0.59	0.56	0.54	0.55	0.55	0.55
Housewife services	19	0.22	0.22	0.21	0.22	0.21	0.21	0.20	0.19	0.18	0.17	0.17
Party, youth union and association activities	20	0.09	0.09	0.11	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11
Growth rate in financial intermediation	21		1.86	-3.53	0.02	4.98	-0.68	-0.57	-0.10	0.57	0.26	0.86

Source: The author's calculation from data of General Statistics Office's website: http://www.gso.gov.vn.

Table 2.9-1: The effects of financial development on economic growth
(Credit to the economy as a percentage of GDP)

	Panel data				Panel data (GLS)	
	1 (RE)	2 (IV-RE)	3 (FE)	4 (IV-FE)	5	6
Constant	-5.735 (0.405)	-16.004* (0.052)	6.167*** (0.000)	5.724** (0.023)	-3.1687 (0.541)	4.0505 (0.520)
Credit to the economy	0.017 (0.223)	0.092* (0.088)	0.039* (0.083)	0.197** (0.025)	0.0227* (0.075)	0.0363** (0.024)
Initial real GDP per capita	0.793* (0.084)	1.014* (0.051)			0.6472* (0.054)	0.2097 (0.607)
Schooling	0.686*** (0.000)	0.734** (0.025)	-0.102 (0.782)	-0.076 (0.796)	0.6884*** (0.000)	0.4671** (0.012)
Government expenditure	0.018** (0.045)	0.023** (0.035)	0.054*** (0.003)	0.043** (0.036)	0.01445** (0.045)	0.0053 (0.542)
Inflation	-0.009 (0.462)	-0.011 (0.379)	0.002 (0.904)	-0.0004 (0.977)	-0.0143 (0.274)	-0.0131 (0.333)
Openness	0.209 (0.185)	0.251 (0.144)	-0.139 (0.621)	0.004 (0.991)	0.3284*** (0.005)	0.2727** (0.024)
FDI			0.0002* (0.070)	0.0001 (0.452)		0.0001 (0.242)
Hausman test (p-value)	0.2335		0.0714			
Wald test for heteroscedasticity (p-value)			0.000			
Sargan test (p-value)		0.1114		0.4137		
Serial correlation test (p-value)		0.0000		0.0703		
R_square	0.132		0.513		0.788	0.889
Observations	360	348	234	234	360	234

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Table 2.9-2: The effects of financial development on economic growth

(Number of financial institutions per million population)

	Panel data				Panel data (GLS)	
	1 (RE)	2 (IV-RE)	3 (RE)	4 (IV-RE)	5	6
Constant	-23.339*** (0.003)	-37.108** (0.012)	-22.717** (0.016)	-26.168* (0.074)	-22.249*** (0.000)	-22.540*** (0.007)
Number of financial institutions	0.021 (0.239)	0.223** (0.032)	0.042** (0.042)	0.166* (0.090)	0.031** (0.021)	0.053*** (0.001)
Initial real GDP per capita	1.024** (0.033)	1.756** (0.022)	0.851 (0.124)	1.057 (0.155)	0.794** (0.018)	0.646 (0.00150)
Schooling	0.672*** (0.001)	0.034 (0.765)	0.195* (0.067)	0.008 (0.943)	0.513*** (0.001)	0.207** (0.038)
Government expenditure	0.013 (0.162)	0.036** (0.030)	0.013 (0.212)	0.025 (0.104)	0.011 (0.131)	0.008 (0.369)
Inflation	0.133*** (0.000)	0.145*** (0.003)	0.152*** (0.000)	0.152*** (0.005)	0.159*** (0.000)	0.179*** (0.000)
Openness	0.126 (0.352)	0.171 (0.302)	0.070 (0.627)	0.146 (0.352)	0.250*** (0.000)	0.215* (0.053)
FDI			0.0003* (0.072)	0.0002 (0.286)		0.0001 (0.311)
Hausman test (p-value)	0.1653		0.3693			
Wald test for heteroscedasticity (p-value)						
Sargan test (p-value)		0.5193		0.4133		
Serial correlation test (p-value)		0.9099		0.6761		
Overall R_square	0.2144		0.2477		0.971	0.956
Observations	219	218	160	159	219	160

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Table 2.10-1: The effects of financial development on savings efficiency (ISOR)
(Credit to the economy as a percentage of GDP)

	Panel data (Random effect)		Panel data (GLS)	
	1	2	3	4
Constant	0.140***	0.098***	0.141***	0.094***
	(0.000)	(0.002)	(0.000)	(0.000)
Credit to the economy	-0.0001	-0.0001	-0.0001*	-0.0001
	(0.227)	(0.210)	(0.056)	(0.104)
Initial real GDP per capita	-0.006***	-0.003*	-0.006***	-0.003**
	(0.004)	(0.096)	(0.000)	(0.043)
Schooling	-0.001***	-0.001*	-0.001***	-0.001**
	(0.004)	(0.073)	(0.001)	(0.046)
Government expenditure	-0.00003	-0.00001	-0.00003	5.08E-06
	(0.469)	(0.787)	(0.288)	(0.892)
Inflation	-0.0001***	-0.0001*	-0.0001**	-0.0001
	(0.008)	(0.099)	(0.023)	(0.242)
Openness	-0.001*	-0.001	-0.002***	-0.001**
	(0.06)	(0.124)	(0.001)	(0.018)
FDI		-7.85E-07***		-6.61E-07**
		(0.003)		(0.011)
Hausman test (p-value)	0.2860	0.3417		
Wald test for heteroscedasticity (p-value)	0.000	0.000		
R-square	0.113	0.1229	0.555	0.949
Observations	382	254	382	254

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Table 2.10-2: The effects of financial development on savings efficiency (ISOR)

(Number of financial institutions per million population)

	Panel data				Panel data (GLS)	
	1 (FE)	2 (IV-FE)	3 (FE)	4 (IV-FE)	5	6
Constant	0.105***	0.106***	0.102***	0.053	0.185***	0.167***
	(0.000)	(0.000)	(0.000)	(0.126)	(0.000)	(0.000)
Number of financial institutions	-0.001***	-0.005**	-0.001***	-0.004**	-0.0001*	-0.0002**
	(0.000)	(0.039)	(0.000)	(0.025)	(0.061)	(0.033)
Initial real GDP per capita					-0.005***	-0.005**
					(0.002)	(0.026)
Schooling	-0.011***	-0.011**	-0.012***	-0.010**	-0.001	-0.001
	(0.000)	(0.024)	(0.004)	(0.036)	(0.208)	(0.365)
Government expenditure	1.05E-05	0.0002	-0.00002	0.0001	-0.0001***	-0.0001**
	(0.886)	(0.294)	(0.845)	(0.642)	(0.002)	(0.015)
Inflation	-0.0003	-0.0003	-0.0002	0.0002	-0.001***	-0.0004*
	(0.157)	(0.443)	(0.424)	(0.549)	(0.006)	(0.071)
Openness	-0.001	-0.001	-0.001	-0.001	-0.001***	-0.001**
	(0.407)	(0.818)	(0.401)	(0.593)	(0.009)	(0.044)
FDI			-6.81E-08	5.63e-07		-2.14E-07
			(0.921)	(0.523)		(0.749)
Hausman test (p-value)	0.0002		0.0019			
Wald test for heteroscedasticity (p-value)	0.0000		0.0000			
Sargan test (p-value)		0.5475		0.1161		
Serial correlation test (p-value)		0.4967		0.5351		
Overall R_square	0.0238		0.0316		0.963	0.978
Observations	245	245	184	187	245	184

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets. Turnover of financial companies/ provincial GDP is used as a measure of financial development in IV-FE.

Table 2.11-1: The effects of financial development on capital growth

(Credit to the economy as a percentage of GDP)

	Panel data				Panel data (GLS)	
	1 (FE)	2 (IV-FE)	3 (FE)	4 (IV-FE)	5	6
Constant	56.090* (0.058)	56.415* (0.057)	60.287* (0.066)	63.891* (0.084)	157.423** (0.042)	213.289** (0.013)
Credit to the economy	1.199*** (0.000)	1.401 (0.357)	1.0201*** (0.003)	3.541** (0.021)	0. 610*** (0.000)	0. 727*** (0.001)
Initial real GDP per capita					-7.692 (0.113)	-11.016** (0.039)
Schooling	1.561 (0.612)	1.448 (0.650)	3.344 (0.0.362)	1.399 (0.745)	0. 545 (0.619)	0.380 (0.781)
Government expenditure	-0.204 (0.369)	-0.227 (0.424)	- 0.307 (0.253)	-0.447 (0.154)	- 0.080 (0.447)	0.048 (0.680)
Inflation	-0.476** (0.025)	-0.481** (0.025)	-0.657*** (0.001)	-0.697*** (0.002)	-0.293 (0.132)	-0.392** (0.033)
Openness	-0.483 (0.916)	-0.360 (0.938)	1.236 (0.767)	3.085 (0.523)	0. 758 (0.661)	1.182 (0.462)
FDI			0.002** (0.027)	0.001 (0.205)		0.002** (0.050)
Hausman test (p-value)	0.0197		0.0901			
Wald test for heteroscedasticity (p-value)	0.000		0.000			
Sargan test (p-value)		0.9468		0.6350		
Serial correlation test (p-value)		0.0009		0.1927		
R_square	0.0420		0.0500		0.143	0.893
Observations	392	392	262	262	392	262

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Table 2.11-2: The effects of financial development on capital growth
(Number of financial institutions per million population)

	Panel data (Pooled OLS)		Panel data (GLS)	
	1	2	3	4
Constant	-29.176 (0.655)	41.953 (0.601)	-29.176 (0.649)	41.953 (0.591)
Number of financial institutions	0.329** (0.012)	0.263* (0.066)	0.329*** (0.010)	0.263* (0.058)
Initial real GDP per capita	-0.637 (0.855)	-2.837 (0.506)	-0.637 (0.853)	-2.837 (0.495)
Schooling	-0.229 (0.789)	-0.041 (0.967)	-0.229 (0.786)	-0.041 (0.967)
Government expenditure	0.199** (0.014)	0.237** (0.017)	0.199** (0.012)	0.237** (0.013)
Inflation	0.487 (0.245)	0.089 (0.842)	0.487 (0.236)	0.089 (0.838)
Openness	0.674 (0.476)	0.563 (0.560)	0.674 (0.468)	0.563 (0.549)
FDI		0.001 (0.197)		0.001 (0.184)
Durbin – Watson test	1.666	1.596		
Breusch and Pagan Lagrangian multiplier test for random effects (p-value)	0.6070	0.2828		
Cook-Weisberg test for heteroskedasticity (p-value)	0.9261	0.2952		
R_square	0.069	0.081	0.414	0.736
Observations	221	168	221	168

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Test for multicollinearity

FDI not included in the model			**FDI included in the model**		
Variable	VIF	1/VIF	Variable	VIF	1/VIF
Financial indicator	1.11	0.89	Financial indicator	1.13	0.88
Initial real GDP per capita	1.95	0.51	Initial real GDP per capita	2.75	0.36
Schooling	1.20	0.84	Schooling	1.25	0.80
Government expenditure	1.70	0.59	Government expenditure	1.70	0.59
Inflation	1.05	0.95	Inflation	1.03	0.97
Openness	1.16	0.86	Openness	1.28	0.78
			FDI	1.96	0.51
Mean VIF	1.36			1.59	

Table 2.12-1: The effects of financial development on ICOR growth
(Credit to the economy as a percentage of GDP)

	Panel data (Fixed and random effect)		Panel data (GLS)	
	1 (FE)	2 (RE)	3	4
Constant	54.536** (0.067)	122.672 (0.327)	69.833 (0.456)	122.437 (0.274)
Credit to the economy	-0.331 (0.348)	-0.627** (0.044)	-0.420* (0.072)	-0.580** (0.044)
Initial real GDP per capita		-5.857 (0.471)	-3.368 (0.577)	-5.913 (0.411)
Schooling	-27.449*** (0.000)	-9.217*** (0.010)	-8.791*** (0.000)	-8.672*** (0.007)
Government expenditure	0.252 (0.364)	-0.175 (0.303)	-0.178 (0.177)	-0.142 (0.367)
Inflation	0.259 (0.301)	0.096 (0.693)	0.239 (0.313)	0.075 (0.755)
Openness	-2.399 (0.682)	-2.813 (0.264)	-1.993 (0.350)	-2.303 (0.283)
FDI		0.002* (0.075)		0.001 (0.105)
Durbin – Watson test	2.311	1.763	1.930	1.873
Hausman test (p-value)	0.0086	0.6219		
Wald test for heteroscedasticity (p-value)	0.000			
R_square	0.267	0.077	0.09	0.153
Observations	343	233	343	233

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Test for multicollinearity

FDI not included in the model			**FDI included in the model**		
Variable	VIF	1/VIF	Variable	VIF	1/VIF
Financial indicator	1.09	0.91	Financial indicator	1.10	0.91
Initial real GDP per capita	1.73	0.58	Initial real GDP per	2.07	0.48
Schooling	1.49	0.67	capita	1.47	0.68
Government expenditure	1.80	0.55	Schooling	1.69	0.59
Inflation	1.16	0.86	Government expenditure	1.17	0.85
Openness	1.14	0.88	Inflation	1.49	0.67
			Openness	1.96	0.51
			FDI		
Mean VIF	1.40			1.57	

Table 2.12-2: The effects of financial development on ICOR growth

(Number of financial institutions per million population)

	Panel data				Panel data (GLS)	
	1 (Pooled OLS)	2 (2SLS)	3 (Pooled OLS)	4 (2SLS)	5	6
Constant	-288.812*** (0.001)	-229.635** (0.011)	-265.530** (0.018)	-221.012* (0.068)	-288.812*** (0.001)	-270.320** (0.013)
Number of financial institutions	-0.426** (0.016)	-0.980*** (0.003)	-0.378* (0.077)	-0.782** (0.045)	-0.426** (0.013)	-0.362* (0.081)
Initial real GDP per capita	16.049*** (0.000)	14.069*** (0.010)	13.869** (0.012)	12.146* (0.086)	16.049*** (0.000)	13.547** (0.011)
Schooling	0.631 (0.429)	4.684** (0.040)	0.897 (0.351)	6.166** (0.032)	0.631 (0.421)	0.718 (0.447)
Government expenditure	0.264** (0.018)	0.236** (0.017)	0.236* (0.094)	0.224* (0.084)	0.264** (0.016)	0.230* (0.092)
Inflation	0.360 (0.533)	0.083 (0.884)	0.427 (0.527)	0.217 (0.756)	0.360 (0.526)	541 (0.413)
Openness	-1.413 (0.267)	-1.620 (0.131)	-1.906 (0.181)	-1.277 (0.296)	-1.413 (0.258)	-1.142 (0.446)
FDI			0.001 (0.472)	-0.0004 (0.713)		-0.0003 (0.858)
Hausman test (p-value)	0.8292		0.3096			
Wald test for heteroscedasticity (p-value)	0.9691		0.5085			
Sargan test (p-value)		0.7464		0.6975		
Serial correlation test (p-value)		0.0539		0.3596		
R_square	0.116		0.108		0.121	0.289
Observations	224	224	167	167	224	167

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Table 2.13-1: The effects of financial development on information technology

(Credit to the economy as a percentage of GDP)

	Panel data				Panel data (GLS)	
	1 (FE)	2 (IV-FE)	3 (FE)	4 (IV-FE)	5	6
Constant	-0.482*** (0.000)	-0.391 (0.278)	-0.642*** (0.000)	-0.447** (0.032)	-0.672*** (0.000)	-0.692*** (0.000)
Credit to the economy	0.0002 (0.147)	0.012*** (0.009)	0.001** (0.044	0.012*** (0.006)	0.0004*** (0.002)	0.0005*** (0.008)
Initial real GDP per capita					0.039*** (0.000)	0.039*** (0.000)
Schooling	0.044*** (0.000)	0.034 (0.291)	0.057**** (0.000)	0.042** (0.039)	0.010*** (0.000)	0.012*** (0.000)
Government expenditure	0.0004*** (0.000)	-0.001 (0.119)	0.001*** (0.002)	-0.001 (0.217)	0.001*** (0.000)	0.001*** (0.000)
Inflation	-0.00004 (0.689)	-0.0002 (0.655)	0.00002 (0.847)	-0.0001 (0.803)	-6.31E-08 (1.000)	5.82E-06 (0.965)
Openness	0.013*** (0.000)	0.001 (0.928)	0.014*** (0.000)	-0.002 (0.854)	0.010*** (0.000)	0.009*** (0.000)
FDI			-1.38E-06 (0.120)	5.94e-08 (0.983)		7.58E-07 (0.405)
Hausman test (p-value)	0.0002		0.0000			
Wald test for heteroscedasticity (p-value)	0.0000		0.0000			
Sargan test (p-value)		0.1629		0.8319		
Serial correlation test (p-value)		0.000		0.0012		
R_square	0.1573		0.1118		0.575	0.618
Observations	389	389	257	257	389	257

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Table 2.13-2: The effects of financial development on information technology

(Number of financial Institutions per million population)

	Panel data				Panel data (GLS)	
	1 (RE)	2 (IV-RE)	3 (RE)	4 (IV-RE)	5	6
Constant	-1.081*** (0.000)	-1.089*** (0.000)	-1.110*** (0.000)	-1.078*** (0.000)	--1.076*** (0.000)	-0.-1.054*** (0.000)
Number of financial Institutions	0.0001 (0.695)	0.001** (0.045)	7.63E-05 (0.870)	0.002** (0.016)	0.0003 (0.181)	0.0004 (0.222)
Initial real GDP per capita	0.056*** (0.000)	0.056*** (0.000)	0.055*** (0.000)	0.055*** (0.000)	0.055*** (0.000)	0.051*** (0.000)
Schooling	0.011*** (0.000)	0.007*** (0.001)	0.013*** (0.001)	0.009*** (0.003)	0.008*** (0.000)	0.011*** (0.000)
Government expenditure	0.0004*** (0.000)	0.0004*** (0.000)	0.0005*** (0.001)	0.0005*** (0.000)	0.0003*** (0.000)	0.0004*** (0.000)
Inflation	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
Openness	0.011*** (0.000)	0.009*** (0.000)	0.010*** (0.000)	0.008*** (0.000)	0.009*** (0.000)	0.008*** (0.000)
FDI			2.44E-06* (0.071)	2.26e-06 (0.204)		2.84E-06* (0.077)
Durbin – Watson test	1.325		1.502		1.019	0.937
Hausman test (p-value)	0.6318		0.4078			
Wald test for heteroscedasticity (p-value)	0.000		0.000			
Sargan test (p-value)		0.1498		0.7962		
Serial correlation test (p-value)		0.0000		0.0001		
R_square	0.634		0.538		0.825	0.838
Observations	223	223	168	168	223	168

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Table 2.14-1: The effects of financial development on productivity growth
(Credit to the economy as a percentage of GDP)

	Panel data (Fixed and random effect)		Panel data (GLS)	
	1 (FE)	2 (RE)	3	4
Constant	-105.257*** (0.002)	-25.774 (0.499)	-34.164 (0.204)	-25.774 (0.487)
Credit to the economy	0.047 (0.629)	0.147* (0.077)	0.115* (0.075)	0.147* (0.069)
Initial real GDP per capita		1.283 (0.512)	2.239 (0.139)	1.283 (0.504)
Schooling	13.699*** (0.000)	2.216*** (0.039)	3.454*** (0.000)	2.216** (0.035)
Government expenditure	-0.074 (0.282)	0.030 (0.478)	0.081** (0.016)	0.030 (0.470)
Inflation	-0.338** (0.034)	-0.197 (0.357)	-0.384*** (0.010)	-0.197 (0.348)
Openness	0.162 (0.904)	0.613 (0.288)	0.797 (0.124)	0.613 (0.279)
FDI		0.0005 (0.387)		0.001 (0.379)
Durbin – Watson test	2.263	1.670	1.957	1.674
Hausman test (p-value)	0.017	0.293		
Wald test for heteroscedasticity (p-value)	0.000			
R_square	0.271	0.068	0.202	0.631
Observations	340	221	340	221

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

Test for multicollinearity

FDI not included in the model			**FDI included in the model**		
Variable	VIF	1/VIF	Variable	VIF	1/VIF
Financial indicator	1.13	0.89	Financial indicator	1.17	0.86
Initial real GDP per capita	1.67	0.59	Initial real GDP per capita	2.09	0.48
Schooling	1.10	0.91	Schooling	1.11	0.89
Government expenditure	1.58	0.63	Government expenditure	1.55	0.65
Inflation	1.09	0.92	Inflation	1.07	0.94
Openness	1.15	0.87	Openness	1.48	0.68
			FDI	2.02	0.49
Mean VIF	1.29				

Table 2.14-2: The effects of financial development on productivity growth
(Number of financial institutions per million population)

	Panel data				Panel data (GLS)	
	1 (Pooled OLS)	2 (2SLS)	3 (Pooled OLS)	4 (2SLS)	5	6
Constant	27.241* (0.051)	22.357 (0.101)	32.651** (0.041)	28.628* (0.063)	27.241** (0.045)	32.65** (0.034)
Number of financial institutions	0.058* (0.052)	0.141*** (0.008)	0.076** (0.025)	0.149*** (0.008)	0.058** (0.046)	0.076** (0.020)
Initial real GDP per capita	-2.087*** (0.004)	-1.724*** (0.009)	-2.641*** (0.002)	-2.191*** (0.003)	-2.087*** (0.003)	-2.641*** (0.001)
Schooling	0.435 (0.200)	0.260 (0.497)	0.942 (0.021)	0.862* (0.075)	0.435 (0.191)	0.942** (0.017)
Government expenditure	-0.006 (0.710)	0.004 (0.816)	0.001 (0.946)	0.012 (0.564)	-0.06 (0.705)	0.001 (0.944)
Inflation	0.054 (0.582)	0.041 (0.696)	0.065 (0.528)	0.030 (0.792)	0.054 (0.574)	0.065 (0.516)
Openness	0.638*** (0.007)	0.619*** (0.004)	0.475* (0.071)	0.460** (0.041)	0.638*** (0.005)	0.475* (0.061)
FDI			0.0003 (0.330)	0.0003 (0.312)		0.0003 (0.316)
Hausman test (p-value)	0.4872		0.9870			
Wald test for heteroscedasticity (p-value)	0.5298		0.9729			
Hansen test (p-value)		0.9042		0.3163		
Serial correlation test (p-value)		0.0840		0.2318		
R_square	0.112		0.199		0.475	0.786
Observations	197	196	155	196	197	155

Note: *** is significant at 1 percent, ** is significant at 5 percent and * is significant at 10 percent. P-values are in brackets.

CHAPTER III

THE IMPACTS OF FINANCIAL DEVELOPMENT ON VIETNAMESE HOUSEHOLD ECONOMIC ACTIVITIES

I. INTRODUCTION

The economic growth of most developing countries depends largely on the policies they adopt (Burnside and Dollar, 2000). Vietnam, for instance, had experienced economic difficulties until the introduction of the Doimoi (renovation) polices in 1986. The difficulties arose from the Vietnamese government exercising too much control over the economy. The development of the financial sector was constrained and this led to a low level of savings, and a low level and quality of investment. Consequently, even food production was insufficient to feed a fast growing population. It was hard for many households, especially in the rural areas, to meet basic demands. However, the Doimoi policy started in 1986 has changed dramatically the picture of Vietnam. Not only can households now meet their basic needs, but also a growing number of rich households are appearing rapidly.

Arguably, the improvement can be attributed to the government policies that gradually reduce the constraints on production. The question raised here is whether reducing these constraints can improve the development of the financial system and in turn whether the development of the financial sector would stimulate economic activities of households. Answering these questions is the main goal of this chapter.

Many papers have looked at the role of financial development in economic activities at both the macro and micro level. However, only a few papers such as Guiso et al. (2002, 2004) analyze the role at the household level, although Guiso et

al. do not examine the impact of financial development on household income and sources of household income.

The existing literature has not estimated a simultaneous equation model to show how financial development can influence economic growth. The analysis of financial development on household welfare has also been neglected. Furthermore, the measures of financial development used so far have not completely captured the role of the financial system in economic activities. Therefore, this chapter has estimated income equation and sources of household income equation, and the simultaneous equation to show how financial development influences economic activities and household welfare, which have been neglected by the existing literature. Furthermore, I have produced measures of financial development that capture the role of the financial system in economic activities more appropriately.

The main results of this chapter suggest that government policies improve financial development by encouraging education, financial liberalization, property rights which increase people's fixed assets, and the social relationship of households. In turn, financial development promotes the level and quality of savings and investment, labor productivity and the progress of information technology, and hence income of households. Furthermore, financial development is positively related to household economic welfare.

The rest of this chapter is structured as follows. Section II looks at the literature review, in which it shows determinants of financial development and its role in economic activities. Section III presents the model for estimation. Section IV describes data and methodology. Section V provides estimation results and discussion. Section VI summarizes the main findings.

II. LITERATURE REVIEW

1. Determinants of financial development

The relationship between financial development and economic activities has been analysed in detail by previous researchers, but they have paid little attention to answering the question 'what determines financial development'. It is very hard to find any papers apart from Gelb (1989) which analyse the determinants of financial development. Gelb uses data of 34 countries from 1965 to 1985 and employs M3/GDP as financial development indicator to point out that the impact of inflation on financial development is stronger than that of interest rate.

Guiso et al. (2001) employ around 8,000 households from the Survey of Households Income and Wealth in Italy to study the role of social capital in financial development. Besides social capital variables measured by the electoral turnout at the provincial level and voluntary blood donations, they include the characteristics of households' head such as education, age, place of birth, income, wealth and dummies. They conclude that social capital has the important role in the level of financial development in Italy.

Instead of answering the question above, many papers have paid attention to the question 'what determines household borrowing'. Some examples from rural economies are Yadav et al. in Nepal, Duong et al. and Quach et al. in Vietnam. Yadav et al. (1992) use an intensive survey of farm household in Nepal to study the segmentation in the rural financial markets and conclude that farm size is the most important determinant of borrowing in the informal markets while farm size and irrigation are main determinants of borrowing in the formal markets.

Duong and Izumida (2002) survey 300 households in three provinces which are located in the North, the Centre and the South of Vietnam to analyse the determinants of borrowing in the rural financial markets. They conclude that total farming area and total value of livestock are the major determinants of borrowing in the formal markets. They also point out that the dependent ratio of households and the total farming area are the decisive determinants of borrowing in the informal financial markets.

Quach and Mullineux (2006) use data of 2,108 households from the Vietnam Living Standard Survey conducted in 1997/1998 to study the determinants of borrowing. They find that education, savings and farming area are the most important determinants of borrowing.

2. The role of financial development in economic activities

There has been steady progress on studying the relationship between financial development and economic growth, both theoretically and empirically. Studies started from Goldsmith (1969) to recent papers such as Levine et al. (2000), Drifill (2003), Hansan (2006) and Phan (2006). Generally, most studies find a positive role for the financial system in the economic activities. Most studies focus on the national and provincial level to conclude that financial development can improve economic growth through increasing mobilization of savings and investment, enhancing efficiency of using saving and investment, and productivity.

Much attention has been paid to the nexus between financial development and economic growth at the firm level. However, there have been few subsequent papers looking at the nexus at the household level. The link has been only examined in some aspects. Guiso et al. (2002, 2004) consider this link at the household level.

They use three datasets: 8,119 households, 326,590 firms and the provincial data with their new financial development indicator $\left[1 - \frac{\text{Regional Effect}}{\text{Max (Regional Effect)}}\right]$ to analyze the effects of differences of the local financial development on the economic activity across the Italian regions. Probit, OLS and 2SLS estimation are employed to conclude that financial development affects positively on firm growth, industrial competition and individual business starts. The local financial development accelerates economic activities in the Italian regions. They also point out that the domestic financial system is still very important to the Italian economy though the economy is financially integrated into the European Union.

Lanot and Lawrence (2005) employ the Indian household consumption data for 11 rounds of the National Sample Survey before and during the period 1987-2000 to analyze the link between financial liberalization and household financial behavior. They suggest that financial development has an influence on expenditure on durable goods. Antzoulatos and Tsoumas (2005) look at the role of financial development from another aspect. They examine the impact of financial development on composition of household portfolios in Spain, England and America over the past two decades. Their findings point out that there is a link between financial development and household asset returns.

III. MODEL FOR ESTIMATION

1. Determinants of household financial development

There are several ways of analysing the determinants of financial development in the existing literature. Gelb (1989) employs OLS estimation with inflation and real interest rate as the determinants of financial development. Other

researchers such as Duong and Izumida (2002) and Quach and Mullineux (2006), use the Tobit regression to estimate the determinants of financial development. They use the Tobit estimation since their dependent variables are truncated at zero for households holding non-financial liabilities. Households with financial liabilities supply their level of financial liabilities.

The dependent variables are not truncated at zero in my dataset. Therefore, in this chapter, I set OLS estimation to analyse the determinants of household financial development. I propose the following model to analyse the determinants of household financial development:

$$y_i = \alpha + \beta X_i + u_i \quad (1)$$

where y_i = financial development indicators; X_i includes the household number of dependent people, education, household size, age of household head, age of household head squared, gender of household head, household interest rate, household fixed asset, household health expenditure, household social relationship, dummies for urban, ethnicity and region; and u_i is the error term.

The three new measures of financial development (FD), which can capture all the role of the financial system, are built. These measures are calculated as follows:

$$FD_1 = \frac{Deposit + the\ value\ of\ stock\ exchange + the\ value\ of\ asset\ of\ financial\ companies}{Income}$$

$$FD_2 = \frac{Loan + the\ value\ of\ stock\ exchange + the\ value\ of\ asset\ of\ financial\ companies}{Income}$$

$$FD_3 = \frac{Turnover\ of\ banks + the\ value\ of\ stock\ exchange + turnover\ of\ financial\ companies}{Income}$$

These new measures of financial development reflect the role of the banking system, stock market and financial companies.[21] It is likely that the financial

[21] The value of assets of financial companies is measured as follows: Asset = liability + equity.

development measures capture the role of the financial system. Hence, they reflect the role of the financial system in economic activities better than the measures used in the existing literature.

The financial system is very important in household economic activities by showing how much financial liabilities and financial assets households hold. In Vietnam, financial assets and financial liabilities are normally in the form of deposit, loan, bond (share) and insurance. Therefore, the ratio and the level of financial assets and liabilities are employed to analyse the role of financial development in economic activities at the household data level as follows:

$$\text{FD} = \frac{Deposit + bond\ and\ share + insurance}{Income}$$

LnDBSI = Log (deposit + bond and share + insurance)

LnLBSI = Log (loan + bond and share + insurance)

The following reasons outline why these measures are better than those in other studies. Firstly, these measures reflect and appraise the situation of holding financial assets and financial liabilities by households directly. The more advanced the financial system, the higher the value of financial assets and financial liabilities held by households. Secondly, household savings in Vietnam used to be in the form of non-productive assets such as gold and land, because of the poor financial system. However, the improvement of the financial system that started when the Doimoi (renovation) policy was introduced has accelerated since 1998. This has led to a change of the savings habits and encouraged the holding of financial assets from which both individuals and the economy would benefit. The financial assets and liabilities held by households in Vietnam are mainly loans, deposits, bonds/shares

and insurance. Therefore, the measures reflect more appropriately the development level of the financial system in Vietnam.

However, there are still issues with these measures. Firstly, economic activities are influenced by the following factors: loans, bond (share) and insurance, but it is hard to see which factor is more important. Secondly, another question is how substitutable they are. Therefore, good financial development indicators should weight the individual financial development factors by their influences on economic activities. This method allows us to know the relative importance of each of these factors in my financial development indicators.

To overcome these issues, I run eight OLS regressions for equation 2 in the next section.[22] Note that each estimated equation, FDH is replaced by α_{11ij}*Loan + α_{12ij}*Bond (Share) + α_{13ij}*Insurance.[23] The individual indicators' estimated coefficients from these eight estimated equations, then, are taken to construct my financial development index (FDindex) as follows:

FDindex = α_{11i0} + α_{11ij}*Loan + α_{12ij}*Bond and Share + α_{13ij}*Insurance.

The values of α_{11ij}, α_{12ij} and α_{13ij} are taken from the results of the eight estimated regressions based on equation 2. Meanwhile I nominate the value of α_{11i0} which can make the means of dependent variables in equation 2 equal the means of FDindex. This nomination allows us to predict the level of per-capita income, investment, savings, labour productivity, information technology, per-capita expenditure, per-capita expenditure for food and drink, and per-capita spending for non-food and non-drink, given their loans, bond (share) and insurance, assuming that they had the mean values of all other variables.

[22] I reference the methodology of Burnside et al. (2000).
[23] i = {1,8}; j = {1, 3}

2. The impacts of financial development on household economic activities

The model in this chapter is built on the models used by Deaton (1997), Maycock (2005), Croppenstedt (2006), Reddy et al. (2004), Levine (1997) and Beck et al. (2000). This chapter has the two additional variables, social relationship and health expenditure, which consider the determinants of income, savings, investment, productivity, information technology and household economic welfare. This model is stated in equation 2 below.

Financial development can help to improve income through increasing the level of savings, quantity and quality of investment, productivity (Levine, 1997 and Beck et al., 2000), and the efficiency of using savings and information technology (Phan, 2006). In addition, the regression results in this chapter show that financial development is positively related to household economic welfare. Therefore, financial development variables are added in the model.

The social relationship can strongly influence economic activities in Vietnam and is included in the model. The reason for adding this variable is that the economic activities of Vietnamese households depend largely on their own social relationship. This is not only because of the national culture but also because of a serious problem of corruption in Vietnam.

It is hard to find a good proxy for the social relationship since illegal activities are often hidden. Fortunately, I have expenses on buying gifts and holding parties which are a very good proxy for the social relationship. This is because families which have many friends and know a lot of influential people or officials normally spend a lot on these things. Families with a broad relationship normally not only hold their own big parties, but also participate in other parties. They also buy a

lot of gifts and presents to give their friends, influential people and officials. The better the social relationship, the more spending families incur.

Health expenditure of households is also another factor, which might have an effect on economic activities of households, and is included in the model. This spending can tell us the health situation of each household. The lower this spending, the better the health situation the household and vice versa. Better health might have a positive influence on household economic activities.

It is expected that financial development and relationship variables have a positive impact, while the health variable has a negative influence on household economic activities in this estimation model. Therefore, the model for estimation in this chapter is built as follows:

$$LnY = \alpha_0 + \alpha_1*FDH + \alpha_2*FDP + \alpha_3*DEP + \alpha_4*EDU + \alpha_5*HSIZE + \alpha_6*HAGE + \alpha_7*HAGE2 + \alpha_8*HGEN + \alpha_9*INT + \alpha_{10}*LnFA + \alpha_{11}*LnRE + \alpha_{12}*LnHEA + \alpha_{13}*URDUM + \alpha_{14}*EDUM + \alpha_{15}*RDUM + e_i \quad (2)$$

where LnY = alternative dependent variables which are the log of household income per person (LnHIN), the log of household investment (LnHINV), the log of household savings (LnHSAV), the log of household labour productivity (LnHPRO) measured by household income divided by household labour, information technology (LnHTECH) measured by the log of the expenses of newspapers, books, telecom, phone and internet, and the log of household expenditure per capita. On the explanatory side, FDH = financial development indicator of households; FDP = financial development indicator of provinces measured by the value of capital resource of financial companies over the provincial GDP for 62 provinces; DEP = the household number of dependent people; EDU = education of the household head measured by the number of schooling years; HSIZE = the size of household

measured by the household number of people; HAGE = the age of household head; HAGE2 = the age of household head squared; HGEN = the gender of household head, 1 for male and 0 otherwise; INT = household interest rate; LnFD = the log of fixed asset; LnRE = the social relationship of households measured by the log of the cost of parties and gifts; LnHEA = household health measured by the log of expenses on health check, treatment and others at home and hospital; URDUM = urban dummy; RDUM = regional dummy; and e_i = error term.

In this chapter, I use equation 2 as the following savings equation. This savings equation does not include income, despite it being an important determinant of savings. It is because of a correlation between income and financial development indicators. The literature and the regression results of this chapter show the robust link between financial development and income. Thus, fixed asset is employed to proxy for income factor.

I use expenditures which include expenditure per capita, expenditure for food and drink per capita, and expenditure for non food and drink per capita as measures of household economic welfare since expenditures are better measures of household economic welfare than that of income in the household survey data. Firstly, survey respondents are more likely to report their spending honestly than their income. For low income earners, they may report a higher level of income than they have, out of pride. Secondly, some of respondents may have some illegal sources of income resulting from imperfect markets and corruption, and hence they do not want to reveal these earnings. Finally, these respondents might forget what they earned from the previous period.

The existing literature has shown the impact of financial development on growth and sources of growth. However, the simultaneous impact of financial development on sources of growth and on growth has not been shown in the existing literature. Therefore, this chapter uses 3SLS to show clearly this relationship by estimating the following income equation: $LnHIN = \beta_0 + \beta_1*LnHINV + \beta_2*LnHSAV + \beta_3*LnHPRO + \beta_4*LnHTECH$ simultaneously with the four equations in which LnHINV, LnHSAV, LnHPRO and LnHTECH are dependent variables and functions of all the explanatory variables in equation 2.

IV. DATA AND METHODOLOGY

The data used in this chapter is collected from the Vietnam Living Standard Survey conducted by the General Statistics Office of Vietnam (GSOV) in 2004 for 40,438 households as a whole country. GSOV took 5,233 out of the 40,438 households to ask for details of deposits, borrowings and expenditure. However, in this analysis households with missing deposits and loans, income, and expenditures are removed. Therefore, I finally have 1,685 households. The provincial data is collected from the GSOV and VCCI (2006).

There are no data for savings and investment in the survey, but these can be derived from items of income and expenditure. Household savings are calculated by taking household consumption away from household income. Taking the sum of household spending for production and business purposes gives household investment.

The chapter uses OLS, 2SLS and 3SLS regression methods to estimate all equations. Breusch-Pagan is employed to test the heteroscedasticity problem. This problem is resolved by using White's heteroscedasticity correction method if any

estimation results present evidence for heteroscedasticity. The Hansen test from the overidentification test is applied to check the validity of the instrument variables.

In order to solve the problem of endogeneity, I use the Two Stage Least Square method to estimate the relationship with the following instruments. Firstly, the provincial and family population can be treated as instrument variables since the provincial and family population, which can capture the size of the province and households, will have an influence on the financial development in the presence of economies of scale in the financial system. Secondly, the lags of provincial financial indicator, regional dummies and provincial legal institution scores given by the Vietnam Chamber of Commerce and Industry (VCCI) in 2006 are used as instrument variables.

The provincial legal institution scores in 2006 are employed here since the survey conducted by VCCI gave similar results to those in 2004 and 2005. This means that these scores would seem to be not much different in 2002 and 2003.

V. ESTIMATION RESULTS AND DISCUSSION

1. Determinants of household financial development

I run three OLS regressions with three different measures of financial development as dependent variables and the results are reported in table 3.2 in the appendix. Table 3.2 shows that the result in regression 1 is less robust than those in regression 2 and regression 3. The results become more robust from regression 1 to regression 3. Regression 1 has only one estimated coefficient, which is significant while regression 2 has five and regression 3 has eight significant coefficients.

The estimated results show that the variable Education enters with a positive significance. This implies that households with higher education promote household

financial development. This is consistent with the finding in Quach and Mullineux (2006) which suggests that the more educated households could get more formal credit.

Household size is positively significant at 1 percent in regression 3, indicating that either the bigger households have more demand for credit, or lenders tend to give credit to the larger households due to a higher profit potential.

The variable Fixed Assets is positively and significantly related to the household financial development. This is because households with more assets are more likely to secure loans since the assets can be used as collateral for lenders.

The social relationship plays an important role in household financial development as indicated by all the estimated coefficients being positive and significant. The finding indicates that the determinants of household financial development not only rely on their own characteristics but also depend on their social relationship. For example, a good relationship with bank managers helps to facilitate lending to households. Building the social relationship may include: invitations to meals and parties, and giving valuable gifts and scholarship to the bank managers' children (Nguyen et al., 2006).

Another interesting point is that the age of the household head is negatively and significantly related to household financial development, while the age squared of the household head is positively significant. This implies that the middle-aged households get and hold the least amount of loans and financial assets. The result reflects the Vietnamese culture that people tend to trust the elderly aged household heads. Older people are always believable in many aspects. For instance, the age is the first criteria for people to take into account when considering any leadership role

in organizations in Vietnam. Younger people normally respect the older ones. This is because the older people tend to be more experienced, knowledgeable, self-respected and reliable.

The significance of an urban dummy provides some evidence on how the location of the household plays a positive role in financial development. It is because most financial institutions in Vietnam are mainly located in the big cities and town areas where there is high demand for financial services. The significance of the ethnicity dummy reflects that minority groups contribute less to financial development than Kinh people do.

2. The impacts on economic activities

2.1. The impact on household per-capita income

The results of the OLS and 2SLS estimation for household per-capita income, with four alternative financial development indicators, are reported in table 3.3.1 in the appendix. Financial development indicators show their positive influence on household per-capita income because they are positively significant at 1 percent. This supports the hypothesis that the higher level of financial development can lead to better household per-capita income in particular and economic growth in general. This implies that households with greater ability to borrow and hold financial assets can benefit more from the financial system. This also reflects the inequality in the credit distribution across households (Duong et al., 2002). Quach and Mullineux (2006) conclude that the inequality in the credit distribution still appears within a province or across communes within a province. This is because households with larger assets have more chance to get loans from the financial market, especially from the banking system. All banks lend their money by looking at collateral, rather

than the efficiency of investment, since bankers have been afraid of their responsibilities for loan repayment. In addition, the banking system is dominated by state owned banks. The market share of loans by banking institutions of state owned banks had been around 75 percent during the period 2002-2005 (Phan, 2006). Thus, bankers do not pay much attention to the profit of their banks nor to the benefit of their clients. Instead they have chosen safety by asking for collateral when lending. The social relationship is another factor that causes the inequality in loan distribution. Bankers normally consider the social relationship with their customers before making loans. They are sometimes informally forced to lend by influential people such as their bosses or officials.

The variable Dependency is negatively significant at 1 percent. This is expected because the larger the number of dependent people in the household the lower household per-capita income. Household size also bears a negative sign and is significant at 1 percent. Larger households, therefore, have less per-capita income. This explains why the Vietnamese government has been implementing its population policy in which each family could have less than three children since the early 1980s. In addition, the coefficient of the age of the household head is positively significant at 10% while that of age of household head squared shows a negative significance at 10% in equation 4. This supports the Life Cycle Hypothesis that household heads increase the per-capita income as they become more mature. Beyond this point in life, the per capita income reduces when household heads become too old. This means that households with middle-aged household heads hold the largest amount of per-capita income in Vietnam.

All coefficients of education, fixed asset and relationship are positively significant at 1 percent and have their expected sign. This implies that households can benefit from being educated, holding more assets and having a good social relationship. The coefficient Relationship shows the biggest value. This means that relationship has a strong influence on household per-capita income in Vietnam. This is a very good signal to realize the fact that doing business in Vietnam relies heavily on the relationship. This is a part of Vietnamese culture that any one who wants to be successful should learn before doing business in Vietnam.

It is surprising that the coefficient of health expenditure is significant at 1 percent with an unexpected sign. This coefficient should be negative since health expense might reflect the health situation of households. However, this result shows differently and can be explained as follows. On one hand, the richer and better educated households can have more chance to take health care than the poor and lower educated households. The better health care might help improve productivity and thus per-capita income. On the other hand, the poor households normally do not go to see a doctor if they do not have a serious health problem. They just stay at home and use traditional medicine, for which they do not need to pay, and wait for natural recovery.

The dummy for urban households is positively significant at 1 percent in all estimated equations while the dummy for ethnicity is negatively significant at 5 percent for only equation 5. Nevertheless, the sign of all coefficients is as expected. This evidence points out that households living in urban areas have much more per-capita income than those not living in these areas. The estimated regression 1, for instance, presents that the per capita income of urban households is around 27

percent higher than that of non-urban households. This indicates the fact that non-urban households, especially small farm ones, are the last to be able to access formal credit markets, and so investment suffers as a consequence as shown in section 2.2. This has contributed to the fall in the agriculture's share of GDP from 22% to 16% all over the world, and from 22.3% to 16.3% in Vietnam in the decade to 2005 (see table 2.8 in the appendix, chapter II). There is evidence that ethnic minority groups have lower per-capita income than the Kinh people which is the majority group. It may be due to the Kinh group being more educated and hence much more skilled than others.

2.2. The impact on household investment

Table 3.3.2 in the appendix clearly shows that there exists a positive link between financial development and household investment since most financial development coefficients enter with positive and significant coefficients at the 1 percent level in all regressions. This finding confirms the arguments of previous researches such as Levine (1997, 1999) and Beck et al. (2000) that both the level and quality of investment increase as a result of a better financial development. This reflects that the public have been becoming more confident in the financial system, especially in the banking system since the early 1990s. They are more confident to put their savings into the banking system in any form (dong, dollar or gold). Subsequently, this helps the financial system to have more funds for household investment.

Furthermore, the Socio-Economics Development Program for Extremely Difficult Communities (CT135) and the National Program for the Poverty Alleviation and Employment for the period 2001-2005 (CT 143) have contributed to

the increase in household investment. However, these programs have found that many households lack the financial knowledge to use the funds, resulting from the low level of financial development. Some of them put money borrowed into the bamboo holes of their house roof and then return them back to the lender on expiry. Thus, financial development makes a big contribution to both the level and quality of investment.

As it can be seen that education, household size and fixed assets also have a positive link with household investment as most coefficients for these variables are positively significant at the 10 percent level or better. The variable, relationship, enters strongly and significantly at the 1 percent level meanwhile health expense shows as less robust. This evidence indicates that household relationship continues to present an important positive role in household investment while household health shows a weaker role in household investment.

The positive and significant coefficients of the urban and gender variables lead to the finding that the households with a male head and living in the urban area have higher investment than others. As expected, ethnicity enters with a negative and significant coefficient to show that minority groups have less investment compared with the Kinh group.

Compared with part 2.1, the link between financial development and household investment is as robust as the link between financial development and household income but the former has a much stronger link.

2.3. The impact on household savings

The results are reported in the table 3.3.3 in the appendix and are quite revealing. Firstly, the estimated results in the table 3.3.3 suggest that financial

development promotes household savings since the coefficients of financial development indicators are positively significant at least 10 percent. This is consistent with the conclusion of Beck et al. (1999).

Secondly, the variables Dependency, Household Size, Fixed Asset and Relationship are highly significant while the variable Education is less robust and the other variables are not significant. This indicates that household savings depends positively on education, household size, fixed asset and relationship, and negatively on the number of dependent people in each family.

In addition, it is argued that older household heads tend to force their family members to save. In general, however, households with a male head tend to consume more compared to those with a female head in Vietnam. This argument seems to be supported by my finding since the coefficient of age of household head squared is positively significant at 10% in equation 1 and that of gender of household is negatively significant at 10 and 5 percent in regression 5 and regression 6 respectively.

Finally, the dummy for urban household is positively significant at 10%. This evidence confirms that savings of households living in the urban area are much higher than those of non-urban households.

2.4. The impact on household labour productivity

Table 3.3.4 in the appendix reports the empirical evidence about the link between labour productivity and the financial development. Most financial development indicators in table 3.3.4 show their positive and significant coefficients at the 1% level. This confirms the literature that financial development promotes productivity.

Education, fixed asset and relationship express their important role in promoting labour productivity since most of their estimated coefficients appear to be positively significant at least 10 percent while household size and male household head lessen labour productivity.

The urban dummy variable is positively significant at the 1 percent level. This supports the hypothesis that people living in the urban area have more chance for better education, and best people tend to live in the cities, especially in Vietnam and hence have better productivity. This is because the gap between the rural and urban area is really big in the case of Vietnam.

The regional dummy is significant at the 5 percent level. This supports the hypothesis that the North East of the South region has higher labour productivity than other regions. This is because reforms occur earliest and fastest in this region. Normally reforms originated and are tested in this region and then applied in other regions.

The variables Dependency and Health Expense show their positively significant coefficients at 1 percent. This is an interesting point and indicates that more dependent members in a household can improve labour productivity. This can be explained as follows. Working people in families with more dependent members have to work harder and more efficiently in Vietnam. This is because they have more pressure to work and improve their skill. It is not surprising that higher health expenditure leads to higher labour productivity, which has been explained in part 2.1.

2.5. The impact on household information technology

All financial indicators are less robust than those in other tables as shown in table 3.3.5 in the appendix. However, all the signs of coefficients of the financial

development variables are positive as expected. The household financial development indicator presents with an expected sign and significantly at the 5 percent level in regression 3 and regression 6, significant at 1% in regression 5 and regression 7, and 10% at regression 4. This supports the hypothesis suggested by Levine (1997) that financial development could reduce the problem of asymmetric information, leading to a better efficiency of investment.

Education, relationship and health expense appear to have a strongly positive influence on information technology because almost these coefficients are strongly robust, and significant at 1 percent. Meanwhile the variable Dependency is only negatively significant at 10 percent in regression 3 and regression 5. This indicates that the larger the number of dependents in the household the lower the ability of the household to develop information technology.

Urban and gender dummy are significant. However, only the urban dummy bears a positive sign. This implies that families living in the urban area have a higher chance to access the information technology. A male household head is an obstacle for the development of information technology in that household.

3. The simultaneous impact on household economic activities

The system of equations has been constructed in order to show the simultaneous influence of financial development on household economic activities. The results are reported in four tables: table 3.3.6, table 3.3.7, table 3.3.8 and table 3.3.9 in the appendix.

The results show that any positive changes in savings, investment, labour productivity and information technology have positive impacts on household per-

capita income. All coefficients of the variables Savings, Investment, Labour productivity and Information technology enter with a positive significance at 1 percent in equation 1.

The positive change in household per capita income is explained by the improvement of the financial system, fixed assets, social relationship and health of households. Education still plays a positive role on the change but is less robust in this estimation method than in the OLS and 2SLS ones. These results strongly reconfirm the hypothesis that the channels of transmission from financial development to economic growth are the channels through which financial development promotes savings, investment, productivity and technology.

4. The impact on household economic welfare

Expenditure per capita, expense on food and drink per capita, and spending on non-food and non-drink per capita are used to proxy for household economic welfare. All indicators of household economic welfare are in the log form.

The results in table 3.3.10, table 3.3.11, table 3.3.12 and table 3.3.13 in the appendix show that both household financial development and provincial financial development are positively correlated to household economic welfare. This supports the hypothesis that a better financial system can increase household welfare. This is also consistent with Quach and Mullineux (2006)'s conclusion that access to credit improves household economic welfare in Vietnam.

As expected, education plays a positive role in household welfare. Households with bigger asset, and better relationship and health care lead to a better welfare. Meanwhile the larger size of households makes household welfare worse. The significance of the variable Age and Age squared with an expected sign

indicates correctly the Life Cycle hypothesis that households get more benefit as their heads become more mature up to a point but the benefit decline older beyond that point. The welfare of households with female heads and living in the urban area is better. The welfare of the Kinh group is also better than that of the other ethnic groups.

VI. CONCLUSION

This chapter uses the OLS, 2SLS and 3SLS method of estimation to analyse the determinants of household financial development and the role of financial development in economic activities of Vietnamese households. In this chapter, I find that the social relationship, location, fixed assets, household size, education, age of head of household and Kinh group are the key determinants of household financial development.

Consistent with the literature, I find that the role of financial development in household economic activities is very important. Financial development helps to increase the level of savings and investment, improve labour productivity and diminish problems of asymmetric information and hence leads to higher household income. The impact of financial development on household income is not only direct but also indirect. In addition, financial development plays a key role in household welfare.

I also find that there has been an inequality in credit distribution across households due to collateral requirement and the borrowing relationship of households. The empirical results indicate that social relationship has an extremely importance role in every economic activities in Vietnam.

Other interesting findings are follows. Firstly, households can benefit from having better education and larger assets, and taking health care regularly. Secondly, larger households can have more savings and hence investment but less per-capita income and lower labour productivity. Thirdly, an increase in the number of dependents in the household could improve labour productivity while it deteriorates household per-capita income, saving and ability to access information technology. Fourthly, households with a male head are audacious in investment but less productive. Fifthly, households living in the urban area have a better standard of living. Economic activities appear to be better in households located in the North East of the South region. Finally, Kinh group dominates the economic activities and benefits more compared to the other ethnic groups in Vietnam.

APPENDIX

Table 3.1: Economic Regions and Provinces in Vietnam

NOTE:
This table is included on page 81 of the print copy of the thesis held in the University of Adelaide Library.

Source: General Statistics Office of Vietnam

Table 3.2: The determinants of household financial development

Dependent Variables Independent Variables	FD	LnDBSI	LnLBSI
	(1)	(2)	(3)
Constant	-10.4664	5.2894***	6.6030***
	(0.524)	(0.000)	(0.000)
Dependency	-0.3694	-0.03587	-0.0389
	(0.510)	(0.676)	(0.245)
Education	0.2856	0.0248	0.0244***
	(0.353)	(0.208)	(0.001)
Households' size	-0.4184	0.0245	0.0891***
	(0.235)	(0.714)	(0.000)
Household head's age	-0.2439	-0.1141***	-0.0511***
	(0.341)	(0.002)	(0.000)
Household head's age squared	0.0021	0.0010***	0.0010***
	(0.341)	(0.003)	(0.001)
Household head's gender	2.3574	0.0398	0.0551
	(0.198)	(0.826)	(0.471)
Household interest rate	-0.0153	-0.0037*	0.0002
	(0.232)	(0.071)	(0.843)
Fixed asset	0.6504	0.0512	0.1003***
	(0.205)	(0.273)	(0.000)
Relationship	1.4553*	0.3204***	0.3346***
	(0.070)	(0.000)	(0.000)
Health expenditure	0.9795	-0.0162	0.0223
	(0.127)	(0.733)	(0.215)
Urban dummy	3.2317	0.3723**	0.2539***
	(0.228)	(0.041)	(0.005)
Ethnicity dummy	15.2131	0.3016	-0.2912***
	(0.263	(0.449)	(0.002)
Regional dummy	Yes	Yes	Yes
R_squared	0.0573	0.0622	0.2342
Observations	939	939	1685

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
FD is measured by the share of deposit, bond and share, and insurance to income. LnDBSI is measured by the log of the level of deposit, bond and share, and insurance. LnLBSI is measured by the log of the level of loan, bond and share, and insurance.

Table 3.3.1: The effects of financial development on household income per capita

	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	6.6738***	6.6826***	6.3195***	5.1323***	5.6042***	4.6351***	-1.02997	-8.7359*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.144)	(0.083)
Households' financial development indicator								
1. FD	0.0028***	0.0038						
	(0.006)	(0.558)						
2. LnDBSI			0.0623***	0.2881**				
			(0.000)	(0.029)				
3. LnLBSI					0.1545***	0.2965***		
					(0.000)	(0.000)		
4. LnFDindex							0.9462***	1.8955***
							(0.000)	(0.002)
Provincial financial development indicator	0.0032***	0.0032***	0.0034***	0.0036***	0.0026***	0.0026***	0.0024***	0.0022**
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.000)	(0.001)	(0.011)
Dependency	-0.0574***	-0.0572***	-0.0561***	-0.0497*	-0.0739***	-0.0694***	-0.0773***	-0.0749***
	(0.010)	(0.010)	(0.010)	(0.096)	(0.000)	(0.000)	(0.000)	(0.000)
Education	0.0150***	0.0148***	0.0142***	0.0087	0.0125***	0.0087**	0.0120***	0.0073*
	(0.000)	(0.001)	(0.001)	(0.201)	(0.000)	(0.027)	(0.000)	(0.088)
Households' size	-0.0429***	-0.0424**	-0.0458***	-0.0509**	-0.0540***	-0.0662***	-0.0470***	-0.0534***
	(0.009)	(0.011)	(0.004)	(0.025)	(0.000)	(0.000)	(0.000)	(0.000)
Household head's age	0.0003	0.0005	0.0068	0.0322*	0.0029	0.0108	0.0022	0.0105
	(0.969)	(0.953)	(0.433)	(0.096)	(0.639)	(0.165)	(0.732)	(0.248)
Household head's age squared	-4.94e-06	-6.36e-06	-0.0001	-0.0003*	-0.00002	-0.0001	-0.00002	-0.0001
	(0.952)	(0.938)	(0.427)	(0.095)	(0.668)	(0.196)	(0.749)	(0.278)
Household head's gender	-0.0398	-0.0417	-0.0355	-0.0401	-0.0241	-0.0362	-0.0164	-0.0236
	(0.366)	(0.363)	(0.399)	(0.475)	(0.449)	(0.285)	(0.604)	(0.485)
Household interest rate	0.0002	0.0003	0.0004	0.0013	-0.0002	-0.0001	-0.0001	0.0002
	(0.694)	(0.682)	(0.505)	(0.220)	(0.538)	(0.732)	(0.850)	(0.668)
Fixed asset	0.0503***	0.0496***	0.0489***	0.0362**	0.0332***	0.0236**	0.0273***	0.0096
	(0.000)	(0.000)	(0.000)	(0.023)	(0.000)	(0.042)	(0.001)	(0.532)
Relationship	0.2233***	0.2221***	0.2069***	0.1349***	0.1886***	0.1395***	0.1962***	0.1500***
	(0.000)	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)
Health expenditure	0.0268**	0.0260**	0.0303***	0.0342**	0.0327***	0.0294***	0.0331***	0.0293***
	(0.018)	(0.027)	(0.007)	(0.037)	(0.000)	(0.000)	(0.000)	(0.001)
Urban dummy	0.2720***	0.2701***	0.2542***	0.1694**	0.1992***	0.1588***	0.1520***	0.0599
	(0.000)	(0.000)	(0.000)	(0.021)	(0.000)	(0.000)	(0.000)	(0.359)
Ethnicity dummy	-0.0654	-0.0775	-0.0462	-0.1066	-0.0912**	-0.0491	-0.1236***	-0.1107**
	(0.340)	(0.449)	(0.472)	(0.339)	(0.018)	(0.294)	(0.002)	(0.038)
Regional dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.5583		0.9347		0.6617		0.5757
R_squared	0.4412	0.4404	0.4726		0.5147	0.4678	0.5249	0.4554
Observations	933	933	933	933	1663	1642	1663	1643

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
FD is measured by the share of deposit, bond and share, and insurance to income. LnDBSI is measured by the log of the level of deposit, bond and share, and insurance. LnLBSI is measured by the log of the level of loan, bond and share, and insurance. FDindex = 3994.2258 + 0.0524*Loan + 0.0906*Bond (Share) + 0.4497*Insurance.

Table 3.3.2: The effects of financial development on household investment

	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	6.7540***	6.8133***	5.8649***	5.2365***	3.5337***	1.3652	-1.6224*	-11.3770
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.586)	(0.078)	(0.289)
Households' financial development indicator								
1. FD	0.0122***	0.0186						
	(0.000)	(0.198)						
2. LnDBSI			0.1471***	0.2659*				
			(0.000)	(0.056)				
3. LnLBSI					0.4622***	0.7914**		
					(0.000)	(0.036)		
4. FDindex							0.9238***	2.0227*
							(0.000)	(0.091)
Provincial financial development indicator	0.0031	0.0028	0.0038*	0.0039*	0.0008	0.0007	0.0012	0.0009
	(0.116)	(0.215)	(0.068)	(0.074)	(0.303)	(0.412)	(0.450)	(0.624)
Dependency	0.0014	0.0024	0.0038	0.0073	-0.0245	-0.0115	-0.0382	-0.0332
	(0.975)	(0.958)	(0.931)	(0.873)	(0.398)	(0.729)	(0.226)	(0.328)
Education	0.0191**	0.0175*	0.0187**	0.0158	0.0178***	0.0097	0.0201***	0.0092
	(0.037)	(0.068)	(0.040)	(0.101)	(0.004)	(0.370)	(0.002)	(0.502)
Households' size	0.1367***	0.1399***	0.1267***	0.1237***	0.0981***	0.0684*	0.1327***	0.1242***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.091)	(0.000)	(0.000)
Household head's age	-0.0200	-0.0188	-0.0057	0.0078	-0.0099	0.0071	-0.0219*	-0.0077
	(0.254)	(0.286)	(0.732)	(0.717)	(0.399)	(0.750)	(0.083)	(0.718)
Household head's age squared	0.0002	0.0016	0.00003	-0.0001	0.0001	-0.0001	0.0002	0.00004
	(0.310)	(0.341)	(0.823)	(0.655)	(0.633)	(0.627)	(0.172)	(0.840)
Household head's gender	0.1136	0.1006	0.1338	0.1302	0.1509**	0.1325*	0.1664**	0.1537**
	(0.198)	(0.283)	(0.125)	(0.147)	(0.017)	(0.058)	(0.014)	(0.031)
Household interest rate	0.0012	0.0013	0.0015	0.0019	0.0005	0.0005	0.0009	0.0012
	(0.467)	(0.440)	(0.332)	(0.243)	(0.543)	(0.598)	(0.346)	(0.203)
Fixed asset	0.1164***	0.1117***	0.1175***	0.1113***	0.0533***	0.0199	0.0618***	0.0158
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.633)	(0.000)	(0.719)
Relationship	0.2724***	0.2645***	0.2403***	0.2023***	0.1829***	0.0725	0.2697***	0.1893**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.573)	(0.000)	(0.032)
Health expenditure	0.0144	0.0059	0.0243	0.0263	0.0323**	0.0247	0.0348**	0.0248
	(0.579)	(0.785)	(0.232)	(0.216)	(0.029)	(0.161)	(0.031)	(0.264)
Urban dummy	0.1999**	0.1874*	0.1694*	0.1256	0.0861	0.0023	0.0141	-0.2078
	(0.031)	(0.053)	(0.073)	(0.265)	(0.209)	(0.985)	(0.848)	(0.380)
Ethnicity dummy	-0.4474***	-0.5288**	-0.3330**	-0.3648***	-0.1558**	-0.0608	-0.3048***	-0.3232***
	(0.001)	(0.017)	(0.016)	(0.009)	(0.035)	(0.651)	(0.000)	(0.005)
Regional dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.3206		0.9954		0.1133		0.7418
R_squared	0.3048	0.2929	0.3329	0.2869	0.4632	0.3718	0.3852	0.2397
Observations	934	934	934	934	1665	1665	1665	1657

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
FD is measured by the share of deposit, bond and share, and insurance to income. LnDBSI is measured by the log of the level of deposit, bond and share, and insurance. LnLBSI is measured by the log of the level of loan, bond and share, and insurance. FDindex = 9.3080 + 1.18e-05*Loan + 1.82e-05*Bond (Share) + 1.703e-04*Insurance.

Table 3.3.3: The effects of financial development on household savings

	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	6.8388***	5.7591****	6.2267***	1.0678	4.3689***	-0.4135	-0.7289	-29.6065**
	(0.000)	(0.000)	(0.000)	(0.769)	(0.000)	(0.861)	(0.463)	(0.021)
Households' financial development indicator								
1. FD	0.0083*	0.0926*						
	(0.052)	(0.078)						
2. LnDBSI			0.1035***	0.8466*				
			(0.000)	(0.098)				
3. LnLBSI					0.3047***	0.9872***		
					(0.000)	(0.003)		
4. FDindex							0.9148***	4.5668***
							(0.000)	(0.004)
Provincial financial development indicator	0.0063***	0.0095***	0.0066***	0.0108**	0.0041**	0.0049*	0.0042**	0.0060*
	(0.003)	(0.001)	(0.003)	(0.015)	(0.045)	(0.059)	(0.046)	(0.068)
Dependency	-0.1428**	-0.1471**	-0.1394**	-0.1200	-0.1787***	-0.1814***	-0.1818***	-0.1953**
	(0.026)	(0.046)	(0.026)	(0.219)	(0.000)	(0.001)	(0.000)	(0.017)
Education	0.0209	0.0319*	0.0189	0.0127	0.02472**	0.0024	0.0266**	-0.0053
	(0.111)	(0.098)	(0.145)	(0.556)	(0.025)	(0.879)	(0.016)	(0.776)
Households' size	0.1809***	0.2493***	0.1718***	0.1641**	0.1961***	0.1430***	0.2189***	0.2143***
	(0.000)	(0.000)	(0.000)	(0.023)	(0.000)	(0.002)	(0.000)	(0.000)
Household head's age	-0.0475	-0.0105	-0.0363	0.0682	-0.0317	0.0139	-0.0387**	0.0168
	(0.065)	(0.780)	(0.144)	(0.405)	(0.103)	(0.638)	(0.043)	(0.703)
Household head's age squared	0.0004*	0.0001	0.0003	-0.0006	0.0003	-0.0001	0.0003*	-0.0002
	(0.087)	(0.830)	(0.178)	(0.388)	(0.136)	(0.592)	90.059)	(0.688)
Household head's gender	-0.1661	-0.1794	-0.1455	-0.0143	-0.1727*	-0.2731**	-0.1490	-0.2467*
	(0.223)	(0.361)	(0.275)	(0.949)	(0.074)	(0.037)	(0.128)	(0.081)
Household interest rate	-0.0003	0.0011	0.0002	0.0047	-0.0007	-0.0006	-0.0003	0.0011
	(0.881)	(0.638)	(0.920)	(0.253)	(0.544)	(0.562)	(0.780)	(0.414)
Fixed asset	0.0994***	0.0685	0.0941***	0.0325	0.0671***	0.0004	0.0708***	-0.0370
	(0.002)	(0.146)	(0.003)	(0.645)	(0.008)	(0.994)	(0.006)	(0.465)
Relationship	0.2575****	0.1931**	0.2356***	0.0341	0.1778***	-0.0444	0.2193***	-0.0134
	(0.000)	(0.025)	(0.000)	(0.840)	(0.000)	(0.697)	(0.000)	(0.888)
Health expenditure	-0.0144	-0.0363	-0.0053	0.0444	-0.0054	-0.0121	-0.0119	-0.0522
	(0.66)	(0.470)	(0.870)	(0.509)	(0.834)	(0.695)	(0.640)	(0.208)
Urban dummy	0.2082*	0.1687	0.1853	-0.0052	0.1496	0.0512	0.0801	-0.3653
	(0.089)	(0.287)	(0.126)	(0.892)	(0.134)	(0.720)	(0.428)	(0.148)
Ethnicity dummy	-0.0757	0.1423	-0.0589	0.2117	0.0175	0.2219	-0.0338	0.1325
	(0.774)	(0.668)	(0.821)	(0.588)	(0.891)	(0.242)	(0.791)	(0.419)
Regional dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.2443		0.7232		0.8567		0.7184
R_squared	0.1746		0.1941		0.2391		0.2354	
Observations	640	636	640	636	1105	1093	1105	1093

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
FD is measured by the share of deposit, bond and share, and insurance to income. LnDBSI is measured by the log of the level of deposit, bond and share, and insurance. LnLBSI is measured by the log of the level of loan, bond and share, and insurance. FDindex = 8.1170 + 8.79e-06*Loan + 0.6e-04*Bond (Share) + 14.89e-05*Insurance.

Table 3.3.4: The effects of financial development on household labor productivity

	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	7.2887***	7.3226***	6.9480***	5.594***	6.22539***	5.1498***	-2.1090**	-12.7005*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.014)	(0.054)
Households' financial development indicator								
1. FD	0.0028***	0.0064						
	(0.006)	(0.446)						
2. LnDBSI			0.0604***	0.3202**				
			(0.000)	(0.033)				
3. LnLBSI					0.1559***	0.3202***		
					(0.000)	(0.000)		
4. LnFDindex							1.0659***	2.2659***
							(0.000)	(0.002)
Provincial financial development indicator	0.0033***	0.0031***	0.0035***	0.0037***	0.0026***	0.0027***	0.0024***	0.0022**
	(0.000)	(0.002)	(0.000)	(0.004)	(0.000)	(0.000)	(0.001)	(0.013)
Dependency	0.2784***	0.2791***	0.2802***	0.2899***	0.2611***	0.2656***	0.2589***	0.2619***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Education	0.0149***	0.0141***	0.0143***	0.0080	0.0124***	0.0084**	0.0115***	0.0066
	(0.001)	(0.004)	(0.001)	(0.286)	(0.000)	(0.038)	(0.000)	(0.152)
Households' size	-0.1854***	-0.1837***	-0.1885***	-0.1959***	-0.2014***	-0.2127***	-0.1959***	-0.2017***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Household head's age	-0.0005	0.0002	0.0058	0.0351	0.0024	0.0106	0.0016	0.0097
	(0.956)	(0.986)	(0.536)	(0.109)	(0.718)	(0.200)	(0.819)	(0.309)
Household head's age squared	3.66e-06	-1.74e-06	-0.0001	-0.0003	-0.00002	-0.0001	-7.53e-06	-0.0001
	(0.967)	(0.984)	(0.534)	(0.109)	(0.794)	(0.248)	(0.906)	(0.376)
Household head's gender	-0.0717	-0.0786	-0.0673	-0.0709	-0.0465	-0.0596*	-0.0370	-0.0409
	(0.126)	(0.111)	(0.136)	(0.254)	(0.166)	(0.100)	(0.266)	(0.250)
Household interest rate	0.0004	0.0004	0.0006	0.0015	-0.0001	-0.0001	0.00003	0.0002
	(0.542)	(0.503)	(0.392)	(0.177)	(0.755)	(0.877)	(0.944)	(0.612)
Fixed asset	0.0489***	0.0463***	0.0475***	0.0325*	0.0307***	0.0178	0.0254***	0.0042
	(0.000)	(0.001)	(0.000)	(0.061)	(0.000)	(0.163)	(0.003)	(0.798)
Relationship	0.2265***	0.2220***	0.2102***	0.1251**	0.1874***	0.1312***	0.1964***	0.1463***
	(0.000)	(0.000)	(0.000)	(0.028)	(0.000)	(0.000)	(0.000)	(0..000)
Health expenditure	0.0278**	0.0247*	0.0314***	0.0368**	0.0331***	0.0302***	0.0334***	0.0299***
	(0.018)	(0.054)	(0.007)	(0.039)	(0.000)	(0.001)	(0.000)	(0.001)
Urban dummy	0.2709***	0.2638***	0.2538***	0.1565*	0.1988***	0.1554***	0.1503***	0.0501
	(0.000)	(0.000)	(0.000)	(0.052)	(0.000)	(0.001)	(0.000)	(0.471)
Ethnicity dummy	-0.0537	-0.0993	-0.0348	-0.1035	-0.1065***	-0.0584	-0.1397***	-0.1259**
	(0.435)	(0.395)	(0.582)	(0.392)	(0.006)	(0.228)	(0.000)	(0.016)
Regional dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.9626		0.9626		0.6726		0.4151
R_squared	0.4440	0.4333	0.4717		0.5016	0.4383	0.5105	0.5105
Observations	928	928	928	928	1641	1622	1641	1622

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
FD is measured by the share of deposit, bond and share, and insurance to income. LnDBSI is measured by the log of the level of deposit, bond and share, and insurance. LnLBSI is measured by the log of the level of loan, bond and share, and insurance. FDindex = 8091.3494 + 8.52e-02*Loan + 0.1116*Bond (Share) + 0.8844*Insurance.

Table 3.3.5: The effects of financial development on household information technology

	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-0.2339	0.1494	-0.6526	-3.9620	-1.6874**	-5.3845**	-4.3324***	-28.6069
	(0.797)	(0.895)	(0.481)	(0.131)	(0.039)	(0.038)	(0.009)	(0.101)
Households' financial development indicator								
1. FD	0.0016	0.0425						
	(0.451)	(0.251)						
2. LnDBSI			0.0712**	0.6610*				
			(0.014)	(0.086)				
3. LnLBSI					0.2657***	0.7768**		
					(0.000)	(0.025)		
4. FDindex							1.0262***	6.9234*
							(0.003)	(0.098)
Provincial financial development indicator	0.0064	0.0030	0.0078	0.0191	0.0058	0.0061	0.0057	0.0058
	(0.758)	(0.891)	(0.704)	(0.408)	(0.119)	(0.131)	(0.169)	(0.224)
Dependency	-0.1194*	-0.1081	-0.1187	-0.1087	-0.1118*	-0.0962	-0.1187*	-0.1022
	(0.099)	(0.149)	(0.102)	(0.273)	(0.051)	(0.122)	(0.099)	(0.287)
Education	0.0441***	0.0314	0.0442***	0.0415*	0.0354***	0.0297**	0.0415***	0.0122
	(0.006)	(0.128)	(0.005)	(0.061)	(0.007)	(0.043)	(0.010)	(0.661)
Households' size	0.0794	0.1292*	0.0832	0.1457	0.0459	0.0272	0.0787	0.0659
	(0.201)	(0.099)	(0.183)	(0.126)	(0.302)	(0.592)	(0.200)	(0.389)
Household head's age	-0.0045	0.0113	0.0041	0.0781	0.0031	0.0350	0.0058	0.0645
	(0.877)	(0.747)	(0.890)	(0.235)	(0.901)	(0.310)	(0.850)	(0.315)
Household head's age squared	0.0001	-0.00004	0.00001	-0.0007	-0.00002	-0.0003	-4.09e-06	-0.0005
	(0.749)	(0.901)	(0.969)	(0.272)	(0.929)	(0.327)	(0.989)	(0.367)
Household head's gender	-0.2536	-0.3129*	-0.2522	-0.2421	-0.2621**	-0.2673*	-0.2716*	-0.3651*
	(0.114)	(0.087)	(0.120)	(0.275)	(0.038)	(0.052)	(0.086)	(0.052)
Household interest rate	0.0001	0.0004	-0.0004	-0.0034	-0.0001	-0.0001	0.0003	0.0013
	(0.998)	(0.924)	(0.927)	(0.520)	(0.957)	(0.974)	(0.944)	(0.800)
Fixed asset	0.0555	0.0325	0.0545	0.0355	0.0539*	-0.0081	0.0357	-0.1034
	(0.169)	(0.485)	(0.171)	(0.519)	(0.097)	(0.884)	(0.376)	(0.320)
Relationship	0.4005***	0.3089***	0.3699***	0.0860	0.3034***	0.1409	0.3503***	0.1577
	(0.000)	(0.001)	(0.000)	(0.666)	(0.000)	(0.262)	(0.000)	(0.273)
Health expenditure	0.1636***	0.0990*	0.1647***	0.1506***	0.1382***	0.1271***	0.1600***	0.1525***
	(0.000)	(0.054)	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)	(0.002)
Urban dummy	1.4470***	1.3756***	1.4251***	1.2302***	1.1203***	0.8914***	1.2905***	0.7618*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.077)
Ethnicity dummy	0.0797	-1.0790	0.0962	-0.1461	0.0382	0.1146	0.0603	-0.1101
	(0.816)	(0.173)	(0.765)	(0.806)	(0.850)	(0.623)	(0.855)	(0.785)
Regional dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.3416		0.4801		0.9448		0.8473
R_squared	0.4019	0.1590	0.4079		0.3706	0.2797	0.4167	0.0783
Observations	597	592	597	592	933	922	596	590

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
FD is measured by the share of deposit, bond and share, and insurance to income. LnDBSI is measured by the log of the level of deposit, bond and share, and insurance. LnLBSI is measured by the log of the level of loan, bond and share, and insurance. FDindex = 4.2476 + 4.62e-06*Loan.

Table 3.3.6: The simultaneous effects of financial development on household economic activities (3SLS Estimation Approach)

Dependent Variables / Independent Variables	INCOME	INVESTMENT	SAVINGS	LABOUR PRODUCTIVITY	INFORMATION TECHNOLOGY
	(1)	(2)	(3)	(4)	(5)
Constant	2.0141***	6.8046***	7.2639***	7.7866***	0.1947
	(0.000)	(0.000)	(0.000)	(0.000)	(0.858)
Investment	0.0505***				
	(0.000)				
Savings	0.1459***				
	(0.000)				
Labour productivity	0.4823***				
	(0.000)				
Information technology	0.0821***				
	(0.000)				
Households' financial development indicator		0.0177***	0.0049	0.0044***	0.0073
		(0.000)	(0.180)	(0.005)	(0.112)
Provincial financial development indicator		0.0046*	0.0029	0.0021*	0.0018
		(0.057)	(0.281)	(0.074)	(0.337)
Dependency		0.0165	-0.2434***	0.2980***	-0.2881***
		(0.789)	(0.000)	(0.000)	(0.001
Education		0.0129	-0.0046	0.0042	0.0525***
		(0.333)	(0.754)	(0.513)	(0.005)
Households' size		0.1208***	0.1545***	-0.1763***	0.1033
		(0.009)	(0.003)	(0.000)	(0.114)
Household head's age		-0.0325	-0.0321	-0.0139	-0.0115
		(0.248)	(0.304)	(0.309)	(0.774)
Household head's age squared		0.0003	0.0003	0.0001	0.0001
		(0.303)	(0.349)	(0.307)	(0.708)
Household head's gender		-0.0087	-0.1819	-0.1308**	-0.2240
		(0.947)	(0.209)	(0.039)	(0.226)
Household interest rate		0.0038	-0.0018	0.0010	0.0001
		(0.241)	(0.615)	(0.502)	(0.979)
Fixed asset		0.1291***	0.0811**	0.0372***	0.0564
		(0.000)	(0.013)	(0.009)	(0.176)
Relationship		0.3013***	0.2506***	0.2304***	0.4034***
		(0.000)	(0.000)	(0.000)	(0.000)
Health expenditure		0.0534	0.0096	0.0442***	0.1793***
		(0.102)	(0.790)	(0.005)	(0.000)
Urban dummy		0.1323	0.2589*	0.2440***	1.3264***
		(0.270)	(0.052)	(0.000)	(0.000)
Ethnicity dummy		-0.5186**	0.1028	-0.0216	0.2442
		(0.043)	(0.719)	(0.862)	(0.502)
Regional dummy		Yes	Yes	Yes	Yes
R_squared	0.8381	0.3136	0.1804	0.4627	0.3974
Observations	417	417	417	417	417

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
Households' financial development indicator is measured by the share of deposit, bond and share, and insurance to income.

Table 3.3.7: The simultaneous effects of financial development on household economic activities (3SLS Estimation Approach – Alternative Measure of Financial Development)

Dependent Variables / Independent Variables	INCOME	INVESTMENT	SAVINGS	LABOUR PRODUCTIVITY	INFORMATION TECHNOLOGY
	(1)	(2)	(3)	(4)	(5)
Constant	1.9879***	5.9991***	6.6553***	7.4332***	-0.2215
	(0.000)	(0.000)	(0.000)	(0.000)	(0.842)
Investment	0.0516***				
	(0.000)				
Savings	0.1462***				
	(0.000)				
Labour productivity	0.4837***				
	(0.000)				
Information technology	0.0819***				
	(0.000)				
Households' financial development indicator		0.1484***	0.0918***	0.0568***	0.0730**
		(0.000)	(0.000)	(0.000)	(0.029)
Provincial financial development indicator		0.0049**	0.0033	0.0023**	0.0019
		(0.039)	(0.219)	(0.046)	(0.311)
Dependency		0.0222	-0.2409***	0.2997***	-0.2853***
		(0.716)	(0.000)	(0.000)	(0.001)
Education		0.0084	-0.0065	0.0029	0.0505***
		(0.524)	(0.658)	(0.651)	(0.007)
Households' size		0.1071**	0.1534***	-0.1787***	0.0982
		(0.018)	(0.002)	(0.000)	(0.130)
Household head's age		-0.0213	-0.0206	-0.0078	-0.0048
		(0.447)	(0.508)	(0.560)	(0.904)
Household head's age squared		0.0002	0.0002	0.0001	0.0001
		(0.519)	(0.554)	(0.542)	(0.830)
Household head's gender		0.0152	-0.1553	-0.1173*	-0.2094
		(0.906)	(0.278)	(0.059)	(0.257)
Household interest rate		0.0034	-0.0022	0.0009	-0.0001
		(0.281)	(0.539)	(0.575)	(0.986)
Fixed asset		0.1261***	0.0784**	0.0358***	0.0545
		(0.000)	(0.015)	(0.010)	(0.190)
Relationship		0.2703***	0.2196***	0.2144***	0.3848***
		(0.000)	(0.000)	(0.000)	(0.000)
Health expenditure		0.0792**	0.0211	0.0524***	0.1909***
		(0.014)	(0.556)	(0.001)	(0.000)
Urban dummy		0.1148	0.2398*	0.2342***	1.3164***
		(0.333)	(0.069)	(0.000)	(0.000)
Ethnicity dummy		-0.4870*	0.1267	-0.0081	0.2614
		(0.055)	(0.653)	(0.947)	(0.471)
Regional dummy		Yes	Yes	Yes	Yes
R_squared	0.8382	0.3285	0.1975	0.4861	0.3989
Observations	417	417	417	417	417

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
Households' financial development indicator is measured by the log of the level of deposit, bond and share, and insurance.

Table 3.3.8: The simultaneous effects of financial development on household economic activities (3SLS Estimation Approach – Alternative Measure of Financial Development)

Dependent Variables / Independent Variables	INCOME	INVESTMENT	SAVINGS	LABOUR PRODUCTIVITY	INFORMATION TECHNOLOGY
	(1)	(2)	(3)	(4)	(5)
Constant	1.9626***	3.7075***	3.9078***	6.3384***	-1.8467*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.055)
Investment	0.0602***				
	(0.000)				
Savings	0.1249***				
	(0.000)				
Labour productivity	0.4941***				
	(0.000)				
Information technology	0.0889***				
	(0.000)				
Households' financial development indicator		0.5147***	0.3573***	0.1846***	0.2692***
		(0.000)	(0.000)	(0.000)	(0.000)
Provincial financial development indicator		0.0038**	0.0023	0.0020**	0.0007
		(0.041)	(0.373)	(0.039)	(0.649)
Dependency		-0.0430	-0.2330***	0.2926***	-0.3514***
		(0.293)	(0.000)	(0.000)	(0.000)
Education		0.0001	-0.0045	0.0004	0.0311**
		(0.993)	(0.706)	(0.929)	(0.037)
Households' size		0.0834***	0.1697***	-0.2055***	0.0567
		(0.007)	(0.000)	(0.000)	(0.281)
Household head's age		-0.0196	0.0005	0.0007	0.0086
		(0.296)	(0.984)	(0.940)	(0.787)
Household head's age squared		0.0001	-0.00002	2.13e-06	-0.00004
		(0.417)	(0.929)	(0.982)	(0.888)
Household head's gender		-0.0466	-0.2057*	-0.1163**	-0.13330
		(0.590)	(0.086)	(0.011)	(0.364)
Household interest rate		0.00004	-0.0035*	-0.0004	0.0010
		(0.980)	(0.100)	(0.592)	(0.692)
Fixed asset		0.0485**	0.0371	0.0207**	0.0495
		(0.015)	(0.178)	(0.050)	(0.143)
Relationship		0.2106***	0.1680***	0.1824***	0.3369***
		(0.000)	(0.001)	(0.000)	(0.000)
Health expenditure		0.0435**	0.0134	0.0463***	0.1839***
		(0.049)	(0.662)	(0.000)	(0.000)
Urban dummy		-0.0246	0.1184	0.1674***	1.1146***
		(0.771)	(0.312)	(0.000)	(0.000)
Ethnicity dummy		-0.0834	0.1724	-0.0227	-0.1404
		(0.548)	(0.369)	(0.757)	(0.551)
Regional dummy		Yes	Yes	Yes	Yes
R_squared	0.8271	0.5001	0.2574	0.5385	0.3640
Observations	639	639	639	639	639

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
Households' financial development indicator is measured by the log of the level of loan, bond and share, and insurance.

Table 3.3.9: The simultaneous effects of financial development on household economic activities (3SLS Estimation Approach – Alternative Measure of Financial Development)

Dependent Variables / Independent Variables	INCOME	INVESTMENT	SAVINGS	LABOUR PRODUCTIVITY	INFORMATION TECHNOLOGY
	(1)	(2)	(3)	(4)	(5)
Constant	1.9756***	0.7344	2.4102**	1.1586	-4.0661**
	(0.000)	(0.425)	(0.028)	(1.59)	(0.013)
Investment	0.0415***				
	(0.002)				
Savings	0.1527***				
	(0.000)				
Labour productivity	0.4906***				
	(0.000)				
Information technology	0.0804***				
	(0.000)				
Households' financial development indicator		0.7374***	0.6113***	0.7679***	1.0956***
		(0.000)	(0.000)	(0.000)	(0.001)
Provincial financial development indicator		0.0058***	0.0036	0.0028***	0.0078**
		(0.008)	(0.152)	(0.007)	(0.022)
Dependency		-0.0029	-0.2618***	0.2842***	-0.3035***
		(0.957)	(0.000)	(0.000)	(0.000)
Education		0.0005	-0.0148	-0.0018	0.0469**
		(0.967)	(0.290)	(0.758)	(0.012)
Households' size		0.1171***	0.1558***	-0.1769***	0.1113*
		(0.004)	(0.001)	(0.000)	(0.082)
Household head's age		-0.0205	-0.0198	-0.0086	-0.0069
		(0.414)	(0.500)	(0.483)	(0.859)
Household head's age squared		0.0002	0.0002	0.0001	0.0001
		(0.469)	(0.573)	(0.462)	(0.773)
Household head's gender		-0.0623	-0.2022	-0.1377**	-0.2688
		(0.591)	(0.137)	(0.016)	(0.138)
Household interest rate		0.0046	-0.0017	0.0011	0.0009
		(0.106)	(0.605)	(0.441)	(0.835)
Fixed asset		0.0892***	0.0540*	0.0144	0.0375
		(0.001)	(0.081)	(0.274)	(0.366)
Relationship		0.2212***	0.2246***	0.1967***	0.3557***
		(0.000)	(0.000)	(0.000)	(0.000)
Health expenditure		0.0259	0.0016	0.0371***	0.1691***
		(0.375)	(0.962)	(0.010)	(0.000)
Urban dummy		-0.0109	0.1476	0.1772***	1.2101***
		(0.919)	(0.242)	(0.001)	(0.000)
Ethnicity dummy		-0.5866***	0.1225	-0.0231	0.1825
		(0.010)	(0.648)	(0.838)	(0.609)
Regional dummy		Yes	Yes	Yes	Yes
R_squared	0.8380	0.4233	0.2647	0.2647	0.4150
Observations	416	416	416	416	416

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.

Households' financial development indexes are constructed as follows:

- FDindex for income equation = 3994.2258 + 0.0524*Loan + 0.0906*Bond (Share) + 0.4497*Insurance.
- FDindex for investment equation = 9.3080 + 1.18e-05*Loan + 1.82e-05*Bond (Share) + 1.703e-04*Insurance.
- FDindex for saving equation = 8.1170 + 8.79e-06*Loan + 0.6e-04*Bond (Share) + 14.89e-05*Insurance.
- FDindex for labour productivity equation = 8091.3494 + 8.52e-02*Loan + 0.1116*Bond (Share) + 0.8844*Insurance.
- FDindex for information technology equation = 4.2476 + 4.62e-06*Loan.

Table 3.3.10: The effects of financial development on household economic welfare

Dependent Variables / Independent Variables	Expenditure Per Capita		Expenditure for Food and Drink Per Capita		Expenditure for Non Food and Drink Per Capita	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Constant	6.4126***	6.1977***	6.4248***	6.2186***	4.8592***	4.5997***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Households' financial development indicator	0.0018	0.0315*	0.0007	0.0319*	0.0035	0.0380
	(0.183)	(0.069)	(0.507)	(0.051)	(0.127)	(0.147)
Provincial financial development indicator	0.0032***	0.0039***	0.0024***	0.0031***	0.0039***	0.0047***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dependents	-0.0900***	-0.0744***	-0.0750***	-0.0574***	-0.1038***	-0.0870***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Adults	-0.0371***	-0.0165	-0.0295***	-0.0077	-0.0437**	-0.0198
	(0.004)	(0.370)	(0.009)	(0.651)	(0.021)	(0.467)
Education	0.0164***	0.0197***	0.0064**	0.0099**	0.0306***	0.0341***
	(0.000)	(0.000)	(0.025)	(0.031)	(0.000)	(0.000)
Household head's age	0.0142**	0.0181**	0.0060	0.0097	0.0222**	0.0270**
	(0.032)	(0.041)	(0.224)	(0.214)	(0.041)	(0.041)
Household head's age squared	-0.0001**	-0.0002**	-0.0001	-0.0001	-0.0002**	-0.0003**
	(0.027)	(0.031)	(0.236)	(0.184)	(0.032)	(0.032)
Household head's gender	-0.0575	-0.1019*	-0.0167	-0.0627	-0.0863	-0.1380*
	(0.148)	(0.056)	(0.568)	(0.131)	(0.147)	(0.066)
Household interest rate	0.0003	0.0004	0.0004	0.0005	0.0002	0.0003
	(0.519)	(0.406)	(0.315)	(0.263)	(0.695)	(0.574)
Fixed asset	0.0366***	0.0268**	0.0252***	0.0136	0.0464***	0.0364**
	(0.000)	(0.023)	(0.000)	(0.228)	(0.000)	(0.035)
Relationship	0.1727***	0.1688***	0.1217***	0.1170***	0.2281***	0.2239***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Health expenditure	0.0160*	0.0178	0.0113	0.0129	0.0233*	0.0250
	(0.061)	(0.111)	(0.115)	(0.226)	(0.079)	(0.109)
Urban dummy	0.2546***	0.2637***	0.2275***	0.2386***	0.2917***	0.3027***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ethnicity dummy	-0.0245	0.0435	-0.0512	0.0233	0.0047	0.0807
	(0.676)	(0.562)	(0.348)	(0.744)	(0.960)	(0.474)
Regional dummy	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.7000		0.7834		0.1553
R_squared	0.4646	0.1579	0.4338		0.3798	0.1751
Observations	931	920	931	920	931	923

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
Households' financial development indicator is measured by the share of deposit, bond and share, and insurance to income.

Table 3.3.11: The effects of financial development on household economic welfare (Alternative Measure of Financial Development)

Dependent Variables / Independent Variables	Expenditure Per Capita		Expenditure for Food and Drink Per Capita		Expenditure for Non Food and Drink Per Capita	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Constant	6.2047***	5.2195***	6.3017***	5.5530***	4.5455***	3.3504***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Households' financial development indicator	0.0388***	0.2111**	0.0225***	0.1562*	0.0595***	0.2657**
	(0.000)	(0.031)	(0.000)	(0.056)	(0.000)	(0.045)
Provincial financial development indicator	0.0032***	0.0036***	0.0025***	0.0028***	0.0039***	0.0044***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dependents	-0.0910***	-0.0897***	-0.0754***	-0.0734***	-0.1056***	-0.1053***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Adults	-0.0392***	-0.0401**	-0.0304***	-0.0308**	-0.0473**	-0.0489**
	(0.002)	(0.026)	(0.007)	(0.048)	(0.011)	(0.040)
Education	0.0156***	0.0130**	0.0060**	0.0040	0.0293***	0.0260***
	(0.000)	(0.013)	(0.037)	(0.339)	(0.000)	(0.000)
Household head's age	0.0183***	0.0373***	0.0084*	0.0228**	0.0283***	0.0516***
	(0.007)	(0.010)	(0.091)	(0.049)	(0.010)	(0.009)
Household head's age squared	-0.0002***	-0.0004***	-0.0001*	-0.0002**	-0.0003***	-0.0005***
	(0.006)	(0.009)	(0.096)	(0.050)	(0.008)	(0.008)
Household head's gender	-0.0557	-0.06231	-0.0162	-0.0211	-0.0827	-0.0912
	(0.158)	(0.228)	(0.572)	(0.558)	(0.165)	(0.214)
Household interest rate	0.0004	0.0010	0.0004	0.0009	0.0004	0.0011
	(0.337)	(0.125)	(0.233)	(0.116)	(0.457)	(0.158)
Fixed asset	0.0353***	0.0254**	0.0245***	0.0156	0.0448***	0.0340**
	(0.000)	(0.039)	(0.000)	(0.136)	(0.000)	(0.042)
Relationship	0.1620***	0.1144***	0.1154***	0.0778***	0.2117***	0.1553***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Health expenditure	0.0177**	0.0262**	0.0122*	0.0190*	0.0258*	0.0358**
	(0.037)	(0.044)	(0.086)	(0.074)	(0.051)	(0.047)
Urban dummy	0.2418***	0.1889***	0.2202***	0.1805***	0.2719***	0.2080***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)
Ethnicity dummy	-0.0253	-0.0101	-0.0508	-0.0356	0.0019	0.0166
	(0.660)	(0.893)	(0.347)	(0.584)	(0.984)	(0.878)
Regional dummy	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.9967		0.7115		0.5227
R_squared	0.4850	0.0639	0.4449	0.0455	0.4029	0.1041
Observations	931	920	931	920	931	920

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
Households' financial development indicator is measured by the log of the level of deposit, bond and share, and insurance.

Table 3.3.12: The effects of financial development on household economic welfare (Alternative Measure of Financial Development)

Dependent Variables / Independent Variables	Expenditure Per Capita		Expenditure for Food and Drink Per Capita		Expenditure for Non Food and Drink Per Capita	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Constant	6.0311***	5.3220***	6.2570***	5.6740***	4.1074***	2.7278***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Households' financial development indicator	0.0826***	0.1887***	0.0434***	0.1327**	0.1367***	0.3435***
	(0.000)	(0.002)	(0.000)	(0.016)	(0.000)	(0.000)
Provincial financial development indicator	0.0025***	0.0026***	0.0022***	0.0022***	0.0028***	0.0029***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.003)
Dependents	-0.1114***	-0.1163***	-0.0917***	-0.0960***	-0.1321***	-0.1424***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Adults	-0.0458***	-0.0544***	-0.0434***	-0.0502***	-0.0461***	-0.0636***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Education	0.0162***	0.0136***	0.0078***	0.0056**	0.0292***	0.0242***
	(0.000)	(0.000)	(0.000)	(0.036)	(0.000)	(0.000)
Household head's age	0.0071	0.0126**	0.0013	0.0058	0.0129	0.0239**
	(0.138)	(0.032)	(0.720)	(0.228)	(0.101)	(0.014)
Household head's age squared	-0.0001	-0.0001**	-6.79e-06	-0.00005	-0.0001*	-0.0002***
	(0.123)	(0.030)	(0.845)	(0.290)	(0.063)	(0.010)
Household head's gender	-0.0352	-0.0413	0.0128	0.0070	-0.0852*	-0.0978**
	(0.225)	(0.180)	(0.566)	(0.771)	(0.056)	(0.041)
Household interest rate	-0.00001	-0.00001	0.0001	0.0002	-0.0001	-0.0002
	(0.962)	(0.969)	(0.517)	(0.512)	(0.788)	(0.749)
Fixed asset	0.0251***	0.0152*	0.0192***	0.0092	0.0276***	0.0086
	(0.000)	(0.090)	(0.000)	(0.281)	(0.005)	(0.535)
Relationship	0.1614***	0.1259***	0.1182***	0.0883***	0.2143***	0.1446***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Health expenditure	0.0184***	0.0159**	0.0137***	0.0122**	0.0269***	0.0219**
	(0.003)	(0.016)	(0.010)	(0.029)	(0.007)	(0.045)
Urban dummy	0.2102***	0.1830***	0.2104***	0.1860***	0.2136***	0.1614***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)
Ethnicity dummy	-0.0511	-0.0179	-0.0296	-0.0019	-0.0886*	-0.0272
	(0.114)	(0.637)	(0.293)	(0.956)	(0.100)	(0.663)
Regional dummy	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.7636		0.1111		0.7257
R_squared	0.5095	0.4650	0.4649	0.4168	0.4294	0.3488
Observations	1665	1643	1665	1635	1665	1643

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.
Households' financial development indicator is measured by the log of the level of loan, bond and share, and insurance.

Table 3.3.13: The effects of financial development on household economic welfare (Alternative Measure of Financial Development)

Dependent Variables / Independent Variables	Expenditure Per Capita		Expenditure for Food and Drink Per Capita		Expenditure for Non Food and Drink Per Capita	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Constant	-1.2480	-27.3352**	-1.6746	-45.9354**	-1.8567	-26.3016*
	(0.409)	(0.042)	(0.493)	(0.047)	(0119)	(0.070)
Households' financial development indicator	1.0001***	4.3346**	1.1226***	7.1710**	1.0011***	4.5641**
	(0.000)	(0.011)	(0.001)	(0.023)	(0.000)	(0.031)
Provincial financial development indicator	0.0026***	0.0029***	0.0021***	0.0021***	0.0029***	0.0034***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Dependents	-0.1076***	-0.1077***	-0.0901***	-0.0931***	-0.1255***	-0.1254***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Adults	-0.0384***	-0.0376***	-0.0404***	-0.0446***	-0.0335**	-0.0315*
	(0.000)	(0.001)	(0.000)	(0.000)	(0.015)	(0.073)
Education	0.0166***	0.0114***	0.0080***	0.0035	0.0304***	0.0228***
	(0.000)	(0.002)	(0.000)	(0.283)	(0.000)	(0.000)
Household head's age	0.0041	0.0086	0.0006	0.0087	0.0073	0.0131
	(0.387)	(0.201)	(0.873)	(0.189)	(0.354)	(0.213)
Household head's age squared	-0.00004	-0.0001	-2.17e-07	-0.0001	-0.0001	-0.0001
	(0.360)	(0.219)	(0.995)	(0.230)	(0.252)	(0.188)
Household head's gender	-0.0307	-0.0327	0.0146	0.0096	-0.0776*	-0.0803
	(0.288)	(0.315)	(0.512)	(0.715)	(0.084)	(0.113)
Household interest rate	0.00002	0.0001	0.0002	0.0004	-0.0001	-0.0001
	(0.922)	(0.745)	(0.412)	(0.151)	(0.876)	(0.907)
Fixed asset	0.0269***	0.0047	0.0196***	-0.0033	0.0327***	0.0017
	(0.000)	(0.708)	(0.000)	(0.793)	(0.001)	(0.937)
Relationship	0.1767***	0.1351***	0.1262***	0.0907***	0.2433***	0.1820***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Health expenditure	0.0183***	0.0111	0.0144***	0.0134**	0.0271***	0.0151
	(0.004)	(0.249)	(0.006)	(0.032)	(0.007)	(0.328)
Urban dummy	0.2006***	0.0953	0.2025***	0.0954	0.2078***	0.0592
	(0.000)	(0.135)	(0.000)	(0.103)	(0.000)	(0.586)
Ethnicity dummy	-0.0665**	-0.0368	-0.0405	-0.0309	-0.1154**	-0.0706
	(0.041)	(0.322)	(0.150)	(0.335)	(0.034)	(0.257)
Regional dummy	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.7310		0.1976		0.1917
R_squared	0.5081	0.2246	0.4612	0.2331	0.4206	0.0913
Observations	1665	1643	1665	1643	1665	1643

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. P-values are in brackets.

Households' financial development indexes are constructed as follows:

- FDindex for estimated equation of expenditure per capita = 7.9143 + 1.38e-06*Loan + 7.64e-05*Insurance.
- FDindex for estimated equation of expenditure for food and drink per capita = 7.3432+ 1.28e-06*Loan.
- FDindex for estimated equation of expenditure for non food and non drink = 6.9912 + 1.64e-06*Loan + 11.85e-05*Insurance.

CHAPTER IV

THE IMPACTS OF FINANCIAL DEVELOPMENT ON VIETNAMESE FIRM PERFORMANCE

I. INTRODUCTION

Efficiency is the prerequisite condition for the survival and development of firms and economies. Thus, many researchers have examined the determinants of firm performance in every aspect. They have mainly focused on the two following questions: how firm performance is measured, and what determines firm performance.

To answer the first question, the literature has initially used the traditional method to measure firm performance. The traditional method looks at the accounting measures: total sales turnover, net profit, net income, return on assets, return on equity, return on sales and labor productivity. However, the traditional method has some concerning issues. Kapelko (2005) states that these traditional measures of firm performance do not reflect effectively the multidimensional characteristics of the production process which has a lot of inputs and outputs. In addition, earnings data can be modified to achieve different objectives. Hence, the literature has then employed the modern method which uses parametric and non-parametric approaches to calculate the scores of the firm efficiency as measures of firm performance.

Regarding these concerning issues in the case of Vietnam, these accounting measures can be commonly modified for the three following purposes. Firstly, state-owned firms tend to overstate their turnovers and profits because of leadership objectives. This is because firm leaders want to keep their positions or want to be

promoted to higher positions. They need to pretend that they are good. This is called the achievement disease which has arisen since the start of the centrally planned economy in Vietnam. Secondly, the profits may be artificially modified for borrowing purposes. The banking law only allows the banks to lend to firms which have profits at least the last six months in the financial year. Hence, firms normally change the financial reports and thus allow them to borrow. Thirdly, firms might understate their turnovers and profits for tax evasion. For instance, they can report that they incur losses in their businesses, and avoid paying any firm income tax.

These common problems have taken place since cash has been the most popular medium of payment in the Vietnamese economy. Another reason is that the accounting and auditing system in Vietnam is in the early steps of development. This leads to a problem of asymmetric information which may give us irrelevant measures of firm performance if the accounting method is used alone to measure firm performance. In order to overcome these problems in firms' financial accounts, this chapter also employs the data envelopment analysis (DEA) to calculate firm efficiency, and considers the efficiency scores as the measures of firm performance.

After obtaining the measures of firm performance, the literature has set up the model to examine the factors which could affect firm performance. Many factors have been considered in the literature, such as age, size, technological level and capital structure to be the determinants of firm performance. However, it has paid little attention to financial development, which can strongly affect firm performance. Financial variables, which have an influence on efficiency, have just been mentioned at the farm level, but only a few papers such as Bhasin and Akpalu (2001), Qayyum and Ahmad (2006) and Khambhampati (2006) have analyzed at the firm level which

excludes the financial institutions. In addition, the influence of financial development on firm performance has not been analyzed in the Vietnamese context. Thus, this chapter aims to analyze the role of financial development on firm performance for 4,099 Vietnamese firms in the year 2002 by employing both the traditional and modern methodologies. The chapter uses accounting measures and efficiency scores given by the modern method, and then compares the results. However, the chapter focuses mainly on the modern method in which the DEA technique is employed to calculate the efficiency scores.

My main results suggest that financial development, mainly based on the development of the banking system and capital markets, plays a very important role in improving firm performance. The role of financial development in firm performance is important at both the macro and micro level. The improvement in government administration leads to a better financial system which in turn accelerates efficiency of firm performance in Vietnam.

The rest of the chapter is structured as follows. Section II provides the literature review which states the role of financial development in firm performance and describes how firm performance is measured. Section III describes data and methodology in which the model for estimation and method of estimation are outlined. Section IV presents the estimated results and discussions. Section V summarizes the main findings of the chapter.

II. LITERATURE REVIEW

1. The role of financial development in firm performance

Much attention has been paid to the link between financial development and economic growth at the micro level. Demirguc and Maksimovic (1998) use firm

level data from 26 countries during the period 1980-1991 to analyze the influence of financial development on firm growth. Market capitalization/GDP, turnovers, and bank assets/GDP [24] are used as financial development indicators in this research. Their research focuses on the impact of financial development on firms' investment constraints by looking at long run debt and external equity in financing firm growth. Their finding is that both the development of the banking system and stock market liquidity have a positive correlation with firm growth. Beck et al. (2001) uses an expanded sample to support this finding.

Love (2003) is another micro study with the focus on the influence of financial development on firms' funding constraints. Love uses firm level data from 40 countries to conclude that financial development helps to reduce the financing constraints of small firms.

The analysis of the impact of financial development on firm efficiency has been paid little attention in the existing literature, but there have been a few empirical studies of this impact. At the macro level, Arestis et al. (2006) use data of 26 OECD countries and the DEA technique over the period 1963-1992 to study the impact of financial development on productive efficiency. They conclude that financial development has an influence on productive efficiency and the influence depends on the efficiency level which these countries have already gained. Jeanneney et al. (2006) also employ the same technique and a panel data set of 29 Chinese provinces during the period 1993-2001 to suggest that financial development, mainly through accelerating efficiency, has a positively significant contribution to productivity growth in the Chinese economy.

[24] Market capitalization/GDP = the value of domestic equities listed on domestic exchanges as share of GDP; Turnover = the total value of trades of domestic shares on domestic exchanges as a share of market capitalization.

At the micro level, Nasr et al. (1998), based on a sample of 154 Illinois farmers over the period 1988-94, use a non parametric analysis to suggest that there is a positive relationship between financial structure and efficiency.

The impact of micro finance on firm efficiency is empirically examined by Bhasin and Akpalu (2001) in the case of Cape Coast. This study takes a survey of three types of firms: hairdressers, dressmakers and wood processors. Credits in the research are loans from friends/relatives and suppliers/customers. They suggest that age, education, experience, training programs, credit, and borrowing contracts are the major determinants of the efficiency of these types of firms.

Davidova and Latruffe (2004 and 2007) employ DEA to calculate farm efficiency for 753 farms in the Czech Republic. They then include financial variables[25], farm size, technology, and integration in the factor markets[26] in their estimation model. They do not find a clear relationship between financial variables and farm efficiency. The debt to assets ratio and the financial stress ratio appear to have a positive influence on farm efficiency while the current ratio shows a negative effect on farm efficiency.

Unlike the previous researchers, Kambhampati (2006) examines the impact of finance on firm efficiency at both the macro and micro-finance level by employing 3,200 firms within seven manufacturing industries in India. This study uses a stochastic frontier to estimate the firm efficiency and suggests that the way of financing has an effect on the firm efficiency.

[25] Financial variables include debt to assets ratio, current ratio (current assets/current liabilities), financial stress ratio, a ratio of interest and rents to output.
[26] This includes shares of hired labour in total labour input and of rented land in utilised agricultural area.

2. Measurement of firm performance

Besides the accounting measures used as indicators of firm performance in the existing literature, the methods of the stochastic frontier and DEA have been increasingly employed to calculate firm efficiency and consider to efficiency scores as measures of firm performance. However, the data envelopment analysis (DEA), firstly introduced by Charnes et al. (1978) to calculate firm efficiency, has been preferred since this method does not need production functions which are not always easy to specify.[27] In addition, DEA can be used when there are a lot of outputs and inputs in the production process. Therefore, this method is used and briefly described as follows:

Efficiency Measurement

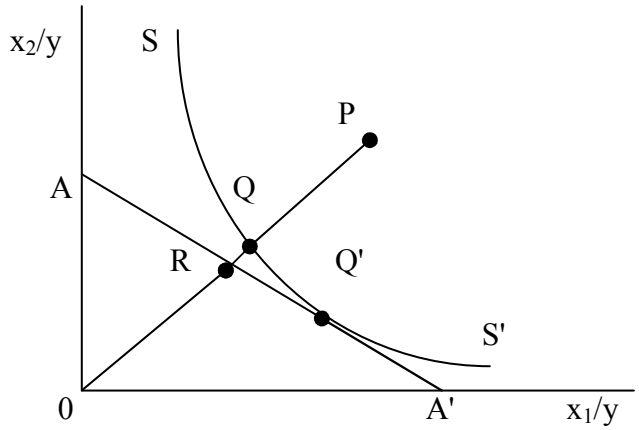
Consider the simple example in which there are two inputs (x_1 and x_2) to produce a single output (y). It is assumed that there is a constant return to scale in the production. The SS' represents the unit isoquant of the fully efficient firm in the figure below.

The point P is input quantities used by a firm to produce a unit of output. The distance QP can represent the technical inefficiency of the firm since this is the amount of inputs which can be reduced without reducing the output level. The technical inefficiency is measured as the ratio of $\frac{QP}{OP}$. Thus, the technical efficiency (TE) is $(1 - \frac{QP}{OP})$ which is equal to the ratio of $\frac{OQ}{OP}$:

$$TE = \frac{OQ}{OP}$$

[27] As stated in Alam and Morrision (2000).

Now let AA' represent the input price ratio. The allocative efficiency (AE) is measured as follows.



$$\text{AE} = \frac{OR}{OQ}$$

The distance, RQ, represents the decline in production costs that would happen if the firm produces the allocative efficiency at the point Q' and allocative inefficiency at the point Q. The measure of the total economic efficiency (TEE) as follows:

$$\text{TEE} = \frac{OR}{OP}$$

And note that the product of technical efficiency and allocative efficiency is also the total economic efficiency.

The scale efficiency can be calculated by conducting the DEA of both constant returns to scale and variable returns to scale. This can be simply measured as the ratio of CRSTE/VRSTE.[28] This means taking the technical efficiency scores

[28] CRSTE is the technical efficiency under the conditions of the constant returns to scale. VRSTE is the technical efficiency scores under the conditions of the variable returns to scale.

under the conditions of constant returns to scale, divided by the technical efficiency scores under the conditions of variable returns to scale to obtain the scale efficiency.

Data Envelopment Analysis

The DEA is the linear programming method to calculate the efficiency including technical efficiency, scale efficiency, allocative efficiency and total efficiency under the assumptions of both constant return to scale and variable return to scale. This is the non parametric method which can be used with an unknown production technology or an unknown production function and without having price information. This is the advantage of this method for the empirical study (Alam and Morrision, 2000). Furthermore, this method does not require the assumption of profit maximization or cost minimization, but can be applied in the case of having multiple inputs and outputs.

Now assume that there are N firms which use i = 1, 2, 3,…, P inputs to produce M outputs for each firm. Let θ denote the technical efficiency, x_i the input vector and y_i the output vector. The value of θ is between 0 and 1. A firm is more efficient if this value θ is closer to one. I use the DEA computer program developed by Coelli (1996) to solve the following problem to obtain the efficiency scores under the conditions of variable return to scale as follows:

$$\text{Max}_{u,v} \ (u'y_i/v'x_i),$$

$$\text{st} \quad u'y_j/v'x_j \leq 1, \quad j = 1,2,\ldots N$$

$$u, v \geq 0$$

Where u is a M x 1 vector of output weights, v is a K x 1 vector of input weights; X and Y are K x N and M x N matrices with column i of each being x_i and y_i for i = 1, 2, 3,….N

Solving this problem gives us an infinite number of solutions. Thus, we can impose the constraint $v'x_i = 1$, which leads to resolving the following problem.

$$\text{Max}_{\mu,\nu} (\mu'y_i),$$[29]

$$\text{st} \quad \nu'x_i = 1,$$

$$\mu'y_j - \nu'x_j \leq 0, \qquad j = 1,2,\ldots N$$

$$\mu', \nu \geq 0$$

Because of using the duality in linear programming, we can derive the equivalent envelopment form of this problem as follows:

$$\text{Min}_{\theta,\lambda} \theta,$$

$$\text{st} \quad -y_i + Y\lambda \geq 0$$

$$\theta x_i - X\lambda \geq 0$$

$$\lambda \geq 0$$

Where λ is a vector of constants.

Solving the problem gives the two measures of the technical efficiency for the constant return to scale (CRSTE) and variable return to scale (VRSTE). The ratio of CRSTE/VRSTE is the scale efficiency.

I use the multi-stage DEA method since it has two advantages. First, it can identify efficient projected points that have input and output mixes which are as similar as possible to those of the inefficient points. Second, it does not vary with units of measurement (Coelli, 1996). I choose the input oriented measures rather than the output oriented measures because the former method has particular orders to fill and thus the input quantities appear to be the primary decision variables.

[29] It is stressed a different linear programming problem by changing the notation from u, v to μ, ν (Coelli et al., 2005).

III. DATA AND METHODOLOGY

1. Description of Data

The data used in this chapter is collected from the firm data survey conducted by the General Statistics Office of Vietnam (GSO). The survey was conducted for 62,705 firms in 2002 and 71,807 firms in 2003. However, this chapter uses data in 2002 since data in 2003 lack some information about the firm age and the firm level of technology.

Data employed in the DEA technique is explained as follows. There are only 4,099 out of 62,705 firms which have borrowings in 2002. From the number of surveyed firms, GSO took a sample of 9,205 firms asking for detailed expenses which I can use to calculate the value added. Out of these firms, there are 2,255 firms which have loans. In addition, in order to run the computer program developed by Coelli (1996), I have to drop any firms which have no expenses on depreciation, labour costs, materials, and water, energy and electricity. Finally, I have 1,886 firms.

In order to obtain the panel data and obtain the variables required, several files were merged and not all firms were included in each of the files leading to further firms being excluded. This process gives 178 firms between 2002 and 2003. These 178 firms are then used for the panel data regression approach.

The sub-sample contains only 1,886 observations out of 62,705 observations, but this sub-sample assures that the estimated results are unbiased for two reasons. First, the percentages of total of the eight regions in both this sub-sample and the whole-sample are similar (as shown in table 4.1). The percentages of this sub-sample are 25.8%, 3.3% and 17.3% compared with those of the whole sample 25.5%, 3.4% and 17.4% in region 1, region 6 and region 8 respectively. The rest of the

percentages varying between 0.6% and 9.3% are little different but close to each other. Second, the ratios (sub-sample as a percentage of the whole sample) between this sub-sample and the whole-sample sub-sample are not much different. These ratios lie between 2.2% and 4.9%. These imply that this sub-sample is a good representative for the whole sample and meets the econometric requirements.

Table 4.1: A Comparison between the Sub-Sample and the Whole-Sample

Regions	Sub-sample		Whole Sample		Sub-sample as a percentage of the whole sample
	Observations	Percent of total	Observations	Percent of total	
1	487	25.82	15,998	25.51	3.04
2	181	9.60	3,682	5.87	4.92
3	29	1.54	607	0.97	4.78
4	184	9.76	3,794	6.05	4.85
5	161	8.54	4,574	7.29	3.52
6	62	3.29	2,142	3.42	2.89
7	456	24.18	21,008	33.50	2.17
8	326	17.29	10,900	17.38	2.99
Total	1,886	100	62,705	100	

Source: The author's calculation from the sample.

Theoretically, the quantitative data of inputs and outputs are used to calculate efficiency (Nasr et al., 1998). However, such data are not available in the case of Vietnam. Thus, expenditures and value added are employed to proxy for input and output quantities in this chapter. The output is the value added and measured in million of Vietnamese dong. The inputs are (i) capital expense measured as depreciation; (ii) labour costs measured as salaries and wages; (iii) costs of materials; and (iv) expenses on water, energy and electricity. All inputs are measured in million of Vietnamese dong.

2. Methodology

2.1. Model for estimation

This chapter uses the following model to estimate the influence of financial development on firm performance.

$$Y_i = \alpha + \beta X_i + e_i \quad (1)$$

where Y_i are the measures of firm performance including total sales turnover, net profit, return on assets, labour productivity and efficiency; X_i includes the firm indicator of financial development, the provincial indicator of financial development, the firm age measured as the number of business years, the firm age squared, the firm size measured as the number of employees, the firm size squared, the provincial inflation, the provincial level of openness measured as the volume of foreign trade to provincial GDP, the technology level of the firm, the firm labour quality measured as the wage and training costs per employee, and dummies for regions and ownership; and e_i is the error term.

Because efficiency scores are between zero and one, the OLS estimates may be inconsistent. To overcome this problem, I use the tobit regression model as follows:

$$FE = \begin{cases} 0 & if\ \alpha + \beta X_i + e_i \leq 0 \\ \alpha + \beta X_i + e_i & if\ 0 < \alpha + \beta X_i + e_i < 1 \\ 1 & otherwise \end{cases} \quad (2)$$

where FE is the firm efficiency scores.

The variables included in the estimation model are explained as follows. Firstly, the financial factor is one of the most important determinants of firm efficiency. As argued above, I expect that financial development affects firm performance. Secondly, although other researchers can argue that firm age can have a negative effect on firm performance because older firms might have backward

technology and management, I argue that the firm age expresses the firm experience, thus experienced firms have better management skills resulting from learning by doing, more capital sources, and thus better technology. Therefore, age is expected to have a positive influence on firm performance in Vietnam, and is added in the model. Thirdly, the firm size is added in the model since firms can enjoy the economies of scale. Fourthly, Vietnam has a problem of deflation with direct influence on firm performance during the period 1999-2000, after the Asian financial crisis. Firms have less motivation to invest in widening their production and improving their technological level at that time. This may worsen firm performance. The consequence of this problem is believed to occur in the following years. Thus, I expect that deflation can negatively affect firm performance. Fifthly, researchers have shown that policy, trade liberalization for example, is one of the channels through which it can affect firm performance. Nishimizu et al. (1988) suggest that trade liberalization has forced domestic firms to adopt newer and more advanced technology to increase their efficiency, thanks to the competing pressure from foreign firms and foreign goods and services. Griliches et al. (1969) suggest that international trade can improve domestic firm performance through international technical knowledge spillovers. This is because domestic firms can improve their technological level by importing technology, or goods containing advanced technology, and exchanging expertise. Therefore, I expect that imports can influence firm performance since Vietnamese firms may improve their performance by importing capital goods and the latest technology. Exports are expected to improve firm performance in Vietnam due to the competing pressure arising from the international markets. Hence, an openness variable is included in the model. Finally,

the firm's level of technology and education influences firm performance, especially firm efficiency and thus are included in the model. I expect that better technology and education can improve firm performance.

2.2. Method of estimation

The chapter uses OLS, 2SLS and tobit regression methods to estimate all equations. The chapter employs various methods because 2SLS can help to avoid the problem of endogeneity. Moreover, the fact that the efficiency scores vary between zero and one may lead to a problem of inconsistent estimation because of the truncated data. Tobit regression is hence employed. IV tobit regression is applied to solve the problem of endogeneity in the case of the truncated data.

Researchers often have to face the problem of heteroscedasticity arising from employing survey data. This problem is hence resolved by using White's heteroscedasticity correction method.

In order to deal with the problem of endogeneity, I use the Wald test to identify the problem and then use the instrumental variable method to eliminate the problem if the problem appears. The method is carried out as follows.

Firstly, I use the Hansen and Amemiya tests from the overidentification test to check the validity of the instrument variables. Secondly, I use provincial population, firm size, lags of provincial financial development measures, the difference between national and provincial levels of inflation, provincial legal scores, and regional and ownership dummies as instrument variables. This is explained as follows. The provincial population and the value of total asset can be treated as instrument variables since these variables, which can capture the size of the province and firm, will have an influence on financial development in the presence of

economies of scale in the financial system. Other variables can influence directly the firm level of financial development, but can be relatively independent of firm performance.

IV. ESTIMATION RESULTS AND DISCUSSION

1. Efficiency scores

The efficiency scores are estimated for the year 2002 under the conditions of variable returns to scale along with the maximum and minimum efficiency performance, and the corresponding standard deviation. The overall technical efficiency is obtained under the condition of constant returns to scale while pure technical efficiency and scale efficiency are gained under the condition of variable returns to scale. The estimated results are shown in the table 4.2.

The estimated results, similar to the results obtained by Qayyum and Ahmad (2006) in the case of India, Pakistan and Bangladesh, suggest that most of firms in Vietnam operate under the efficient level. They consume a large amount of inputs to reach their current outputs, compared with the firms operating at the frontier. Specifically, the average technical efficiency score in 2002 is 5.2% under the conditions of constant returns to scale and 12.9% under the conditions of variable returns to scale. This means that expenses can be reduced by an average of 94.83% and 87.1% without any influence on the existing output. In addition, most of the 1886 firms under the condition of constant returns to scale (92.2%), and under the condition of variable returns to scale (80.7%), lie between 0% and 20% in the efficiency scores, and 1412 out of the 1886 firms operate under the condition of increasing returns to scale.

Table 4.2: Efficiency Scores for the Sample of 1,886 Firms in 2002 in Vietnam

Variables		Mean	Std. Dev.	Observations
CRSTE:	- Overall	5.17%	0.1404	1886
	- 0% – 20%			1738
	- 20% – 40%			85
	- 40% – 60%			25
	- 60% – 80%			20
	- 80% – 100%			18
	- 100%			15
VRSTE:	- Overall	12.92%	0.2295	1886
	- 0% – 20%			1522
	- 20% – 40%			168
	- 40% – 60%			76
	- 60% – 80%			42
	- 80% – 100%			78
	- 100%			58
SCALE:	- Overall	49.02%	0.3438	1886
	- 0% – 20%			567
	- 20% – 40%			254
	- 40% – 60%			255
	- 60% – 80%			299
	- 80% – 100%			511
	- 100%			18
Returns to scale				- DRS: 245 - IRS : 1412 - CRS: 229

Note: CRSTE is the technical efficiency from constant return to scale. VRSTE is the technical efficiency from variable return to scale. SCALE is the scale efficiency. DRS = decreasing returns to scale. IRS = increasing returns to scale. CRS = constant returns to scale.

The low average efficiency scores for the two measures of firm efficiency, CRSTE and VRSTE are interesting results. Therefore, total turnover is used as the output factor to calculate the efficiency scores. The estimated results turn out to be around 42%, 53.2% and 80.3% for the three measures of firm efficiency: CRSTE, VRSTE and SCALE respectively.[30] However, the regressed results (not reported here) show that the impacts of financial development on firm efficiency are similar to those using the value added as the output factor. In addition, the value added reflects more correctly the output factor than turnover does since the latter includes the value

[30] Efficiency of utilizing inputs is very different in all Vietnamese firms. This leads to the large differences in average efficiency scores between employing value added and turnover as output.

of inputs which is used to estimate the efficiency scores, and thus it states a repeated influence on the efficiency scores. This may lead to misleading results. Hence, the value added is the better output measure and employed as the output factor in this chapter.

One can argue that FDI firms may be the best performing firms since they have more advanced technology and better management skills. These firms may be outliers which cause these low average efficiency scores. Therefore, they should be removed from the sample. Doing so yields 5.5 per cent, 13.7 per cent and 47.6 per cent for CRSTE, VRSTE and SCALE respectively. These results are not much different. For these reasons, the sample of 1,886 firms is the best option.

This majority of firms operate under the efficient level since they are financially constrained. The financial constraint is brought on by the low level of financial development in the Vietnamese economy. Firms can only borrow in the informal financial market, which charges a very high interest rate. This limits their ability to invest in technology. Therefore, firms can only employ outdated technology. In addition, they are not able to invest in the training of their employees to be better qualified for their jobs, nor employ qualified staff. These unqualified labourers are not only inefficient, but are also wasteful in using the input resources in production arising from the fact that these employees are less conscientious. The later problem is akin to the common tragedy. Therefore, they consume a lot of inputs to produce a unit of output and they are hence inefficient.

2. The impact of financial development on firm performance

The impact of financial development on firm performance is shown in table 4.4, table 4.5, table 4.6 and table 4.7 in the appendix, and all the tests run show that

the estimated results are robust and unbiased. These tables give the promising results as follows.

The indicator of financial development at the firm level is positive and significant at 10 percent or better in all regressions while this indicator at the provincial level is not significant in some regressions, as shown in table 4.4. Alternative measures of provincial financial development are used, but the results are still similar. The reason is perhaps that accounting measures of firm performance do not reflect correctly the situation of firm performance in Vietnam because of the 'achievement disease', the problem of the systematic matching and poor governmental administration in the whole economy, leading to erroneous accounting reports as discussed in the introduction.[31] These problems can overshadow the role of environmental variables in firm performance. Hence, it is necessary to have a careful look at an analysis of the estimated results from the DEA technique.

Using the level, or ratio, of capital sources of provincial financial companies to provincial GDP as measures of provincial financial development, the estimated results are not much different from the ones using accounting measures as measures of firm performance. However, after using alternative measures of provincial financial development, employing the ratio of provincial total loan to provincial GDP rather than the level, or ratio, of provincial financial companies' liabilities to provincial GDP, the results turn out to be much different and better as presented in table 4.5 in which indicators of firm performance are derived from the DEA

[31] The problem of the systematic matching has taken place in Vietnam for the following reasons. Firstly, legal documents issued by ministries have been sometimes overlapped and not unified. For instance, the banking laws ask bankers to lend to firms which have profits at least six months but the accounting laws do not state clearly the responsibilities of reporting, giving a penalty for example if firms report wrong. Secondly, the responsible division among ministries have been somehow unclear. Thus, there have been some cases in which no authorities have been responsible for bad administration results, but some ministries simultaneously have struggled for obtaining the achievements gained.

technique. Moreover, once the interaction between firm financial development and firm size is inserted in the model, the estimated results are much better as shown in table 4.6. The results not only show the role of financial development but also explain the role of inflation in firm efficiency. The results show that all measures of financial development enter with the expected sign and are significant at 10% or better.

The estimated results from the cross-section data regression may reflect inadequately the impact of financial development on firm performance since development needs a period of time. In order to overcome this issue, the panel data regression approach is employed for 178 firms during the period 2002-2003. The estimated results are shown in table 4.7 in the appendix. It is not surprising that the coefficients of the measure of financial development at the firm level and its interaction with firm size are significant at 10 percent or even better for all regressions and the expected signs.

The positive and significant results of all financial development indicators indicate that an increase in the level of financial development is a good predictor for firm performance. This reflects the hypothesis that a better financial system can help firms to mobilize more funds for their investment, improve efficiency of using funds borrowed (Phan, 2006), and have a better resource allocation (Levine, 1997). This is because the financial system can give firms financial advice, provide more information and transactions with lower costs, increase diversification and thus decrease risk, and analyse the business environment for them. This supports the Vietnam News (2007)'s finding that the banking sector and the stock exchange in going period of rapid development is serving the strong economic growth in

Vietnam. The progress of reforms in administration and the financial sector improves the efficiency of the Vietnamese economy or improves the factors of productivity and therefore there is a high rate of growth.

It is believed that the impact of financial development on firm performance differs between small firms and large firms (Guiso et al., 2004). Small firms find it hard to borrow and this make them more dependent on the level of financial development. It is hypothesized that the impact of financial development on firm performance is stronger for small firms. In order to test this hypothesis, I insert the interaction between financial development and size into the model. The estimated results presented in table 4.6 and table 4.7 show that most estimated coefficients are negatively significant at 1 percent as expected. The significant and negative interaction suggests that small firms have more benefits than large firms once the financial system improves.

The coefficient firm age enters with a positive significance. This means that the firm's experience brings about better performance arising from learning by doing. Arguably, the centrally planned periods (before 1986) did overshadow firm business ability in Vietnam. However, the Doimoi (renovation) policy introduced in 1986 has increased the pressure for firms to study and apply business skills. Thus, firms with more experience have better performance.

The hypothesis set here is that the bigger sized firms can enjoy economies of scale, and hence better firm performance. These estimated results show that the firms with a larger size enjoy economies of scale in terms of turnover and technical efficiency, but incur diseconomies of scale in terms of profitability. This supports the

argument stated in Vietnam News (2007) that Vietnam's economic growth has been largely supported by increasingly using inputs: land, capital and labour.

The diseconomies of scale in terms of profitability are an interesting point. This is because the measure of the firm size and the number of employees reflect that the more employees, the more expenses the firms pay in terms of wages and salaries. In addition, state owned enterprises still dominate the Vietnamese economy. Many state owned firms, especially in Hanoi and other provinces in the central and northern part of Vietnam, have employed too many employees, commonly known as 'descendant of an influential family', because of political or social or blood relationship.[32] The working intensity of those employees is very low, but they enjoy the same or even better salaries and promotion. Therefore, there is a contagion effect between the two types of employees: 'descendant and non descendant of an influential family', of which the latter has no motivation to improve and many even worsen their performance. This leads to a decline in labour productivity, an increase in production costs, and hence a decrease in profit.

As can be seen, provincial inflation has a negative impact on the firms' profitability but openness plays a positive role in the firms' profitability. This is because Vietnamese administration reforms and market liberalisation policy have improved the efficiency of the Vietnamese economy. The increasing competition pressure has forced firms to renovate their management, adopt more advanced technology and employ more skilled labour. In addition, the government accelerating

[32] The term "descendant of an influential family"is understood as follows. Employees are recruited because they are children or relatives of influential people such as officials, leaders of other companies and their friends. These employees might not meet the recruiting conditions but are employed or firms do not have recruiting demand but still employ to please these influential people. This is because few people care efficiency of state owned firms. This leads to the fact that the Vietnamese government has speeded up the implement of the equitization process of these firms.

equitization of questionably efficient state-owned firms leads to better management and better corporate governance, hence better firm efficiency (Vietnam News, 2007). Moreover, the negative impact of inflation on firm profitability as show in table 4.4 and the positive significance of the provincial inflation coefficient in table 4.7 reflect the fact that as a consequence of the Asian financial crisis, deflation occurred in Vietnam over the period 1999-2000, but the problem remained until late 2003. This problem led to a very weak demand. Therefore, the Vietnamese government carried out many programs to stimulate demand for the economy for over the period. These programs accelerated economic growth, but could have somehow reduced the economy's efficiency because the government had provided a lot of credits without a prudential appraisal of the projects' efficiency. However, firms benefited from the lower costs of borrowings. In addition, an increase in prices helps them to increase their sales turnover and hence to better efficiency. Furthermore, the positive and significant coefficients of inflation shown in scale efficiency in table 4.6 suggest that an increase in inflation makes a bigger difference between CRSTE and VRSTE.

Labour quality here is measured as the firm education. Education expresses a key role in firm performance. However, this variable appears to have a negative effect on technical efficiency. This is an interesting point. This is perhaps because wage and training costs are used to measure the labour quality which are already part of firm costs.

The technological level of firms is measured as 1 for the advanced technology, 2 for above average technology, 3 for average technology, 4 for below average technology and 5 for backward technology. The estimated coefficients of this variable are significant as expected. This supports the hypothesis that higher

technology level of firms improves firm performance. However, the coefficient of this variable is significantly positive at 10 percent or 5 percent in the 2SLS and IV tobit regression of the technical efficiency in both table 4.4 and table 4.5, against expected. The reason is perhaps that firms with advanced techniques spend a lot for this advantage. Firms in Vietnam normally carry out the straight line depreciation method which requires having a bigger amount of depreciation than that of the declining balance depreciation method each year. This leads to the fact that they have to have high depreciation, and hence lower efficiency scores.

V. CONCLUSION

This chapter uses both the traditional and modern methodologies to measure firm performance and then uses the OLS, 2SLS, and tobit and IV tobit regression to estimate the impact of financial development on firm efficiency in Vietnam in order to ensure that the estimated results are unbiased, robust and convincing.

The estimated results lead to the following conclusions. Firstly, around 80.7% of Vietnamese firms lie between 0% and 20% in the efficiency scores derived from the DEA technique for the 1886 firms. Secondly, the DEA technique gives the measure of firm performance, which better explain the key role which both firm financial development and financial development environment play in firm performance. This leads to an important conclusion that any improvement in the financial system, mainly arising from banking and stock exchange development, leads to better firm performance in Vietnam. Small firms achieve more benefit to their efficiency than large ones with increases in the level of financial development. Thirdly, the reforms in government administration and the financial sector help increase the level of financial development which in turn improves the firm

efficiency. In addition, besides the characteristics of the firms, good policy environment encourages the firm efficiency. Finally, state–owned enterprises are more efficient than non-state firms, consistent with Nguyen and Giang (2005)'s finding. This is perhaps because the state firms have more capital and thus have more advanced technology. Moreover, the enterprise laws provided a fair playing field for both the private and state sectors in the late 1990s, but state owned enterprises still received some privileges from the government and state-owned banks, especially in borrowing.

APPENDIX

Table 4.3: Economic Regions and Provinces in Vietnam

NOTE:
This table is included on page 120 of the print copy of the thesis held in the University of Adelaide Library.

Source: General Statistics Office of Vietnam

Table 4.4: The Impact of Financial Development on Firm Performance

(Cross-Section Data Regression Approach - Accounting Method)

	Total Sales Turnover		Net Profit		ROA		Labour Productivity		TE	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Constant	4.7708*	4.3293	5.8879	3.3483	10.2857**	11.7862**	4.7708*	4.3363	0.9924***	0.9924***
	(2.7412)	(3.6355)	(4.3467)	(6.0674)	(5.1181)	(5.572)	(2.7412)	(3.6279)	(0.0000)	(0.0000)
Firms' financial development indicator	0.2744***	0.7726***	0.1964***	1.0304***	0.4055*	4.1303*	0.2744***	0.7696***	1.50e-06***	6.58e-06**
	(0.0194)	(0.0771)	(0.0298)	(0.1241)	(0.2337)	(2.3098)	(0.0194)	(0.0767)	(2.74e-07)	(3.23e-06)
Provincial financial development indicator	0.0282*	0.0202	0.0132	0.0001	-0.0007	0.0001	0.0282*	0.0203	5.39e-08	-2.04e-07
	(0.0156)	(0.0198)	(0.0291)	(0.0400)	(0.0010)	(0.0013)	(0.0156)	(0.0198)	(2.34e-07)	(3.12e-07)
Firms' age	0.0176**	0.0173*	-0.0150	-0.0124	0.0225**	0.0267**	0.0176**	0.0172*	3.08e-07***	2.84e-07**
	(0.0082)	(0.0102)	(0.0121)	(0.0161)	(0.0110)	(0.0130)	(0.0082)	(0.0102)	(1.11e-07)	(1.29e-07)
Firms' age squared	-0.0006***	-0.0006**	0.0003	0.0003	-0.0004*	-0.0005*	-0.0006***	-0.0006**	-8.32e-09	-7.85e-09**
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(2.74e-09)	(3.11e-09)
Firms' size	0.5964***	0.1727	0.1367	-0.3997*	0.0201	-0.1047	-0.4036***	-0.8248***	3.38e-06**	-7.29e-07
	(0.0991)	(0.1274)	(0.1522)	(0.2193)	(0.1772)	(0.2053)	(0.0991)	(0.1260)	(1.33e-06)	(2.92e-06)
Firms' size squared	0.0091	0.0182*	0.0514***	0.0515***	-0.0012	0.0094	0.0091	0.0182*	-3.46e-07***	-2.80e-07**
	(0.0091)	(0.0106)	(0.0151)	(0.0196)	(0.0159)	(0.0181)	(0.0091)	(0.0106)	(1.24e-07)	(1.41e-07)
Provincial inflation	-0.0144	-0.0213	-0.0441	-0.0421	-0.0943**	-0.1095**	-0.0144	-0.0213	-2.32e-07	-2.60e-07
	(0.0260)	(0.0346)	(0.0411)	(0.0576)	(0.0466)	(0.0512)	(0.0260)	(0.0345)	(3.40e-07)	(4.11e-07)
Provincial openness	0.0165	0.0007	0.0376	-0.0083	0.0417*	0.0426*	0.0165	0.0008	2.96e-07	2.46e-07
	(0.0192)	(0.0265)	(0.0387)	(0.0514)	(0.0220)	(0.0247)	(0.0192)	(0.0264)	(2.80e-07)	(3.37e-07)
Firms' technological degree	-0.0943***	0.0569	-0.2488***	0.0174	0.0015	-0.0099	-0.0943***	0.0560	7.63e-07*	2.20e-06**
	(0.0299)	(0.0471)	(0.0532)	(0.0817)	(0.0403)	(0.0505)	(0.0299)	(0.0469)	(4.26e-07)	(1.08e-06)
Firms' labour quality	0.6356***	0.3467***	0.8935***	0.3916***	0.0247	0.0569	0.6356***	0.3484***	8.55e-06***	5.80e-06***
	(0.0532)	(0.0730)	(0.0737)	(0.1175)	(0.0589)	(0.0688)	(0.05320	(0.0727)	(8.09e-07)	(2.01e-06)
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.6568		0.2848		0.3728		0.8495		0.1502
R-squared	0.7488	0.6219	0.5803	0.3136	0.0119		0.3911	0.0940	0.2301	0.0104
Observations	1690	1631	1427	1278	4099	3672	1690	1631	1569	1569

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. Robust Standard Errors are in brackets.

Firms' financial development is measured as the log of the level of firm loan for all regressions, unless it is measured by the ratio of loan to total asset of the firm in the case of the ROA regression. Provincial financial development is measured as the log of the level of capital sources of financial companies at the provincial level for all regressions, unless it is measured as the ratio of capital sources of provincial financial companies to provincial GDP in the case of the ROA regression.

Firms' technological degree is measured as follows: 1 for the advanced technology; 2 for above the average technology; 3 for the average technology; 4 for below the average technology; 5 for the backward technology.

Table 4.5: The Impact of Financial Development on Firm Performance

(Cross-Section Data Regression Approach - DEA)

	Technical Efficiency				Scale Efficiency			
	OLS	2SLS	TOBIT	IVTOBIT	OLS	2SLS	TOBIT	IVTOBIT
Constant	0.2532	0.1871	0.2532	0.1871	-1.0631*	-1.3703	-1.0517*	-1.3551
	(0.1750)	(0.2256)	(0.1712)	(0.2132)	(0.5479)	(0.8412)	(0.5937)	(0.8315)
Firms' financial development indicator	0.0038***	0.0305*	0.0038***	0.0305**	0.0312***	0.1599***	0.0313***	0.1590***
	(0.0013)	(0.0163)	(0.0011)	(0.0147)	(0.0042)	(0.0616)	(0.0038)	(0.0573)
Provincial financial development indicator	0.0008*	0.0008*	0.0008***	0.0008***	0.0018**	0.0020*	0.0019**	0.0020*
	(0.0004)	(0.0004)	(0.0002)	(0.0003)	(0.0008)	(0.0011)	(0.0008)	(0.0010)
Firms' age	0.0008**	0.0005	0.0008*	0.0005	0.0067***	0.0053**	0.0066***	0.0053**
	(0.0004)	(0.0005)	(0.0005)	(0.0006)	(0.0021)	(0.0026)	(0.0016)	(0.0023)
Firms' age squared	-0.00002**	-0.00002	-0.00002**	-0.00002	-0.0001**	-0.0001	-0.0001***	-0.0001*
	(9.98e-06)	(0.00001)	(0.00001)	(0.00001)	(0.00005)	(0.00006)	(0.00004)	(0.0001)
Firms' size	-0.0018	-0.0220	-0.0018	-0.0220*	0.1928***	0.0959*	0.1922***	0.0960*
	(0.0060)	(0.0137)	(0.0056)	(0.0129)	(0.0222)	(0.0525)	(0.0193)	(0.0501)
Firms' size squared	0.00004	0.0003	0.00004	0.0003	-0.0079***	-0.0065**	-0.0078***	-0.0064**
	(0.0006)	(0.0007)	(0.0006)	(0.0007)	(0.0023)	(0.0028)	(0.0019)	(0.0027)
Provincial inflation	-0.0022	-0.0023	-0.0022	-0.0023	0.0034	0.0026	0.0033	0.0025
	(0.0017)	(0.0021)	(0.0016)	(0.0020)	(0.0052)	(0.0078)	(0.0056)	(0.0076)
Provincial openness	0.0001	-0.0004	0.0001	-0.0004	0.0025	0.0002	0.0025	0.0003
	(0.0009)	(0.0014)	(0.0013)	(0.0016)	(0.0048)	(0.0065)	(0.0046)	(0.0063)
Firms' technological degree	0.0021	0.0103*	0.0021	0.0103**	-0.0106	0.0288	-0.0106	0.0285
	(0.0016)	(0.0058)	(0.0020)	(0.0051)	(0.0067)	(0.0209)	(0.0069)	(0.0197)
Firms' labour quality	-0.0136**	-0.0269**	-0.0136***	-0.0270***	0.0969***	0.0327	0.0968***	0.0332
	(0.0054)	(0.0120)	(0.0027)	(0.0081)	(0.0115)	(0.0348)	(0.0094)	(0.0314)
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.7102		0.7310^{B}		0.2088		0.2056^{B}
R-squared	0.0503		1973.7165^{A}	0.0283^{C}	0.6324	0.3309	226.0689^{A}	0.0025^{C}
Observations	1403	1398	1403	1398	1403	1398	1403	1398

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. Robust Standard Errors are in brackets.

Firms' financial development is measured as the log of the level of firm loan for all regressions. Provincial financial development is measured as the ratio of total loan/GDP at the provincial level for all regressions.

Firms' technological degree is measured as follows: 1 for the advanced technology; 2 for above the average technology; 3 for the average technology; 4 for below the average technology; 5 for the backward technology. A, B and C stand for the values of the log of likelihood function, p-value of Amemiya-Lee-Newey's test of instrument validity and p-value of Wald test of exogeneity respectively.

Table 4.6: The Impact of Financial Development on Firm Performance

(Cross-Section Data Regression Approach - DEA)

	Technical Efficiency				Scale Efficiency					
	OLS	2SLS	TOBIT	IVTOBIT	OLS	2SLS		TOBIT	IVTOBIT	
Constant	0.1731	-0.1674	0.1731	-0.1674	-1.2161**	-3.0973***	-3.5568***	-1.2161**	-3.0973***	-3.5568***
	(0.1795)	(0.2279)	(0.1714)	(0.2031)	(0.5625)	(0.9097)	(0.9152)	(0.5959)	(0.7991)	(0.7916)
Firms' financial development indicator	0.0160***	0.0727***	0.0160***	0.0727***	0.0545***	0.3681***	0.2871***	0.0545***	0.3681***	0.2871***
	(0.0047)	(0.0157)	(0.0032)	(0.0110)	(0.0132)	(0.0532)	(0.0336)	(0.0112)	(0.0433)	(0.0297)
Firms' financial development x firms' size	-0.0025***	-0.0129***	-0.0025***	-0.0129***	-0.0048*	-0.0622***	-0.0447***	-0.0048**	-0.0622***	-0.0447***
	(0.0008)	(0.0029)	(0.0006)	(0.0020)	(0.0026)	(0.0098)	(0.0057)	(0.0022)	(0.0080)	(0.0051)
Provincial financial development indicator	0.0008*	0.0007*	0.0008***	0.0007***	0.0018**	0.0016*	0.0019**	0.0018**	0.0016*	0.0019**
	(0.0004)	(00004)	(0.0002)	(0.0002)	(0.0008)	(0.0009)	(0.0009)	(0.0008)	(0.0009)	(0.0009)
Firms' age	0.0008**	0.0010**	0.0008*	0.0010*	0.0068***	0.0076***	0.0085***	0.0068***	0.0076***	0.0085***
	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0021)	(0.0023)	(0.0024)	(0.0016)	(0.0021)	(0.0020)
Firms' age squared	-0.00002**	-0.00003**	-0.00002**	-0.00003**	-0.0001**	-0.0001**	-0.0002***	-0.0001***	-0.0001***	-0.0002***
	(0.00001)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
Firms' size	-0.0023	-0.0092	-0.0023	-0.0092	0.1918***	0.1537***	0.4066***	0.1918***	0.1537***	0.4066***
	(0.0060)	(0.0077)	(0.0055)	(0.0062)	(0.0219)	(0.0307)	(0.0376)	(0.0192)	(0.0246)	(0.0338)
Firms' size squared	0.0019*	0.0097***	0.0019***	0.0097***	-0.0043	0.0389***		-0.0043*	0.0389***	
	(0.0010)	(0.0024)	(0.0007)	(0.0016)	(0.0030)	(0.0081)		(0.0025)	(0.0065)	
Provincial inflation	-0.0018	-0.0003	-0.0018	-0.0003	0.0041	0.0122	0.0143*	0.0041	0.0122*	0.0143**
	(0.0017)	(0.0021)	(0.0016)	(0.0018)	(0.0053)	(0.0082)	(0.0082)	(0.0056)	(0.0072)	(0.0070)
Provincial openness	0.00002	-0.0005	0.00002	-0.0005	0.0023	-0.0006	-0.0017	0.0023	-0.0006	-0.0017
	(0.0009)	(0.0011)	(0.0013)	(0.0015)	(0.0048)	(0.0056)	(0.0054)	(0.0045)	(0.0057)	(0.0055)
Firms' technological degree	0.0020	0.0036*	0.0020	0.0036	-0.0108	-0.0020	-0.0002	-0.0108	-0.0020	-0.0002
	(0.0016)	(0.0020)	(0.0020)	(0.0022)	(0.0068)	(0.0089)	(0.0085)	(0.0069)	(0.0088)	(0.0085)
Firms' labour quality	-0.0138**	-0.0178***	-0.0138***	-0.0178***	0.0965***	0.0743***	0.0697***	0.0965***	0.0743***	0.0697***
	(0.011)	(0.0062)	(0.0027)	(0.0031)	(0.0115)	(0.0146)	(0.0140)	(0.0093)	(0.0121)	(0.0118)
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)		0.2119		0.1154[B]		0.1254	0.2391		0.1398[B]	0.2485[B]
R-squared	0.0612		1981.7731[A]	0.0000[C]	0.6337	0.4275	0.4680	233.18708[A]	0.0000[C]	0.0000[C]
Observations	1403	1398	1403	1398	1403	1398	1398	1403	1398	1398

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. Robust Standard Errors are in brackets.

Firms' financial development is measured as the log of the level of firm loan for all regressions. Provincial financial development is measured as the ratio of total loan/GDP at the provincial level for all regressions.

Firms' technological degree is measured as follows: 1 for the advanced technology; 2 for above the average technology; 3 for the average technology; 4 for below the average technology; 5 for the backward technology. A, B and C stand for the values of the log of likelihood function, p-value of Amemiya-Lee-Newey's test of instrument validity and p-value of Wald test of exogeneity respectively.

Table 4.7: The Impact of Financial Development on Firm Performance
(Panel Data Regression Approach - DEA)

	Technical Efficiency		Scale Efficiency	
	XTTOBIT	IVTOBIT	XTTOBIT	IVTOBIT
Constant	-3.7013**	-3.5489*	0.2375	0.2265
	(1.6812)	(2.0653)	(1.9016)	(3.1137)
Firms' financial development indicator	0.0600*	0.3549**	0.0628*	0.6132**
	(0.0309)	(0.1757)	(0.0369)	(0.2649)
Firms' financial development x firms' size	-0.0148***	-0.0642**	-0.0107*	-0.1022**
	(0.0054)	(0.0294)	(0.0065)	(0.0444)
Provincial financial development indicator	0.0001	0.0017	-0.0028	-0.0004
	(0.0022)	(0.0028)	(0.0030)	(0.0043)
Firms' age	0.0024	-0.0032	0.0114*	-0.0030
	(0.0049)	(0.0052)	(0.0065)	(0.0078)
Firms' age squared	-0.0001	0.00002	-0.0003**	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Firms' size	0.0029	-0.0124	0.1552**	0.1384
	(0.0542)	(0.0659)	(0.0692)	(0.0309)
Firms' size squared	0.0120**	0.0464**	0.0060	0.0676**
	(0.0061)	(0.0205)	(0.0076)	(0.0309)
Provincial inflation	0.0337**	0.0227	-0.0079	-0.0241
	(0.0161)	(0.0212)	(0.0182)	(0.0319)
Provincial openness	-0.0220*	-0.0195	-0.0011	0.0040
	(0.0125)	(0.0151)	(0.0157)	(0.0228)
Firms' technological degree				
Firms' labour quality	-0.0067	-0.0111	-0.0077	-0.0126
	(0.0054)	(0.0073)	(0.0061)	(0.0110)
Ownership dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Amemiya test (p-value)		0.2290		0.9983
Wald test (p-value)		0.0346		0.0010
The values of the log of likelihood function	52.6761		6.7275	
Observations	229	224	229	224

Note: * = significant at 10%; ** = significant at 5%; ***= significant at 1%. Standard errors are in brackets. There are 178 firms between 2002 and 2003.
Firms' financial development is measured as the log of the level of firm loan for all regressions. Provincial financial development is measured as the ratio of total loan/GDP at the provincial level for all regressions.

Table 4.8: Summary Statistics

Variables	Observation	Mean	Std. Dev.	Min	Max
CRSTE	178	10.62%	0.2340	0	1
VRSTE	178	19.79%	0.3134	0	1
SCALE	178	52.97%	0.3375	0.004	1

CHAPTER V

CONCLUSIONS

The main findings of this thesis are that financial development plays an important positive role in economic activities both directly and indirectly in Vietnam. Chapter 2 concludes that at the provincial level an increase in the level of financial development leads to an improvement in efficiency of using savings, productivity, capital and efficiency of investment, technological progress, and hence economic growth. The indirect influence of financial development on economic activities is mainly through accelerating the quality of foreign direct investment.

Conclusions in chapter 3 are similar to those of chapter 2, but have three additional findings. First, a better level of financial development leads to better household welfare. Second, it strongly restates that the impact of financial development on economic activities is not only direct but also indirect. Financial development has a direct influence on income through the income equation and an indirect effect on income through increasing savings, investment, productivity and technology which in turn have a positive impact on income. The indirect effect is shown by the simultaneous effect of financial development on economic activities. Finally, the social relationship and collateral requirement lead to an inequality in borrowings.

Chapter 4 shows an additional channel of transmission from financial development into economic activities. It concludes that all firms benefit from the higher level of financial development in terms of firm performance. Smaller firms receive greater benefit from financial development than large firms.

Other interesting conclusions come from this thesis as follows. First, in chapter 2, it is found that inflation promotes economic growth, the efficiency of using savings, and the progress of information technology between 2000 and 2004. It appears to have a negative influence on productivity during the period 1997-2000, but have a positive influence on productivity over the period 2000-2004. In addition, education and the degree of openness help to improve economic growth, the efficiency of using savings, productivity and progress of information technology during the period 1997-2004. Government expenditure also has the same effect, but it shows a negative effect on the efficiency of investment over the period 2000-2004 due to the problem of deflation.

Second, chapter 3 suggests that better education, greater assets and accessing health care helps households to benefit. Savings and investment are at the higher level, but per-capita income and labour productivity are at the lower level for households with a bigger size. These households are under pressure to have more productivity, but incur lower income, savings and ability to access information technology. Investment is preferred, but productivity is lower in households with a male head. Kinh group and households in the urban area dominate the benefits.

Finally, chapter 4 point out that the efficiency of Vietnamese firms is at a low level. About 80.7% of 1886 Vietnamese firms operate under the efficient frontier. In addition, macroeconomic environment plays an important role in firm performance. State-owned firms still have some privileges, hence more capital and more advance technology. This may help these firms to be more efficient.

The largest barrier to development of the financial system in Vietnam is the dominance of state-owned firms in the financial system. This dominance leads to a

series of problems. First, the financial market is less competitive, and there are many distortions in the market. Many bad borrowing decisions appear because of social relationships and poor staff. Second, the efficiency of the financial system is questionable. Not enough staff cares for efficiency in their stated-owned financial institutions. This is because state management over its financial institutions is improper. Although government realizes the problem, it resolves slowly due to the problem of corruption. Therefore, the Vietnamese government should speed up its financial liberalization and equitization of all state-owned financial institutions.

The social relationship (network) plays an important role in every activity in Vietnam. Therefore, in order to be successful in doing business in Vietnam, businessmen should first build a good network and then start their businesses. They should learn how to know many people, especially influential ones such as officials. Simultaneously, they should get to know these people well since these people trust and communicate only when others are well known to them. The Vietnamese culture and the serious problem of corruption explain this situation.

The main limitation of this thesis is that data collected are over a short time period, and mostly based on cross-section data regressions. In order to analyse clearly the trend of development, we need to have a longer period. Therefore, further study is recommended to collect data, or make surveys to get data, over a longer period and to employ the panel data technique to analyse the link between financial development and economic activities. Channels of transmissions of financial development to economic activities, such as trade are not fully empirically examined here. Another study could be done by using the measures of financial development built in chapter 3 at the national or provincial level.

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