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EMPIRICAL STUDIES ON PUBLIC DEBT: THE CASE OF VIETNAM

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Title: EMPIRICAL STUDIES ON PUBLIC DEBT: THE CASE OF VIETNAM

"政府債務に関する実証分析-ベトナムの場合"

Graduate School of International Cooperation Studies

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Nguyen Thi Ngoc Anh

December 19, 2016

EXECUTIVE SUMMARY

The dissertation aims to study the effects of government debt on the solvency risk, economic instability and the quality of banks' loans in case of Vietnam by empirically testing the three main hypotheses following from the theoretical analysis:

1) An increase in domestic borrowing causes Vietnam to be more prone to external shocks (as measured by CDS spreads).
2) Greater reliance on domestic debt as compared to external borrowing leads to a higher economic instability in Vietnam.
3) Higher the country's overall public debt is associated with higher level of non-performing loans in local banks.

The economy of Vietnam is now under severe pressure and threatened by aggressive level of risk related to large public debt - driven mainly by the expansion of domestic borrowing, serious fiscal challenges, inflation uncertainty and huge amount of bank's non-performing loans. This has made it paramount to empirically investigate the relationship and impact between government debt, country credit risk, inflation and bank's non-performing loans so that the policy makers will be well informed in identifying and framing the problems of both macroeconomic conditions and financial market and then can effectively make decision on both fiscal and monetary policy. In addition to that, the government of Vietnam has been also warned, without empirical evidence, that high public debt and in more specific, greater reliance on domestic debt with higher interest rate and shorter maturity can be a serious obstacle to fiscal improvement, development performance and economic growth of Vietnam.

So far, there has been no empirical evidence on the effects of domestic debt on both financial and macroeconomic conditions in the context of Vietnam. Much of the existing studies have focused mainly on external debt in the context of industrialized countries, while the issue of internal debt has received less attention. This study, hence,

contributes to the existing literature by empirically testing the impact of government debt; with specific concentrate on the domestic debt effects, on Vietnam's economic performance in general and on banking market risk in particular, using different economic models such as Autoregressive Distributed Lag Modeling, Vector Error Correction Model and one-step System GMM estimation.

This dissertation includes five chapters – the first chapter provides a general introduction of public debt situation in Vietnam, the next two chapters empirically examine the impact of government debt on macroeconomic variables, with particular concentration on domestic debt analysis due to its increasing contribution to the country's overall public debt, fourth chapter will be more detail in accessing the effect of Vietnam's public debt on banking market risk and final chapter will be the concluding remarks. Specifically:

Chapter 1 is a brief introduction. For systematization purposes, the current issue of Vietnam's public debt was analyzed and the potential impacts of increasing public debt on economic performance were also considered.

Chapter 2 focuses on the macroeconomic determinants of sovereign credit risk in Vietnam from January 2005 to December 2014 by using Autoregressive Distributed Lag Modeling. The study finds the existence of both long run and short run relationships among variables and the global factors outperform macroeconomic factors in the short term. In long-term, the creditworthiness of the country is affected largely by macroeconomic fundamentals, specifically the international reserve, which represents the financial capacity of the country, domestic government debt and terms of trade volatility. The country's output gap is found to causes the country to be more susceptible to the external shocks in long-term, although the scale of its impact is quite small given the fact that Vietnam increasingly depends on domestic borrowings to push economic growth, which results in higher volatility in the long run.

Based on the empirical result of Chapter 2, which shows that domestic borrowing adversely affect the creditworthiness of Vietnam in long run, making the country less attractive to international investors and thus be more prone to the volatility of the global market, leading to higher instability in the economy. In Chapter 3, we next examine how an increase in domestic borrowing (relative to external borrowing) to finance fiscal deficit influences the stability of the economy through its effect on the inflation based on quarterly data from March 2000 to December 2015 by applying a Vector Error Correction Model (VECM) with control variables of budget deficit, bank's credit to private sector and lending interest rate. Granger causality test is also employed to examine the debt-inflation relationship. Furthermore, in order to address the effects of the shift in the composition of country's public debt toward domestic debt on the stability of the economy, this chapter includes the ratio of domestic debt to external debt as a control variable instead of the ratio of domestic debt to GDP. The estimated results show that larger public deficit and higher domestic borrowing as compared to external debt cause inflation to increase in the future. Together with domestic debt and fiscal deficit, the growth rate of credit to the rest of the economy and bank's lending rate also have a significant impact on inflation dynamics of Vietnam. This confirms that besides monetary financing, debt financing is also inflationary in long-term. The findings of this study also indicate the situation of fiscal dominance in case of Vietnam.

Chapter 4 of this dissertation tries to empirically investigate relationship between the country's overall public debt and credit risk of banking market (proxied by the level of Non-performing loans (NPLs)) in 32 Vietnamese banks over the period from 2004 to 2014 by using one-step System GMM estimators developed by Blundell and Bond (1998). Overall, the results indicate that macroeconomic factors (GDP growth rate, public debt, loans provided to and performance of State-owned Enterprises) play predominant role in the movement of NPLs in banks. Unlike previous

studies, the study discovers that higher economic growth is correlated with lower current NPLs, but higher future NPLs. The shortened effect of growth on reducing NPLs suggests that in Vietnam, during the observed period, economic growth affects bank's asset quality mainly through its effects on the volume of bank lending, rather than via its impact on improving borrower's capacity to service their debts. In addition, the estimated results also reveal that large debt burden causes contemporaneous NPLs to decrease. This might because of the transfer of risky loans from balance sheet of banks to the government in form of sovereign debt.

Finally Chapter 5 will review the key outcomes of the thesis and their policy implications, summarizes the limitations of the thesis as well as other issues for further studies.

CONTENTS

ACKNOWLEDGEMENTS i

EXECUTIVE SUMMARY ii

LIST OF TABLES ix

LIST OF FIGURES x

CHAPTER 1 1

INTRODUCTION 1

1.1 RESEARCH PROBLEMS 1

1.2 THE SITUATION OF VIETNAM'S PUBLIC DEBT 4

1.3 RESEARCH OBJECTIVES 11

1.4 CONTRIBUTIONS OF THE THESIS 12

1.5 OUTLINE OF THE THESIS 13

CHAPTER 2 15

DOMESTIC DEBT AND SOVEREIGN CREDIT RISK IN VIETNAM 15

2.1 INTRODUCTION 15

2.2 CREDIT DEFAULT SWAPS: A BRIEF INTRODUCTION 17

2.2.1 How do Credit default swaps work? 17

2.2.3 The Market for CDSs at a glance 18

2.2.4 The CDS spread: a market indicator of credit risk 19

2.3 LITERATURE REVIEW 21

2.4 DATA AND METHODOLOGY 28

2.4.1 The Data 28

2.4.2 Methodology 35

2.5 EMPIRICAL RESULTS 39

2.5.1 Results of Unit Root Tests 39

2.5.2 Bound Testing Results 39

2.5.3 Long-run results 40

2.5.4 Short-run results 42
2.5.5 Diagnostic Tests 45
2. 5.6 Stability Tests 45
2.5.7 Robustness Check 46
2.6 CONCLUSION AND POLICY IMPLICATIONS 47
CHAPTER 3 50
DOMESTIC DEBT AND INFLATION IN VIETNAM 50
3.1 INTRODUCTION 50
3.2 BUDGET DEFICIT AND INFLATION OF VIETNAM 51
3.3 LITERATURE REVIEW 52
3.4 DATA AND METHODOLOGY 59
3.4.1 Data Description 59
3.4.2 Estimation Model 60
3.5 EMPIRICAL RESULTS 61
3.5.1 Unit Root Test 61
3.5.2. Vector Error Correction Model (VECM) 62
3.5.3 Diagnostic tests 66
3.5.4 The impulse response analysis 67
3.6 CONCLUSION AND POLICY IMPLICATIONS 69
CHAPTER 4 72
PUBLIC DEBT AND BANKS' NON-PERFORMING LOANS IN VIETNAM 72
4.1 INTRODUCTION 72
4.2 NON-PERFORMING LOANS: THE SITUATION OF VIETNAM 74
4.3 LITERATURE REVIEW 80
4.3.1 Bank-specific factors 80
4.3.2 Macroeconomic effects 82
4.4 DATA AND EMPIRICAL APPROACH 90

4.4.1 Data 90
4.4.2 Methodology 91
4.5 ESTIMATION RESULTS 93
4.5.1 Summary statistics 93
4.5.2 Correlation matrix 94
4.5.3 Determinants of Non-performing loans 94
4.5.4 Robustness check 100
4.6 CONCLUSION AND POLICY IMPLICATIONS 100
CHAPTER 5 103
CONCLUDING REMARKS 103
REFERENCE 105

LIST OF TABLES

Table 2.1: Net Notional Amount Outstanding (billion US dollars) 19

Table 2.2: Previous studies on the determinant of Country's Credit risk 25

Table 2.3: Episodes of Sovereign defaults 29

Table 2.5: Definitions of Variables 34

Table 2.6: Descriptive Statistics 35

Table 2.7: Results of Unit Root Test 39

Table 2.8 Results of ARDL Bounds Test 40

Table 2.9 Long-run model for the selected ARDL(4,0,2,0,2,2,1) Based on Akaike Information Criteria 42

Table 3.2: Descriptive Statistics 60

Table 3.5: Johansen Trace Cointegration test (4 lags) 63

Table 3.6: Granger Causality Test based on VECM model 66

Table 3.7: Diagnostic tests 66

Table 4.1: Incidence of Public Debt crisis 84

Table 4.2: Previous studies on the determinants of NPLs 88

Table 4.3: List of sampled banks 90

Table 4.4: Definition of Variables 91

Table 4.5 Descriptive statistics 93

Table 4.6 Correlation matrixes of key variables 94

LIST OF FIGURES

Figure 1.1: Total Government Debt to GDP in 2014 (%) 2

Figure 1.3: Budget Balances from 1988 to 2000 4

Figure 1.4: External debt to GNI (percent) 5

Figure 1.5: Composition of public debt (debt to GDP ratio) 7

Figure 1.6: Issuance Volume of Government Bond (billion VND) 8

Figure 1.7: Trading value of G-bonds on Secondary Market (trillion VND) 9

Figure 1.8: Domestic Debt Maturity Profile (as % of total) 10

Figure 1.9: Interest Payment to Revenue 10

Figure 1.10: Total Debt Service To Revenue 11

Figure 2.1: Vietnam's 5-year CDS spreads 16

Figure 2.2: Credit Default Swaps Structure 17

Figure 2.3 CUSUM Curve 46

Figure 2.4 CUSUM of Squares Curve 46

Figure 3.1: CPI inflation over time (%) 51

Figure 3.2: Inflation, Economic growth and Budget imbalance 52

Figure 3.3: The capital-output ratio (%) 58

Figure 3.4: Generalized impulse response function 68

Figure 3.5: Incremental capital output ratio of Vietnam in comparison with other Asian countries (2011-2014) 71

Figure 4.1: Vietnam Banking Sector Loans by Institution Type (% of total) 75

Figure 4.2: Official Non-performing loans ratio 76

Figure 4.3: NPL to Total loan ratio in comparison to other countries 77

Figure 4.4: The NPL ratio from different sources 77

Figure 4.5: The share of banks' loans in 2011 77

Figure 4.6: The allocation of Non-performing loans in 2011 78

Figure 4.8: The value of Vietnamese Government bonds issued in Primary market 85

ABBREVIATIONS

ADB	Asian Development Bank
ARDL	Autoregressive-Distributed Lag
BIS	Bank for International Settlements
CDS	Credit Default Swap
CPI	Consumer Price Index
CRT-4	Country Risk Tier 4
FDI	Foreign Direct Investment
G-BOND	Government Bond
GDP	Gross Domestic Product
GMM	Generalized Method of Moment
GNI	Gross National Income
GSO	General Statistics Office
HIPC	Heavily indebted poor countries
ICOR	Incremental Capital Output Ratio
IFS	International Financial Statistics
IIP	Industrial Production Index
IMF	International Monetary Fund
JSCBs	Joint Stock Commercial Banks
LICs	Low-income Countries
NPLS	Non-performing loans
ODA	Official development assistance
OTC	Over the Counter
ROA	Return on Asset
SBV	State Bank of Vietnam
SOCBs	State-owned Commercial Banks
SOEs	State-owned Enterprises
VAMC	Vietnamese Asset Management Corporation
VAR	Vector Auto-regressions
VECM	Vector Error Correction Model
VIX	Volatility Index
VND	Vietnam dong
WB	World Bank

CHAPTER 1

INTRODUCTION

1.1 RESEARCH PROBLEMS

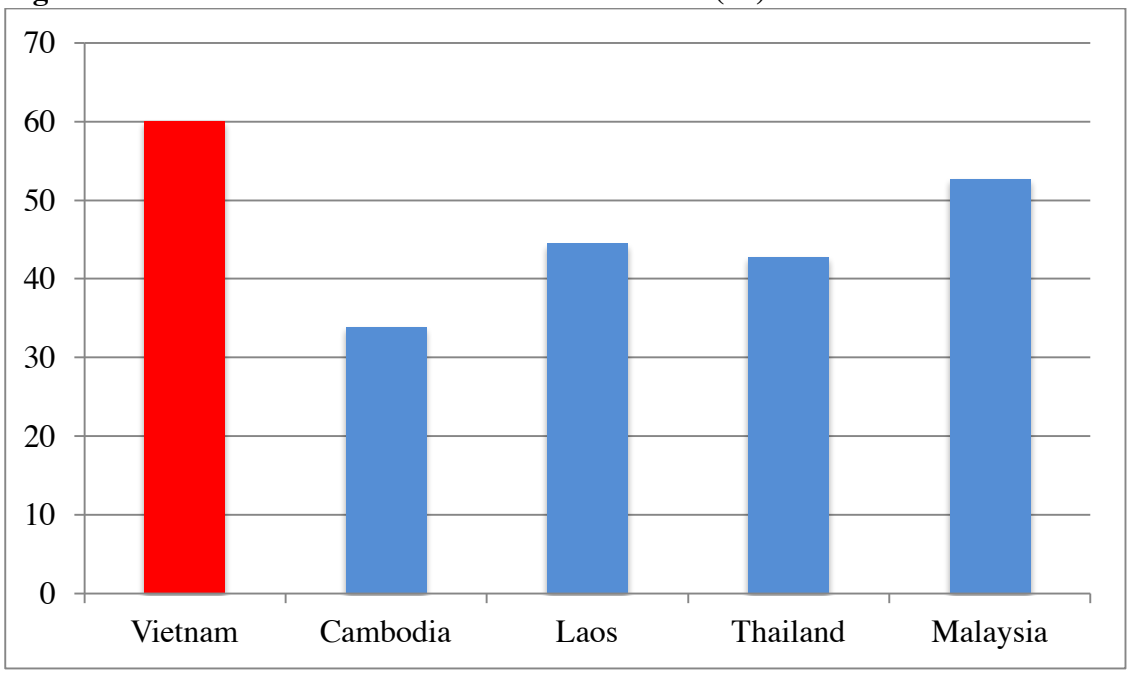
Understanding the effect of public debt on the economy remains central to studies of debt sustainability in developing countries. While the scholarly literature in this topic has focused mainly on external debt, the issue of internal debt has received less attention, although, as Christensen (2005) has noted, domestic borrowing has significant effect on macroeconomic stability, private sector credit and budget position in less developed countries. Similarly, by investigating the growth impact of domestic debt in 93 countries between 1975 and 2004, Abbas and Christensen (2007) has addressed that domestic debt can make an important contribution to macroeconomic stability and the vulnerability to internal and external monetary shocks. The importance of domestic borrowing is also examined in such research as those by Reinhart and Rogoff (2008), who study the link between domestic debt and sovereign default in 64 economies from 1914 to 2007 and come to a conclusion that there is a "*forgotten history of domestic debt*".

In case of Vietnam, recent rapid accumulation of public debt, driven mainly by high and rising domestic debt to finance budget deficit, has become increasingly noticeable, with the level rising to an alarming 60% of GDP in 2014, of which domestic debt accounted for around 32% of GDP, while external debt amounted to 28% of GDP, based on the statistics from the World Bank. This ratio has almost reached the threshold level of 65% set by the government of Vietnam and far exceeded the safety level ranging from 40-45% as suggested by the IMF[1]. In addition, the average growth rate of Vietnam's public debt has been recorded at 18% since 2011; far exceed the average GDP annual growth rate of 5.4% (calculation based on the data of World Bank) and in

[1] IMF Country Report Number 14/311, October 2014.

comparison with regional neighboring countries such as Thailand, Malaysia, Laos and Cambodia, Vietnam ranks the highest (Figure 1.1).

Figure 1.1: Total Government Debt to GDP in 2014 (%)



Source: World Bank

However, it is believed that the official data on public debt does not accurately reflect the real situation of the country because of the difference in accounting methods. Specifically, Vietnam's calculation of public debt does not comply with international practices since it includes only Government debt, Government-guaranteed debt, and local government debt, but exclude the debt held by State-owned Enterprises[2]. If the debt of State-owned Enterprises (SOEs) were accounted, the overall level of Vietnam's public debt would be more than 100% of GDP in 2014[3].

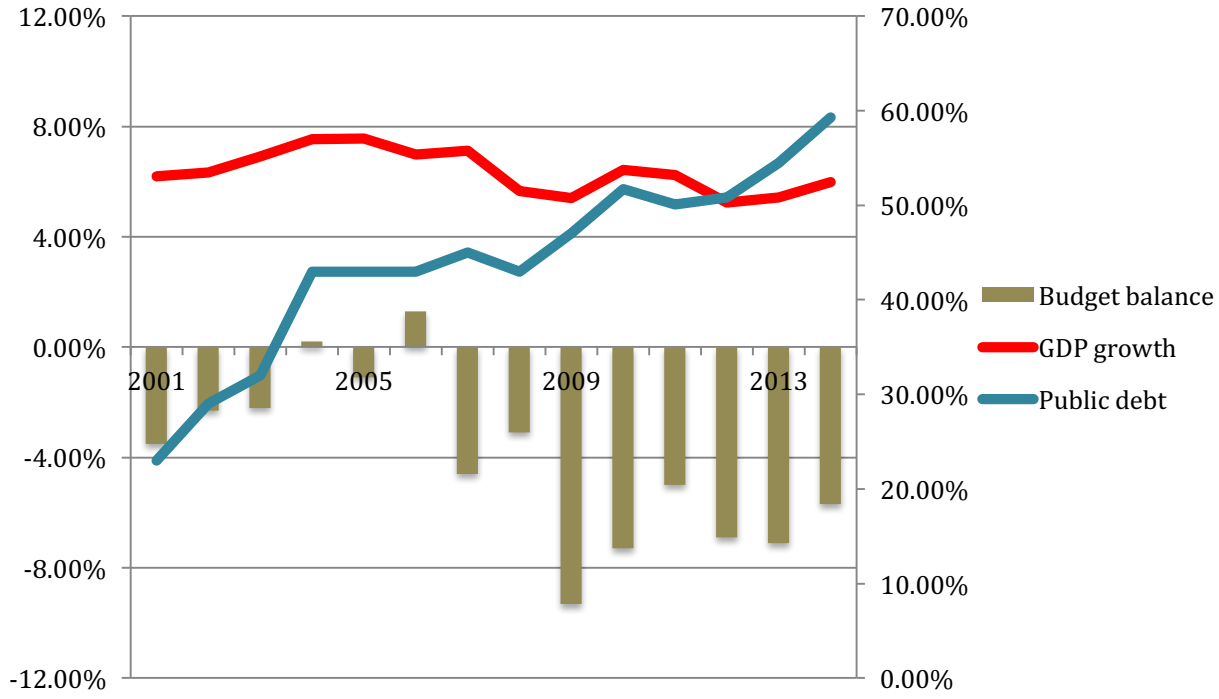
In fact, the quick expansion of Vietnam's public debt is attributed mainly to large and persistent budget deficit resulting from both cyclical and structural reasons. As shown in Figure 1.2, from 2001 to 2014, Vietnam has posted an annual average budget deficit of 4.04% of GDP, reaching its all time high of 9.3 % of GDP in 2009 and

[2] Article 1 of Chapter 1 of the Law on Public debt management No 29/2009/QH12 issued by the Vietnam National Assembly in June 17th 2009.

[3] According to the government report, in 2014, 100 largest SOEs had borrowed a total of $ 68 billion, while the amount of national debt at that time was more than $116 billion. If the SOEs debt were included, the level of debt would reach more than $184 billion or more than 100% of GDP.

an estimated low of -1.3% of GDP in 2006. Also during the period of high budget deficit and large public debt from 2009 to 2014, the economy of Vietnam recorded an average GDP growth rate of 5.84% per annum, decreasing from 6.94% during the previous period between 2001 and 2008 (calculated based on data from the World Bank). It is, hence, undoubtedly that worsening fiscal position and increasing government debt have been the key reasons for the sluggish growth in Vietnam's economy in recent year, posing serious problems for the government in achieving economic stability and prosperity. However, the increasing trend of Vietnam's public debt is likely to continue in the coming years as the government still relies strongly on borrowing to push economic growth and cover its excessive expenditures. Therefore, an important question confronting the policy markers now is how the government can manage the sustainability of their debts and still ensure economic growth or whether the country needs fiscal adjustments.

Figure 1.2. Budget balance and Public debt in Vietnam (% of GDP)



Source: World Bank

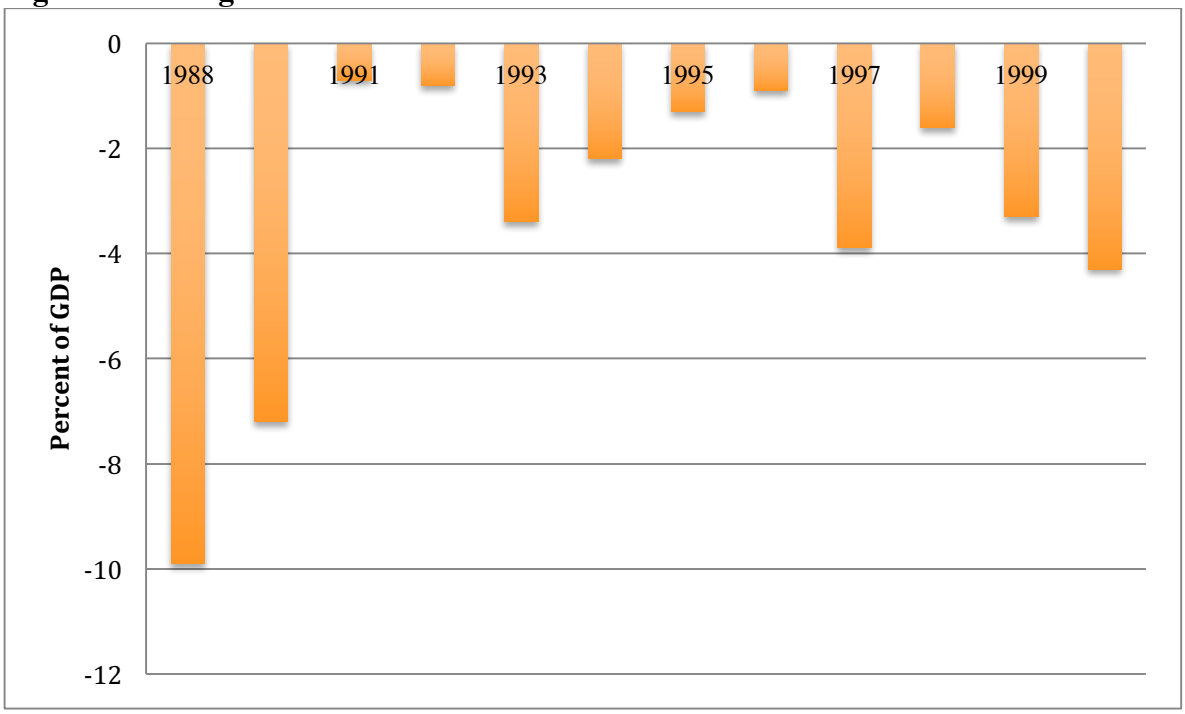
The question is especially pertinent when the World Bank has warned that increasing dependence on public debt, particularly expensive domestic debt, to achieve economic growth can be a serious obstacle to fiscal improvement and development

performance for Vietnam (WorldBank, 2015)[4]. However, an effective policy response to the country's debt problems is somewhat constrained by the lack of empirical evidence on the effects of government debt on financial market risk, economic stability and the solvency of the country. So far, much of the existing literature on government debt has been conducted in the context of developed and emerging economies, while that in the context of Vietnam is still limited.

1.2 THE SITUATION OF VIETNAM'S PUBLIC DEBT

Initially, government public debt in Vietnam has emerged since the start of the reform from centrally planned economy to a market-oriented economy in 1986, with main objective was to achieve sustainable development and assure poverty reduction. Because of soft budget constraints during the centrally planned period, Vietnam had suffered from a shortage of capital and significant fiscal problems (Figure 1.3).

Figure 1.3: Budget Balances from 1988 to 2000



Source: General Statistic Office

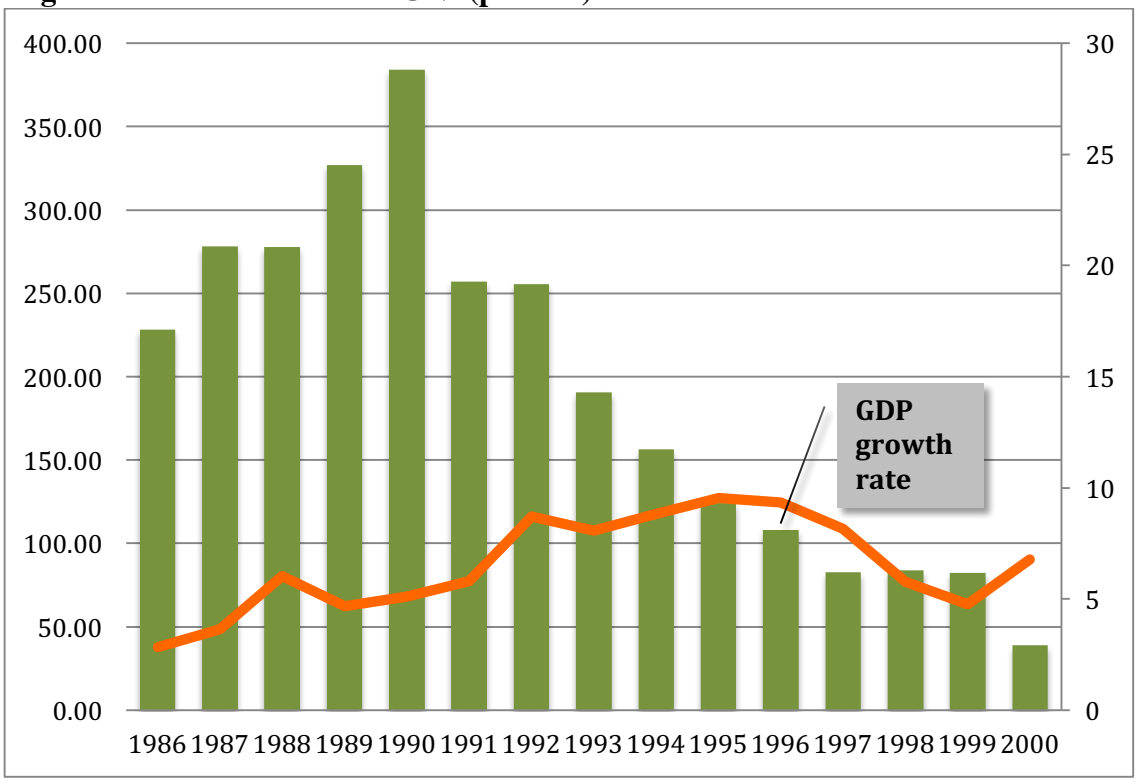
Like all other developing economies, Vietnam needs to borrow from both external sources, under the forms of concessionary loans and grants at the interest rates

[4] WorldBank (2015): Taking Stock – An Update on Vietnam's Recent Economic Developments.

as low as 1 to 3 percent per annum, and internal sources to finance its deficits. Starting at just under 2 % in 1981, the ratio of external debt to GNI of Vietnam climbed up sharply to a peak of approximately 384 % in 1990 before declining to more than 100 % in 1997.

In 1999, in response to the worsening debt's indicators in HIPC countries including Vietnam, the World Bank and the International Monetary Fund decided to endorse the HIPC debt relief initiative with the intention of improving debt situation and reducing poverty in these countries. As Vietnam was qualified for this initiative, about 9 billion USD of external debts of the country were cancelled, and resultantly, the ratio of external debt to GNI was drastically improved – to nearly 40 % in 2000 (Figure 1.4).

Figure 1.4: External debt to GNI (percent)



Source: IMF, ADB

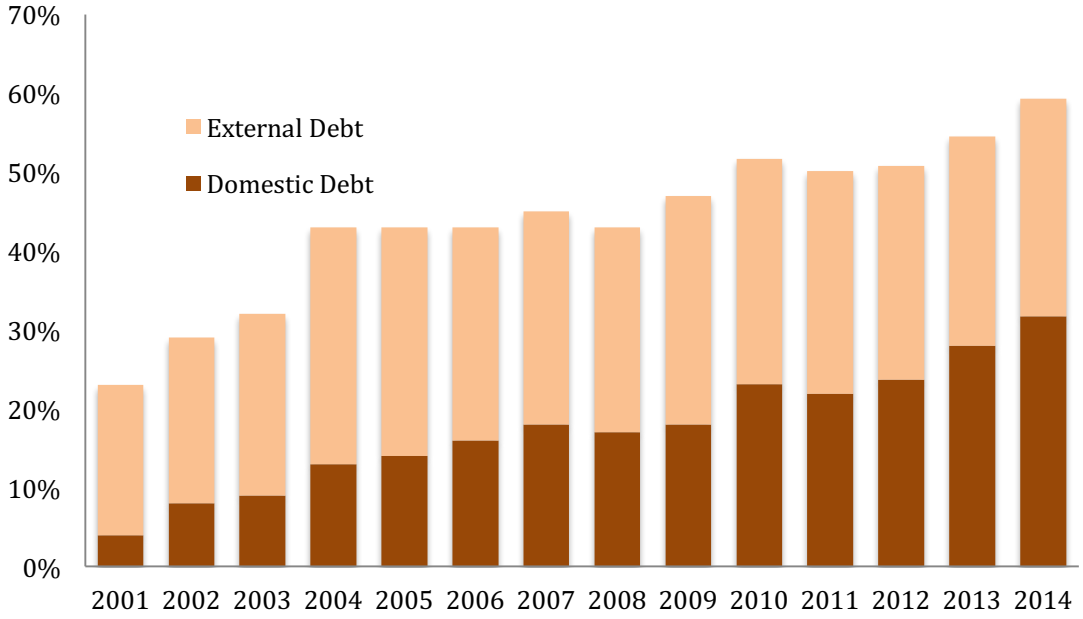
In addition to external sources of finance, the government has also acquired funds from the public domestically. In 1992 the government of Vietnam started borrowing from internal sources to offset deficits by issuing government bonds and treasury bills after an unsuccessful effort in the mid-1980s and a proportion of these

bills were subject to compulsory purchase by state-owned enterprises (Harvie and Tran, 1997)[5]. However, the size of government domestic borrowings was relatively small in comparison to those of external sources and the government generally avoided financing its imbalances through the sale of bonds during 1990s.

Until 2009, while almost 60 % of Vietnam's public debt was external debt, domestic debt accounted for only less than a third of the country's total debt. However, since 2009, the structure of the overall public debt of Vietnam has witnessed a major change, away from foreign-currency-denominated debts towards domestic debts, as a result of the moving in the group of middle-income countries. Between 2010 and 2014, the growth rate of external borrowing was about 76 %, while that of internal borrowing was more than 150 % (MOF, 2014). The significant expansion of domestic debt has contributed mainly to the considerable rise of the country's overall public debt meanwhile access to foreign loans has decreased because of the gradual withdrawal of official creditors. At the end of 2014, the total internal debt increased in terms of GDP to 32 %, while the total external debt remained fairly stable at around 28 % of GDP, leading the total government public debt to 60% of GDP (Figure 1.5).

[5] Harvie, C. and Tran, V. H. (1997). *Vietnam's Reforms and Economic Growth*. London : MacMillan Press Ltd.

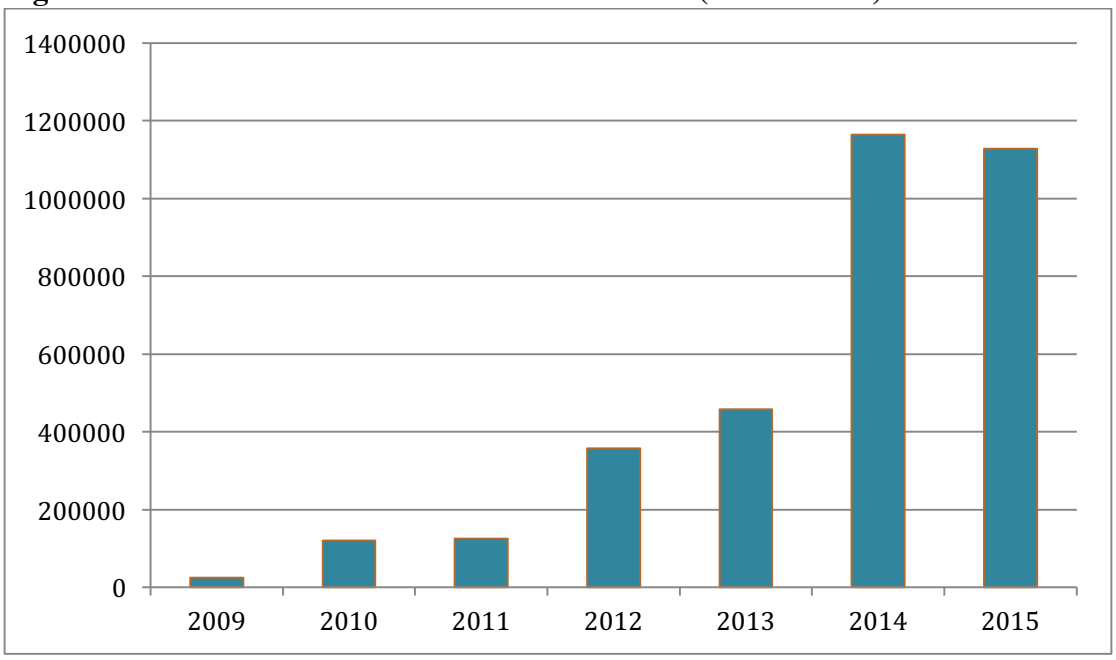
Figure 1.5: Composition of public debt (debt to GDP ratio)



Source: World Bank

This surge in domestic debt market has been led by both the growth in supply from the government and the increased demand from banks. In the face of falling foreign funding (mostly in the form of concessional loans) and increasing budget deficits, the government of Vietnam has turned internal debt market through the sales of government bonds to meet its increasing financial needs. The annual reports prepared by The Hanoi Stock Exchange revealed that the issuance volume of government bonds totaled from 25 trillion VND in 2009 to more than 1,128 trillion VND in 2015, equivalent to 27% of GDP (Figure 1.6).

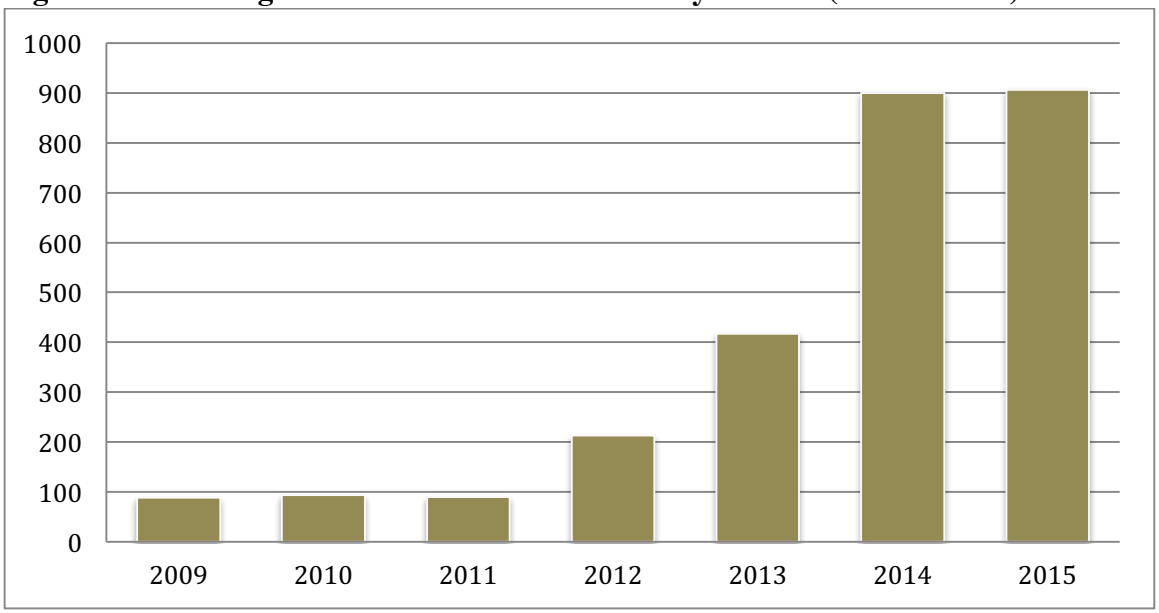
Figure 1.6: Issuance Volume of Government Bond (billion VND)



Source: Hanoi Stock Exchange

On the demand side, local commercial banks are likely to raise their holding of government bonds given the weak balance sheets and economic downturn. In fact, in 2010 the economy of Vietnam witnessed a slowdown in growth and a high-speed rise in bank's bad debt ratio. As a result, commercial banks turned risk averse and preferred to invest in government debt, which allow them to put their money in a safer way as compared to lending, consequently the portion of total commercial banks' assets allocated to government debt increased significantly. According to the statistics from the Hanoi Stock Exchange, 11 largest commercial banks invested VND 342,778 billion ($ 15.6 billion) in government debts in 2013, equivalent to 11 % of their total assets (up from 7 % in 2007). The trading value of Government bonds on secondary market also went up sharply with an average annual increase of more than 115 % between 2011 and 2014 (Figure 1.7).

Figure 1.7: Trading value of G-bonds on Secondary Market (trillion VND)

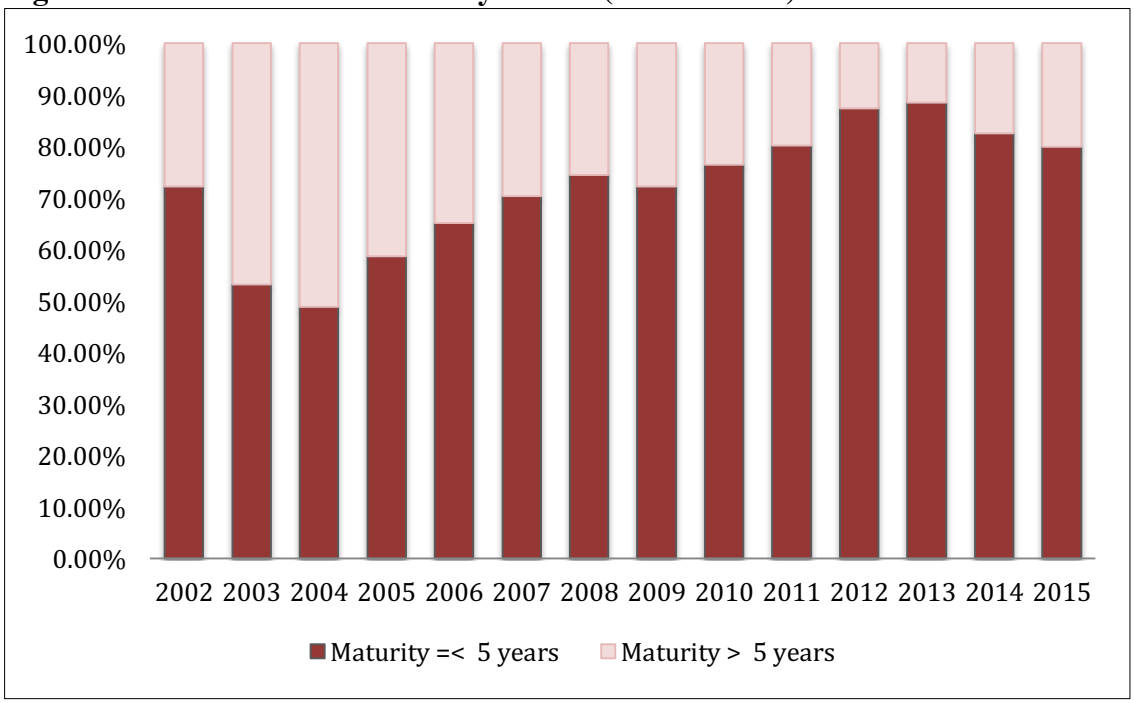


Source: Hanoi Stock Exchange

However, one of the main concerns about domestic borrowing is with its high interest rate and short maturity. Based on the data of Vietnam Bond Market Association[6], by July 2016, the average interest rate of domestic debt is at around 8.15 % per annum and maturity profile has been shortened gradually, with maturities of less than 5 years contributing to more than 80% of total domestic debt between 2011 and 2014 (Figure 1.8). Increasing internal debt, therefore, has caused the debt financing costs to rise accordingly, adding more pressure for fiscal austerity and fiscal space for investment is subsequently further reduced. In 2014[7], interest payment on domestic debt as a percentage of government revenue was about 10.23%, while that on external debt was only 2.15% (Figure 1.9). Along with the rise in interest costs, the total debt service payments went up quickly to more than 35% of total budget revenue in 2014, up from 17.6% in 2010 (Figure 1.10)

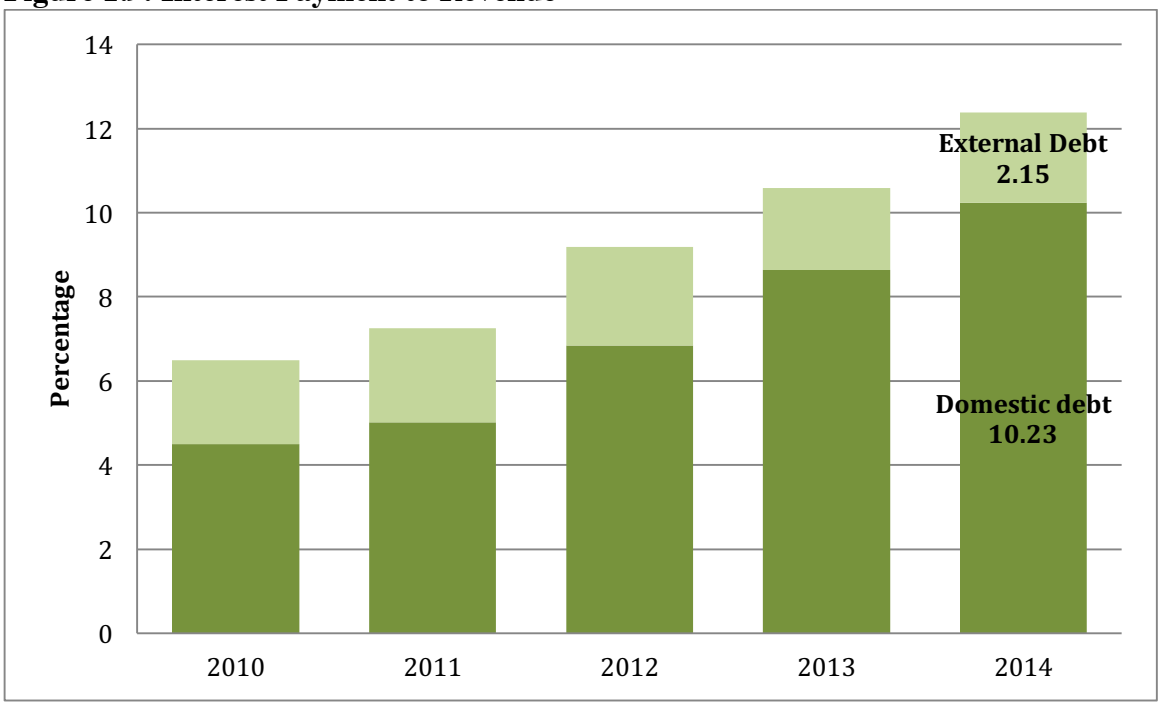
[6] Vietnam Bond Market Report- June 2016. Vietnam Bond Market Association
[7] MOF (2016): Public Debt Bulletin of Vietnam, Number 1 to Number 4

Figure 1.8: Domestic Debt Maturity Profile (as % of total)



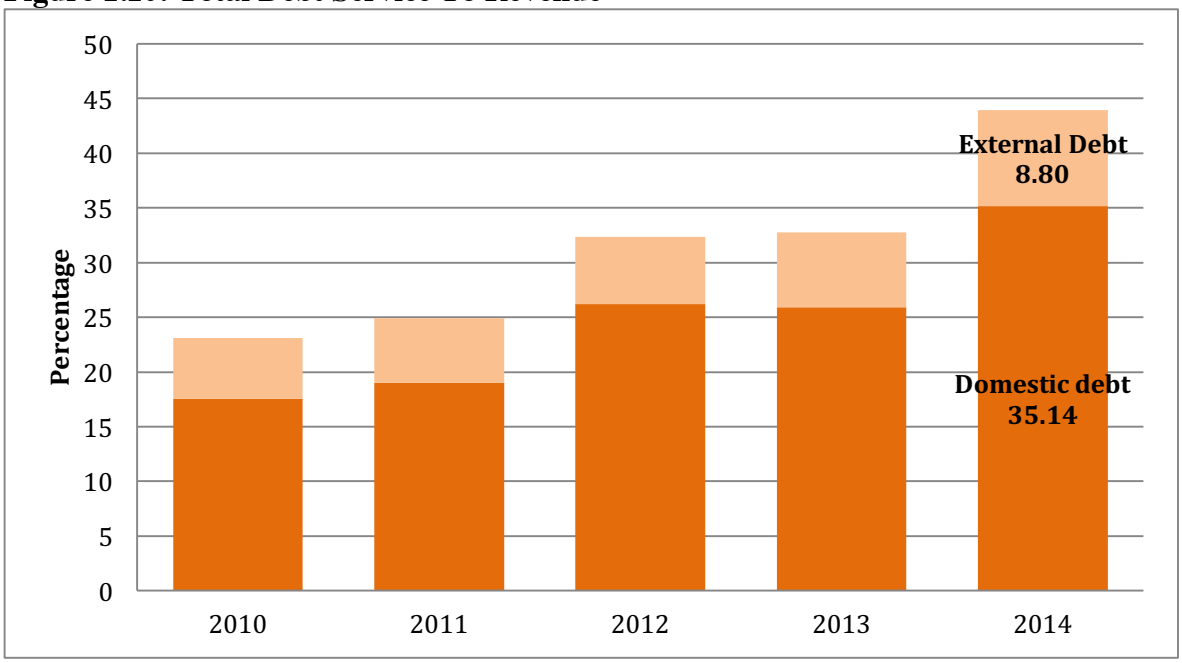
Source: Hanoi Stock Exchange

Figure 1.9: Interest Payment to Revenue



Source: Vietnam's Ministry of Finance

Figure 1.10: Total Debt Service To Revenue



Source: Vietnam's Ministry of Finance

In addition to that, market for government domestic debt of Vietnam is characterized by narrow investor base, consisting mainly of insurance companies and commercial banks. At the end of 2014, out of total government outstanding debt, about 85 % belonged to commercial banks, while 12 % belonged to domestic life insurance companies and the remaining of 3 % was held by investment funds, security and financial companies (Dragon Capital, 2015)[8]. The present of offshore investors in Vietnam domestic debt market is still limited, although there are no constraints on foreign holdings.

1.3 RESEARCH OBJECTIVES

In order to fill the literature gap, this study aims to empirically determine the effect that the current situation of Vietnam's public debt could have on the economy and their policy implications. Specifically, the second and third part of this study particularly concentrate on the impact of domestic debt in the form of local government

[8] Dragon Capital (2015): Vietnam – a brief report from a frontier market, 2015

bond on the solvency risk of the country and the economic stability, while the remaining part focuses on public debt's effects on the banking credit risk.

To investigate the relationship between internal debts and country's credit risk and which factors have determined the sovereign default risk, the prices of 5-year credit default swap are used as an indicator of default probability and a time-series dataset spanning the period from January 2005 to December 2014 is analyzed. Beside the country-specific variables, this part also includes global variables to study the main determinants of Vietnam's sovereign credit risk by using Autoregressive Distributed Lag Modeling (ARDL). The outcome of this second part is expected to answer the following questions: (1) whether the increase in domestic borrowing causes the default risk of Vietnam to increase? And (2) whether the determinants of the country credit risk differ between macrocosmic factors and global factors?

In the third part, the relationship between domestic debt and inflation in Vietnam from 2000 to 2015 is examined by applying Vector Error Correction Model (VECM) and Johansen cointegration technique. This part aims to answer the two sets of question that (1) does greater reliance on domestic debt (relative to external debt) harm the stability of Vietnam's economy? (2) Whether there is a present of fiscal dominance in Vietnam?.

The forth part of this study is to examine the link between large public debt and high banks' non-performing loans in Vietnam by using a cross sectional data set consisting of 32 Vietnamese banks from 2004 to 2014. Based on the results of one-step System GMM estimators developed by Blundell and Bond, the following questions will be answer (1) whether an increase in country's public debt is associated with higher non-performing loans (NPLs) of local banks? and (2) whether the responses of government to alleviate the issue of NPLs take effect?.

1.4 CONTRIBUTIONS OF THE THESIS

This paper provides a number of contributions. First, this is the first study on

the determinants of sovereign credit risk in case of Vietnam through the use of 5-year CDS spreads as indicators for the default probability. The study also includes both global and country levels in examining the main factors behind high risk of default of Vietnam and provides a more direct concentration on the study of domestic debt, making it different from other studies, which focus mainly on external debt dynamics. Secondly, in order to capture the determinants of banking' credit risk of Vietnam, both macro and micro-economic factors are used, while existing studies in case of Vietnam consist of only macroeconomic level. Thirdly, additional variables are introduced in this paper to better explain the behavior of country's credit risk, economic instability as well as banking market risk in recent years, consisting of variables other than those commonly used in previous research such as default history of the State-owned enterprises (SOEs), bank's credit to the government and the SOEs, the performance of SOEs and bank's lending rate to private sector customers, output gap of Vietnam and China's output gap as a global factor. Furthermore, unlike previous study, this study also focuses on inflationary consequence of the increasing dependence on domestic funding to finance budget deficit as compared to external funding. In fact, there have been a number of studies on the importance of domestic debt in developing countries including Vietnam, however these studies cover only the period when domestic debt of Vietnam accounted for a minority of total public debt. This study, fourthly, uses datasets of the most recent time periods when domestic debt plays an increasing important role. Last but not least, the outcomes of this thesis will help the government of Vietnam and the policymakers to understand the importance of domestic debt and come up with a meaningful policy response to maximize the benefits of domestic borrowings in enhancing economic development by improving debt managements and fiscal adjustments.

1.5 OUTLINE OF THE THESIS

This dissertation includes five chapters:

Chapter 1 is a brief introduction. For systematization purposes, the current issue of Vietnam's public debt is summarized.

Chapter 2 focuses on the macroeconomic determinants of sovereign credit risk in Vietnam from January 2005 to December 2014 by using Autoregressive Distributed Lag Modeling.

Chapter 3 examines how an increase in domestic borrowing to finance fiscal deficit influences inflation in Vietnam based on quarterly data from March 2000 to December 2015 by applying a Vector Error Correction Model (VECM) with control variables of budget deficit, bank's credit to private sector and lending interest rate. Granger causality test is also employed to examine the debt-inflation relationship.

Chapter 4 of this dissertation tries to empirically investigate relationship between the country's overall public debt and credit risk of banking market (proxied by the level of Non-performing loans (NPLs)) in 32 Vietnamese banks over the period from 2004 to 2014 by using one-step System GMM estimators developed by Blundell and Bond (1998).

Chapter 5 reviews the key outcomes of the thesis and their policy implications, summarizes the limitations of the thesis as well as other issues for further studies.

CHAPTER 2

DOMESTIC DEBT AND SOVEREIGN CREDIT RISK IN VIETNAM

2.1 INTRODUCTION

The assessment of sovereign default risk has become crucial for both central governments and international investors, especially since the start of the European debt crisis in 2008 – which has made international investors more risk averse and insurance seeking, this is mostly due to the fact that the country's ability to access funding in international markets and their willingness to repay the debt depends strongly upon it. Identifying the determinants of sovereign credit risk may be exceptionally important for emerging countries for which information tends to be more limited in both quality and quantity and lending to these economies is subject to a greater informational risk.

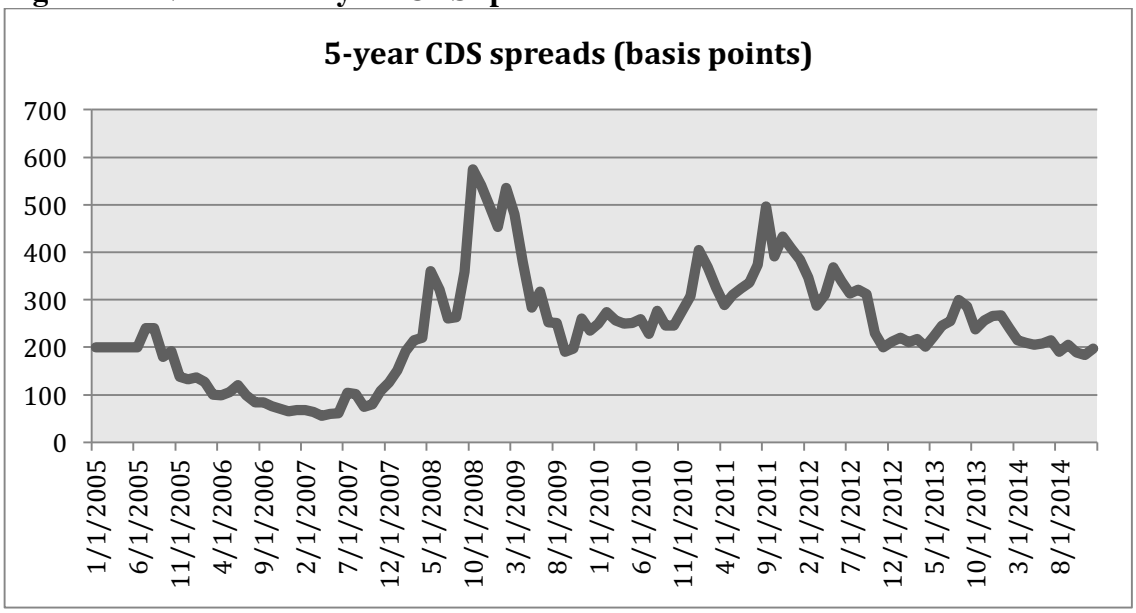
This study, hence, aims to evaluate the determinants of sovereign default risk of Vietnam over the period from January 2005 to December 2014 by using 5-year Credit Default Swap spread as an indicator of the country risk of default. The case of Vietnam seems to be a very interesting case to study due to its ranking of 12th World's riskiest country in the world to invest according to Bank of America Merrill Lynch and the second most risk country in the Southeast Asian region based on AMB Country risk report in August 2015, and a dearth of empirical works in this country.

We particularly concentrate on the explanatory power of the economic fluctuation and the domestic component of government debt. The scholarly literature on sovereign default has often focused on the size of external debt and economic fluctuations, while domestic debt dynamic has received less attention, although it is equally important to explain default episodes. The starting point in investigating sovereign defaults on domestic debt was the study of Reinhart and Rogoff (2008) in 64 countries from 1914 to 2007, which shed light on the importance of internal debt in the analysis of sovereign defaults. In their study, they catalogue defaults on internal debt, which are more difficult to identify than defaults on external debt and point out three

key findings demonstrating the importance of internal debt. (1) Internal debt is large and accounts for the largest portion of total government debt. (2) Default on internal debt is a relatively recent phenomenon and tends to happen in more severe macroeconomic conditions. (3) By taking into account domestic debt, the reason why many countries default on their external debt at seemingly low levels can be explained – in the year of default, the ratio of external debt to total debt in all countries except Latin American countries was less than 50 percent.

This paper contributes to existing literature by (1) examining how global and macroeconomic conditions affects sovereign default risk as a pioneering paper in case of Vietnam, (2) providing better understanding of the main factors behind the high probability of sovereign default which is crucial for government of Vietnam when making decisions on adjustment programs concentrating on reducing the cost of borrowing in international markets and for international investors when assessing risks of their investment in Vietnam, and finally (3) pointing out the role of debt composition in determining the country's default risk through the inclusion of domestic debt.

Figure 2.1: Vietnam's 5-year CDS spreads



Source: Bloomberg

This study is organized as follows. Section 2 provides brief introduction of Credit default swaps. Section 3 summarizes the recent existing literature. Section 4 describes

the data and the econometric methodology. Section 5 discusses the results and policy implication.

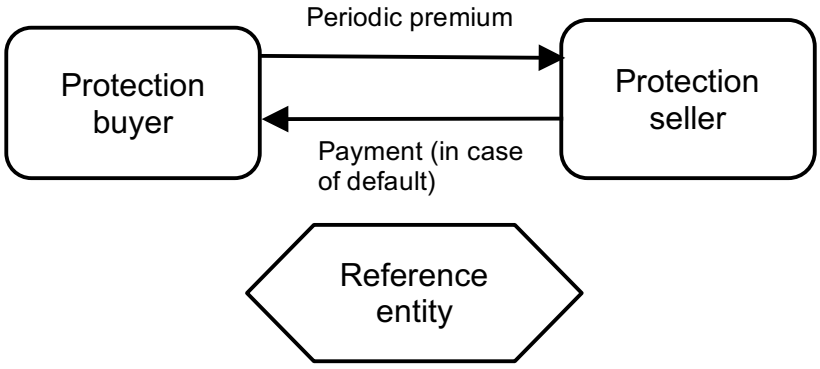
2.2 CREDIT DEFAULT SWAPS: A BRIEF INTRODUCTION

2.2.1 How do Credit default swaps work?

A Credit default swap (CDS)- first introduced by JP Morgan in 1997, is an over-the-counter derivative that plays a role as an insurance contract designed to transfer the credit risk of fixed income products or loans in case of default by a reference entity.

Basically, the protection buyer of a CDS pays the seller a periodic premium (known as the CDS spread), which generally remains constant until maturity or a credit event occurs (bankruptcy, obligation acceleration, obligation default, failure to pay, repudiation or moratorium and restructuring). The CDS spread is usually quoted as a percentage in basis points of the notional amount or face value of the underlying reference debt. If reference entity - often referred to as a corporation or government - fails to meet his debt obligation or other credit events occur, the protection buyer of a CDS has the right to sell debts issued by reference entity to the protection seller for their par value (physical delivery) or receive a cash settlement equal to the difference between the face value of defaulted bonds and its market value. Otherwise, if reference entity is not failure to pay a loan or other type of liability and there is no credit event, the protection buyer will receive no payoff.

Figure 2.2: Credit Default Swaps Structure



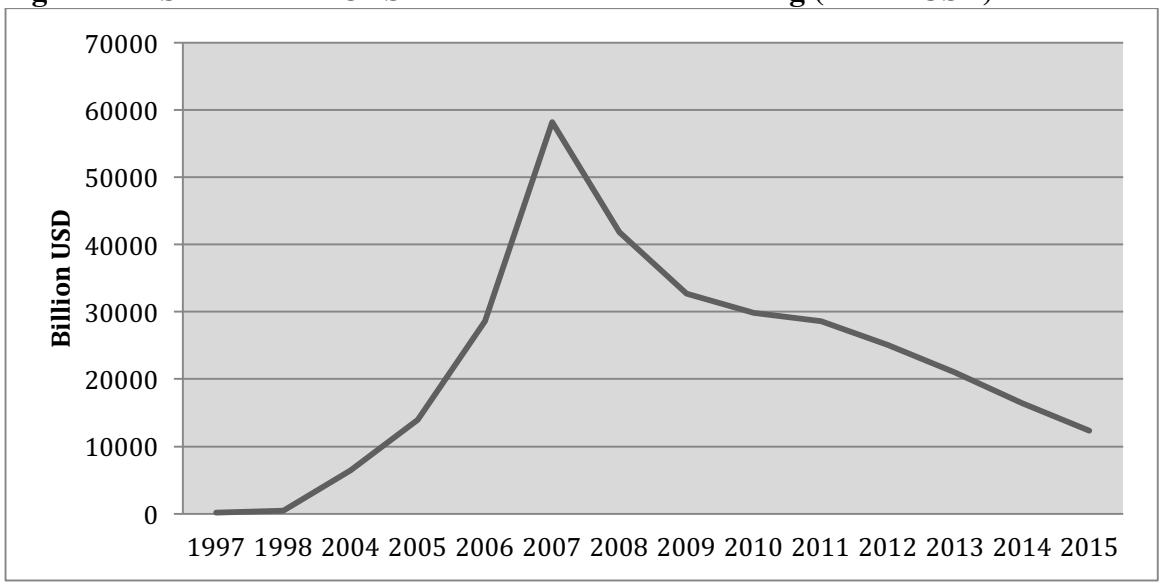
Reference entity is not a party of the agreement. The maturity of most CDS contract is vary from 1 to 10 years, but can be shorter or longer based on the negotiation between buyer and seller

2.2.3 The Market for CDSs at a glance

In the early days of the market, banks were the dominant player who mainly used CDS to hedge and manage credit risk associated with its lending activities. According to the British Bankers Association, the global CDS market recorded a total notional amount outstanding of $180 billion in 1997 and this figure nearly doubled to $300 billion in the first quarter of 1998, with JP Morgan alone contributing about 17 percent of the total ($ 50 billion).

As the market becomes larger and established, the use of CDS is not limited to only hedging credit risk, but, for speculating and arbitraging by banks, asset managers, insurance companies, pension funds and hedge funds. Starting in 2003, the market for CDS expanded tremendously in depth and scale. As can be seen in Figure 2.2, the gross notional amounts of the CDS rose almost ten times from $6 trillion in the end of 2004 to $58 trillion just before the start of the global financial crisis in 2008. This surge in the outstanding amount of CDS likely relates to the increasing need to hedge risks toward unfavorable global economic conditions. In the subsequent period, the CDS market size dropped significantly down to an estimated $12 trillion in the end of 2015. In addition to that, according to the IMF, before the 2007-2008 global financial crisis, CDS contracts on sovereigns of emerging economies contributed to the large part of the CDS market because international investors considered those countries as having higher risk of default. However, from the end of 2009, the CDS contracts on sovereign of advanced economies have increased significantly, starting from European periphery countries.

Figure 2.3: Semi annual CDS notional amount outstanding (billion USD)



Source: BIS semiannual OTC Derivatives statistics

Table 2.1: Net Notional Amount Outstanding (billion US dollars)

Rank		2008	Rank		2010	Rank		2012
1	Italy	18	1	Italy	26	1	Italy	21
2	Spain	14	2	France	18	2	Brazil	17
3	Brazil	10	3	Spain	17	3	France	16
4	Germany	10	4	Brazil	15	4	Germany	15
5	Greece	7	5	Germany	15	5	Spain	13
6	Russia	6	6	Portugal	8	6	Mexico	8

Source: Depository Trust and Clearing Corporation

2.2.4 The CDS spread: a market indicator of credit risk

As the CDS market has become more developed and trade volumes are sizable, CDS spreads - defined as the periodic fee or premium paid by protection buyer to the seller in exchange for protection against potential credit losses- have offered an increasingly accurate benchmark for the credit risk of governments. Along with more traditional representation of default risks such as Credit Ratings and Government Bond spreads, CDS spreads tend to have a direct proportional relationship with the risk perceived by investor toward the underlying asset. The spreads are likely to increase

when there is an unfavorable new and decrease in favorable conditions or that is to say the larger the CDS spread on a debt instrument, the higher the risk of default on that product. Also, the use of CDS spread as a proxy for sovereign credit risk has been increasing significantly in the recent literature because of its determination in credit price discovery.

Both CDS spreads and Bond spreads have been alternatively used as a gauge for credit risk assessment since they exhibit significant and similar dependence on economic fundamentals, and affected by financial market risks similarly (IMF, 2013)[9]. According to Duffie (1990), under a no-arbitrage condition, the probability of default can be estimated and predicted by using either the interest rate spreads on bond or risk premium from the CDS. However, a number of studies investigates that CDS spreads have more favorable characteristics measurement as a valuable market-based assessment of credit risks compared to bond spreads, those are:

- **CDS spreads tend to lead bond spread changes in terms of price discovery** i.e CDS spreads are likely to move first in reaction to an event and then bond prices will shifts towards the pricing in the CDS market as documented in Blanco et al (2005), Norden and Weber (2004). Fontana and Scheicher (2010) also suggest that since the start of the European debt crisis, the bond market leads the credit risk price discovery process in more economically advanced countries such as Germany, France, Austria, Belgium and the Netherlands, while the CDS market plays a predominant role in the most crisis-affected countries including Italy, Ireland, Spain, Greece and Portugal.
- **The CDS spread does not contain a significant liquidity premium as bond spreads**

  Amato and Remolona (2003), Longstaff et al (2005), Chen et al (2007) and Elton et al (2004) suggest that corporate bond yields and prices are significantly

[9] A New Look at the Role of Sovereign Credit Default Swaps, IMF April 2013.

influenced by tax issues and liquidity risk while the CDS spread is not driven by tax effects and does not contain liquidity components (Fabozzi et al (2007)

- **The CDS spread provides a more direct estimation of credit risk**

  The bond yield spread is calculated by subtracting a risk free interest rate from bond yield. Consequently, both reference risk free rates and zero-coupon yield curve methods can distort the level of bond spreads. CDS spreads, in contrast, are already spreads paid by protection buyer to the seller in return for an insurance against default risk and therefore do not need to extract from bond yields.

Another important indicator for sovereign default risk is credit rating, which is an evaluation of the creditworthiness of a sovereign borrower determined by regulated rating agencies such as Standard and Poor's, Fitch and Moody's. In theory, CDS spreads and credit ratings should convey similar information about a country's fundamentals, such that if credit rating reflects the debtor's trustworthiness, then it should have a negative relationship with the CDS spread of this entity, meaning that higher credit rating correspond to lower CDS spread. Nonetheless, there have been some studies finding a gap between CDS spreads and the credit ratings. Chava et al (2012), for example, studied the relationship between CDS spreads and credit ratings by using a wide range of data from January 1996 to December 2010 in 1142 firms, and found that CDS spreads respond more quickly to perceived default risk than credit ratings, or in other words CDS spreads provide information that can predict the possibility of credit rating downgrades (or upgrades). Similar results were suggest by Hull, Predescu and White (2004), Micu et al (2006), Jacobs et al (2010) and Norden (2011), whose results indicated that CDS spreads are more quickly to price credit risk than credit ratings.

2.3 LITERATURE REVIEW

The recent literature on investigating the fundamental factors behind the default

risk of governments appears to focus on both the effects of global factors as potential determinants as well as macroeconomics fundamentals.

Country-specific factors

In case of developed countries, Dieckmann and Plank (2011) conduct a cross sectional regression analysis using CDS panel data in 18 countries. They incorporate variables such as exchange rate reserve, volatility of terms of trade, stock market volatility, the foreign exchange rate, and debt to GDP ratio and find that most of these variables have significant effect on the level of CDS spreads. In a related study, Fabozzi et al (2007) use a set of CDS bid-ask price of 1372 entities in US from 2000 to 2003 and explore that the main determinants of CDS spreads are interest rate, credit rating, sector and liquidity factors.

Ramos-Francia and Rangel (2012) used a panel of 26 developed and developing countries from 2000 to 2009 to investigate the role of macroeconomic factors, including real GDP, inflation, current account deficit, fiscal deficit, exchange rates and international reserves in determining sovereign credit risk. For both developed and developing economies, inflation rate, current account deficit and fiscal deficit is positively related to sovereign spreads, while the relationship between real GDP growth rate and sovereign spreads is negative. The author also found econometric evidence that sovereign spread is negatively influenced by international reserves and exchange rate overvaluation.

There have been also some studies highlighting the role of the fiscal variable such as budget balance and government debt level as an important determinant of the sovereign default risk. Using spread between lending interest rate and the Libor rate as a proxy for default risk in 19 countries from 1976 to 1980, Edwards (1983) suggests that debt-related variables (debt to GNI ratio, debt service ratio and debt duration), current account, investment levels, international reserves, import to GDP ratio and per capital GDP are important predictors of sovereign default risk. Maltritz (2012)

investigate the determinants of sovereign credit risk through the use of sovereign yields spreads in EMU countries from 1999 to 2009. Based on the results of Bayesian Model Averaging method, the author report fiscal dimension to be significant credit risk driver. Similarly, in a more recent study conducted in Eurozone economies over the period from 1970 to 2007, Ghosh et al. (2013) apply OLS regression technique and find that fiscal space – the difference between the debt level and debt limit - is a matter for the probability of sovereign default and thus for CDS spreads.

Global factors

In addition to country specific fundamentals, some of the empirical papers find evidence that CDS prices are strongly driven by global factors particularly the US factors. For example, Pan and Singleton (2008) found that credit spreads for some emerging markets (Mexico, Turkey and South Korea) from March 2001 to August 2006 are largely related to the global risk aversion measured by VIX index. Fender et al (2012) investigated that CDS spreads for 12 emerging countries from different regions between April 2002 and December 2011 changes stem from US bond, equity, high yield and emerging credit returns, especially after the collapse of Lehman Brother. In a larger sample of 26 emerging and advanced countries over a 10-year period, Longstaff et al (2011) documents that global financial market conditions affects the level of CDS spreads more strongly than the country specific macroeconomic factors. Similarly, Heinz and Sun (2014) also find an evidence of the effects of global factors, specifically the VIX index, on CDS spreads in 24 European countries between 2007 and 2012.

In case of China, Eyssell *et al*. (2013) reported that both internal conditions, including stock market index and real interest rate, and external factors – the VIX index – cause the movement of CDS spreads of China from January 2001 to December 2010. This is consistent with Jens Hilsher and Yves Nosbusch (2010), who assessed the influence of macroeconomic and global factors on sovereign credit risk in 31 emerging economies between 1994 and 2007, and concluded that internal fluctuations (term of trade

volatility, change in terms of trade, default history, debt to GDP ratio and reserves to GDP ratio) and external factors (the VIX index) are statistically significant. In Wang *et al* (2013), a data set of 6 Latin American countries over the period from August 2006 to September 2010 has been used to examine the determinants of CDS spreads and global factors, such as VIX index and TED spread, are found to be the main factors behind the changes of CDS spreads.

Table 2.2: Previous studies on the determinant of Country's Credit risk

Study	Methodology	Data Sample	Dependent variable	Significant explanatory variables	
				Macroeconomic variables	Global variables
Afonso et al (2007)	Linear regression	130 countries, 1970-2005	Sovereign credit ratings	GDP per capita(+), GDP growth (+), Inflation (-),Unemployment (+), External debt ratios (-), Government balance (+), International reserves (+), Default history (-), Government effectiveness (+), EU countries (+)	
Aizenman et al (2013),	OLS and dynamic panel estimation (GMM)	20 emerging markets in 4 regions, 2004-2012	Sovereign CDS spreads	External debt/GDP (+), inflation (+), state fragility (+), commodity terms of trade volatility (+), trade openness (-), fiscal balance/GDP (-)	
Attinasi, et al (2009)	Dynamic panel approach	10 european countries, July 2007-March 2009	Sovereign bond spreads	Expected government budget balance to GDP ratio (-), expected government debt to GDP ratio (+), bank rescue package announcements (+)	International risk aversion
Bissoondoyal-Bheenick (2005),	OLS regressions	95 countries, 1995-1999	Sovereign credit ratings	GNP per capita (-), Inflation (+), Government debt/GDP (+), Foreign reserve (-), Net exports/GDP(-), Unemployment rate (+), Current account/GDP (+) , Foreign debt/GDP (+)	
Cantor and Packer (1996),	OLS regressions	49 countries, September 1995	Sovereign credit ratings	GDP per capita (+), GDP growth (+), Inflation (-), fiscal balance (+), External debt ratios (-), Economic development (+)(proxy by minimum income and development level as whether or not a country is classified as industrial countries by IMF , Default history (-)	

Dieckmann and Plank(2011),	Cross-sectional panel regression	18 advance economies, January 2007 to April 2010	CDS spreads	Debt/GDP(+), Exchange rate reserves (-), terms of trade volatility (+), stock market volatility (+), stock market index (-), the FX rate (+)	Eurostoxx 50 index, 10 year German Bund yield spread
Edwards (1983),	Pooled cross section time series	19 least developed countries, 1976-1980	Spread between lending interest rate charged to a country and the LIBOR	Debt-GNP ratio (+), debt service to exports ratio (+), international reserves to GNP (-), loan duration (-), loan volume (-), Investment to GNP ratio (-), current account to GNP ration (+), ratio of import to GNP (-), per capita GDP (+)	
Fender et al (2012),	GARCH models	Emerging markets, April 2002 - December 2011	Sovereign CDS spreads	Budget deficit/GDP (+), credit rating (-), foreign currency income (+), fiscal policy (-) (significant only before financial crisis)	VIX (-), US 3 month rate (+), EMBIG spread (+)
Ghosh et al (2013)	OLS regression	Eurozone, 1970-2007	Sovereign CDS spreads	Fiscal space (-), GDP per capita (-), Trade openness (+), Current account balance (-), Fiscal balance (-)	
Heinz and Sun (2014),	Panel generalised least square (GLS)	24 countries in Europe, monthly period from 2007-2012	CDS spreads	Forecast of fiscal deficit (-), real GDP growth (-) and current account balance (+), public debt to GDP ratio of previous year (+)	VIX index (+), Euro area dummy (-)
Hernandez-Trillo (1994),	Probit analysis	33 debtor countries in 1983	Probability of default	Degree of openess (-), International reserves (-)	

Hilcher and Nosbusch (2010),	Baseline, Linear regression	31 emerging economies, 1994-2007	CDS spreads	Change in terms of trade (-), volatility of terms of trade (+), default history (-), Debt/GDP (+), Reserves/GDP (-)	VIX index (+)
Longstaff et al (2011)	Regression Analysis	26 countries, October 2000-January 2010	CDS spreads	Local stock market return, changes in exchange rate, changes in international reserves,	US stock market returns, global sovereign CDS spreads
Mellios and Parget-Blanc (2006),	Ordered logistic model	86 countries, December 2003	Sovereign credit ratings	GDP per capita (+), Government income (+), real exchange rate changes (+), Inflation (-), Default history (-), corruption index (+)	
Rowland (2004),	OLS regression	50 developing countries. July 2003	Sovereign credit ratings	GDP per capita (+), GDP growth (+), Inflation (-), External debt ratios (-), International reserves (+), Openness (+)	
Remolona et al (2007) ,	Fixed effects dynamic panel regression	24 countries, 2002-2006	CDS spreads	Inflation (+), Industrial production (-), foreign exchange reserves (-)	VIX (+), risk appetite (-), G-10 countries Risk tolerance index (+), Emerging markets risk tolerance index (+)
Yahya, CEPN and Erudite (2013),)	Autoregressive distributed lag modeling (ARDL	6 European countries, 1999-2009	Treasury bond yield	Lagged bond yield (-), Long term interest rate (+), short term interest rate, Gross fixed capital formation, Debt to GDP ratio, Unemployment rate	
Yuan and Pongsiri (2013),	OLS regression with fixed effects	36 countries, 2005-2011	CDS spreads	Gross debt (+), Future government balance (-), Future GDP (-), real GDP growth (-), government bond spreads (+), central bank policy rates (-), inflation (+), effective exchange rates (-)	

2.4 DATA AND METHODOLOGY

2.4.1 The Data

Data

The monthly data used in this study covers the time spanning from January 2005 to December 2014. Five-year CDS spreads are used as a proxy for government credit risk since it is the most traded in the CDS market and the data on spreads are obtained from the Bloomberg database.

Choice of Variables

***Macroeconomic variables*:**

Domestic government debt

Government debt is the liabilities of government in both domestic and international market. Most of the existing studies on sovereign default risk find that high level of debt that government borrow from foreign investors is associated with high possibility of government default. However, these studies have focused mainly on the fundamental of external debts, while very little research has studied the effect of domestic debts although in fact defaults on domestic debt happen as frequent as defaults on external debts (Arellano et al, 2009 and Jeanneret et al, 2016). Reinhart and Rogoff (2008) explore the importance of domestic debt and conclude that there has been "a forgotten history of domestic debt". By cataloguing domestic debt defaults from the database of 64 defaulting countries between 1914 and 2007, they find that governments tend to choose to default on domestic debt in periods of high inflation. However, when the adverse effect of credit contraction due to sovereign defaults on domestic debt is more severe than the high inflationary effect, defaulting on domestic debts appears to be less favorable. This is due to the mechanism that sovereign defaults on domestic debts worsen the balance sheets of domestic investors, particularly the banking sectors, thereby impairing domestic credit and output. In an economy where firms are highly dependent on bank's credit and the effect of a contraction of credit supply appears to be stronger, the

government then would have less incentive to default on their domestic debts (Sandleris, 2012). This indicates that the government's decision to default on which debt securities depends on its political policies and the economic costs.

Table 2.3 presents the link between sovereign default and domestic debt from 1980 to 2005. During that period, there have been 49 default-episodes and 20 of those have been related to the domestic debt.

Table 2.3: Episodes of Sovereign defaults

	External Debt	Domestic Debt	External and Domestic Debt
Observations	26	8	12
Percentage	53%	17%	24%

Source: Arellano and Kocherlakota (2009)

In Vietnam, the share of domestic borrowings has increased significantly since 2009 when the country moved to middle-income country group, which means that the country would no longer receive preferential external debts with low interest rate and long maturity. In the face of decreasing external debts, the government of Vietnam has turned to internal debts for financing of deficit. Consequently, the rapid expansion of public debt in recent years has been mainly driven by an increase in domestic public debt at a rate that has outpaced the growth rate of GDP. According to the report of WorldBank in 2015, the ratio of internal debt to total public debt of Vietnam increased significantly from 45% in 2010 to 53% in 2015 and debt service payment accounted for more than 25 percent of government revenue in the end of 2014[10]. As domestic debts tend to have higher interest rate and shorter maturity, greater reliance on internal financing source is likely to increase average interest rate and decrease the maturity profile of country's public debt. This, in turn, might result in additional pressure of debt repayments. In addition, local firms in Vietnam still rely heavily on credit provided by commercial banks

[10] World Bank (2015): " An update on Vietnam's recent economic developments"

- the major holders of government domestic debt. A contraction in credit then would threaten the economy and therefore giving the government more incentive to default on its external debt instead of domestic debt. An increase in domestic debt, consequently, is expected to positively affect the country's CDS spreads.

Output gap of Vietnam

Output gap is considered as an indicator of economic slack and often used to measure the degree of overheating or slack in relation to potential economic growth. In this study, output gap is defined as the difference between actual monthly industrial production index (in natural logarithm) and potential industrial production index (in natural logarithm), whereby the potential industrial production index is obtained by using Hodrick-Prescott Filter (with $\lambda = 14400$). Higher output gap is associated with the improving economic growth, thus enhancing the solvability of the borrowing country and reducing the possibility of default.

Studying sovereign risk dynamics in a framework of two-county monetary union, Christian and Benjamin (2015) find that while government seems to focus mainly on fiscal consolidation as the main factor driving sovereign credit risk, financial markets care more about the output gap of the country. In addition to that, economic growth of Vietnam is still on an unsustainable trend due to the heavy dependence on the exploitation and the use of natural resources and low value-added industries, while some of the country's strengths such as tourism and agriculture are being constrained. Output gap, therefore, provides more information as compared to economic growth because it includes potential growth.

Volatility of terms of trade

Term of trade volatility is the standard deviation of the monthly percentage change in terms of trade (12 months rolling standard deviation). Term of trade is calculated as the ratio of country export prices to import prices. To estimate the monthly term of trade, I collect data on export and import quantities and prices from website of

General statistics office of Vietnam and then construct Laspeyres fixed weighted export and import price index. The commodities in the basket are coffee, rubber, tea, crude oil, petroleum oil, rice, cashew nut, pepper, coal, car, fertilizers, fibres, plastic materials, paper, textile products, iron and steel, which the price and quantity data can be matched.

Unlike developed countries whose economies tend to be more diversified, the export revenue of Vietnam still rely heavily on primary products such as rice, coffee, crude oil, textiles and so on, although the trend is decreasing (Table 2.4). The export revenue, therefore, tends to be more exposed to the shocks resulting from price volatility of primary commodities in the world markets. Consequently, the volatility of commodity price can be considered as an important factor determining economic instability and uncertainty (WorldBank, 2010[11]). A higher term of trade volatility, hence, might result in a higher probability of default (Aizenman, et al 2013). Jens Hilsher and Yves Nosbusch (2010) also found an evidence that the fluctuations of terms of trade is important for explaining high sovereign credit risk

Table 2.4: Exports of goods by Standard International Trade Classification

	2010	**2011**	**2012**	**2013**	**2014**
TOTAL VALUE (mil USD)	**72,236**	**96,906**	**114,529**	**132,033**	**150,217**
Primary goods	**30,588**	**39,554**	**41,768**	**43,230**	**44,756**
Percent of total (%)	***42%***	***41%***	***36%***	***33%***	***30%***
Food, food stuff and live animals	11,234	13,937	14,615	14,773	17,037
Beverages and tobacco	2,052	2,966	3,899	2,947	3,785
Crude materials, inedible, except fuels	14,342	18,905	20,153	23,289	22,277
Mineral fuels, lubricants and related materials	2,961	3,746	3,101	2,222	1,656
Manufactured products	**35,676**	**52,419**	**63,817**	**79,551**	**95,771**
Percent of total (%)	***49%***	***54%***	***56%***	***60%***	***64%***
Chemical and related products	639	956	1,091	1,288	1,725
Manufactured goods classified by materials	22,803	30,259	28,331	33,089	37,129
Machinery, transport and equipment	10,918	19,591	32,399	44,496	50,218
Miscellaneous manufactured articles	1,316	1,613	1,995	678	6,698

[11] The World Bank Economic Premise Note, No.13, 2010: Subnational Debt Finance and the Global Financial Crisis.

Others	**5,972**	**4,932**	**8,944**	**9,252**	**9,690**
Percent of total (%)	***8%***	***5%***	***8%***	***7%***	***6%***

Source: Official monthly exports of goods, GSO

International reserves

International reserves reflect international liquidity, financial capacity and the willingness of a country to meet its foreign-debt obligations (Thomas, 2010)[12]. Remolona et al (2007) and Longstaff et al (2011) has found a negative relationship between international reserve and CDS spreads, an increasing international reserve reduces the default probabilities of a government.

Default of the VINASHIN

The inclusion of this variable is motivated by Reinhart et al. (2003) and Hilcher and Nosbusch (2010), who argue that a history of default is likely to negatively affects the default risk of a country. To date, Vietnam has not defaulted on its debt repayments, but the failure of a State-backed Corporation, specifically the VINASHIN – a state-owned shipbuilder - to make a U.S. $60 million loan repayment in December 2010, had been considered as a barometer of the country's creditworthiness. After the event of VINASHIN's default, international lenders and investors had loss their faith in Vietnam's government (Hookway and Tudor, 2011[13]). This was mainly due to the fact that in order to help the VINASHIN to obtain an additional $600 million syndicated debt in 2007; the government of Vietnam sent a letter of support for the company to the lenders. However, when the VINASHIN failed to repay its debt in December 2010, the government refused to bail out the company. Therefore, the default of the VINASHIN is expected to lead the Country's CDS spreads become wider. The effects of VINASHIN's default is equals to 12 (months) when there is an event of default and the following months are set to be 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1.

[12] Thomas (2010) defines the capacity of a country to fulfill its debt obligations as the maximum amount of foreign currency that the country is spending to repay external borrowings.

[13] James Hookway and Alison Tudor (2010): "Behind Firm's default: Vietnam's growth Mania". The Wall Street Journal.

Global variables

Output gap of China

China has remained the biggest trade partner of Vietnam for a long time. According to the data of GSO[14], total trade revenue in 2014 between Vietnam and China was more than 58 billion dollars (accounting for nearly 20% of total trade revenue). Vietnam export products also rely overly on cheap raw materials imported from China, and most commodities exported to China are unprocessed with low added value. Therefore, China's output gap might have an impact on the business cycle of Vietnam and then it's sovereign risk. Output gap of China is also estimated as the difference between actual industrial production index and the potential industrial production index (both series are in natural logarithm), the potential industrial production index is calculated using Hodrick-Prescott Filter (with $\lambda = 14400$).

VIX index:

The volatility index of the Chicago Board options exchange is a measure of uncertainty of risk aversion of global market (Ghosh et al ,2012). Higher VIX index is associated with higher CDS spreads (Pan and Singleton, 2008).

In summary, this section empirically tests the following hypotheses:

- *Hypothesis 1*: Higher output gap leads to lower risk of default and then lower CDS spreads.
- *Hypothesis 2*: Higher terms of trade volatility tend to increase CDS spreads (more prone to external shocks).
- *Hypothesis 3:* To the extent that higher international reserves increase financial capacity of the country, the CDS spreads then should be negatively associated with international reserves.
- *Hypothesis 4*: Since expensive domestic borrowing increases pressure on government budget and leads higher possibility of default, domestic debt then is

[14] https://gso.gov.vn

expected to positively related with spreads.

- *Hypothesis 5*: Default of VINASHIN leads to higher CDS spreads.
- *Hypothesis 6*: An increase in China's output gap cause CDS spreads of Vietnam to decrease.
- *Hypothesis 7*: Higher VIX index is associated with higher CDS spreads.

In this study, all the variables were converted into log form except DEFAULT of the VINASHIN, output gap of Vietnam and China. All the data series used are monthly data from January 2005 to December 2014. The definitions and descriptions of variables are indicated in Table 2.5 and Table 2.6. From table 2.6 it can be seen that the output gap of Vietnam has highest standard deviation with respect to the mean, this once again suggests that the economy of Vietnam is highly volatile and uncertainty.

Table 2.5: Definitions of Variables

Variables	Definition	Source	Expected Sign
LNCDS	Natural Logarithm of 5-year CDS spreads	Bloomberg	
LNDEBT	Natural Logarithm of domestic debt outstanding value	Bloomberg	(+)
GAPVN	Output gap of Vietnam	Calculation based on monthly industrial production index (2005=100) data obtained from CEIC	(-)
LNTOTVOL	Natural logarithm of terms of trade volatility	Author's calculation based on monthly statistical data of GSO	(+)
LNRESERVE	Natural logarithm of international reserve	IFS	(-)
GAPCHINA	Output gap of China	Calculation based on monthly industrial production index (2005=100) data obtained from CEIC	(-)
LNVIX	Natural logarithm of VIX index	Chicago Board Options Exchange	(+)
DEFAULT	Default of the VINASHIN		(+)

Table 2.6: Descriptive Statistics

Variables	Mean	Std.Dev	Minimum	Maximum	No of Obs
LNCDS	5.357	0.541	4.025	6.345	120
LNDEBT	23.224	0.887	21.205	24.554	120
GAPVN	-0.128	4.958	-17.273	15.442	120
LNTOTVOL	0.853	0.751	-1.478	2.128	120
LNRESERVE	23.591	0.415	22.776	24.322	120
GAPCHINA	-0.059	2.554	-8.317	4.618	120
LNVIX	2.922	0.383	2.343	4.093	120

2.4.2 Methodology

Model Specification

The relationship between country credit default risk and their determinants will be examined in the long and short run employing the Autogressive Distributed Lag (ARDL) bound test developed by Pesaran, Shin and Smith (2001). One of the advantages of using ARDL technique is that it does not require variables be of the same order of integration. It can be used whether the variables are I(0) or I(1). In time series analysis, use of first differenced variable in regression models is necessary to reduce the spurious results when variables have unit root or non-stationary. However, when variables are used in first differenced, long run information from the data is removed, the model hence can only provide partial information on relationship between variables (short run relationship). Model that use only differenced data may be mis-specified if there exist such long influences, leading to biased parameter estimates. Application of ARDL bounds testing approach to cointegration allows us to examine long-run relationship between sovereign credit risk and its determinants. Following Hilcher and Nosbusch (2010) approach for

estimating the determinants of sovereign credit risk, to estimate the determinants of Vietnam's credit risk, the following equation is modeled:

$$LNCDS_t = \beta_0 + \beta_1 LNDEBT_t + \beta_2 GAPVN_t + \beta_3 LNTOTVOL_t + \beta_4 LNRESERVE_t + \beta_5 GAPCHINA_t + \beta_6 LNVIX_t + \beta_7 DEFAULT_t + \varepsilon_t \quad (1)$$

Testing for Stationary

To apply ARDL bound test, it is important to ensure that the variables under consideration are not I(2). If one of variables in the model are found to be I(2), then the computed F-statistics developed by Pesaran et al (2001) and Narayan (2005) are no longer be valid (Ouatarra, 2004).Therefore, I first conduct ADF unit root test to ensure that all data series are not I(2). The results are summarized in table 2.6.

Bound Testing Approach

ARDL bounds testing approach to co-integration is employed to examine long-run relationship among the series in the model. The Bound test has a number of advantages in comparison to Johansen co-integration test. For example, it is applicable irrespective of the degree of integration of the variables and thus avoids the pre-testing of the order of integration of the variables, long-run and short-run parameters of the model are estimated simultaneously since it takes into account the error correction term in its lagged period, and being more robust and performs better for small sample sizes (Ghatak and Siddiki, 2001). Moreover, according to the study of Odhiamho (2008), ARDL Bound test can provide consistent and unbiased long-term estimates even if some of the model regressors are found to be endogenous.

The general form of an ARDL model is as follows:

$$Y_t = \alpha_0 + \sum_{1}^{n} \beta_i Y_{t-i} + \sum_{1}^{m} \sum_{0}^{p_j} \gamma_{ji} X_{jt-i} + \varepsilon_t$$

Where:

Y is the natural logarithm of 5-year CDS spreads,

n is the lags of dependent variable,

X_j is the explanatory variable number j,

m is the number of exogenous variables,

p_j is the selected lags of regressor j

ε_t is the error term

The unrestricted error correction model derived from ARDL model for equation (1) is expressed as follows:

$$\Delta LNCDS_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta LNCDS_{t-i} + \sum_{i=0}^{p_1} \gamma_{1i} \Delta LNDEBT_{t-i} + \sum_{i=0}^{p_2} \gamma_{2i} \Delta GAPVN_{t-i}$$
$$+ \sum_{i=0}^{p_3} \gamma_{3i} \Delta LNTOTVOL_{t-i} + \sum_{i=0}^{p_4} \gamma_{4i} \Delta LNRESERVE_{t-i}$$
$$+ \sum_{i=0}^{p_5} \gamma_{5i} \Delta GAPCHINA_{t-i} + \sum_{i=0}^{p_6} \gamma_{6i} \Delta LNVIX_{t-i} + \theta_1 LNCDS_{t-1}$$
$$+ \theta_2 LNDEBT_{t-1} + \theta_3 GAPVN_{t-1} + \theta_4 LNTOTVOL_{t-1}$$
$$+ \theta_5 LNRESERVE_{t-1} + \theta_6 GAPCHINA_{t-1} + \theta_7 LNVIX_{t-1} + \eta DEFAULT_t$$
$$+ \varepsilon_t$$

Where:

θ_i is the long-run multipliers,

n is the lags of dependent variable,

p_j is the selected lags of regressor j

ε_t is the error term

The null hypothesis of the existence of long-term relationship among variables is ($H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = \theta_7 = 0$) and the alternative of cointegration is ($H_1: \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq \theta_7 \neq 0$)

The ARDL technique consists 2 steps. The first step is to confirm the existence of a long-term co-integration relationship among variables by using the Wald-test (F-test).

According to Pesaran et al (2001), if the calculated F-statistic is higher than the upper bound, the null hypothesis of no long-run relationships between variables can be rejected. In contrast, if the computed F-statistic is lower than the upper bound, the null hypothesis of no co-integration cannot be rejected, meaning that there is no long-term relationship between dependent and explanatory variables in the model.

Once the series are found to be co-integrating, the next step is to estimate the long run and short-run model.

The long-run model for CDS can be estimated as:

$$LNCDS_t = \alpha_0 + \sum_{i=1}^{n} \theta_1 LNCDS_{t-i} + \sum_{i=0}^{P1} \theta_2 LNDEBT_{t-i} + \sum_{i=0}^{P2} \theta_3 GAPVN_{t-i} + \sum_{i=0}^{P3} \theta_4 LNTOTVOL_{t-i} + \sum_{i=0}^{P4} \theta_5 LNRESERVE_{t-i} + \sum_{i=0}^{P5} \theta_6 GAPCHINA_{t-i} + \sum_{i=0}^{P6} \theta_7 LNVIX_{t-i} + \eta DEFAULT_t + \varepsilon_t$$

The short run causality can be determined by using an error correction model (ECM) of equation (2):

$$\Delta LNCDS_t = \mu + \sum_{i=1}^{n} \beta_i \Delta LNCDS_{t-i} + \sum_{i=0}^{p_1} \gamma_{1i} \Delta LNDEBT_{t-i} + \sum_{i=0}^{p_2} \gamma_{2i} \Delta GAPVN_{t-i} + \sum_{i=0}^{p_3} \gamma_{3i} \Delta LNTOTVOL_{t-i} + \sum_{i=0}^{p_4} \gamma_{4i} \Delta LNRESERVE_{t-i} + \sum_{i=0}^{p_5} \gamma_{5i} \Delta GAPCHINA_{t-i} + \sum_{i=0}^{p_6} \gamma_{6i} \Delta LNVIX_{t-i} + \delta ECT_{t-1} + \varepsilon_t$$

Where δ is the speed of adjustment and ECT_{t-1} is the error correction term obtained from the long-term relationship; the coefficient of ECT is expected to be negative and statistically significant.

Relevant diagnostic tests (normality, serial correlation and heteroscedasticity test) and stability tests (CUSUM and CUSUMSQ tests) are next conducted to access the goodness of fit of the model.

The orders of the lags in the model are selected by using the Akaike Information Criteria (AIC).

2.5 EMPIRICAL RESULTS

2.5.1 Results of Unit Root Tests

Table 2.7: Results of Unit Root Test

Variables	ADF test statistics		Phillips-Perron test statistic		Order of Integration
	Level	*First Differences*	*Level*	*First Differences*	
LNCDS	-1.560 (0)	-9.911(0)***	-1.716	-9.873***	I(1)
LNDEBT	-2.528(1)	-7.852(0)***	-2.520	-7.884***	I(1)
GAPVN	-5.135(11)***	-4.271(12)***	-9.060***	-35.768***	I(0)
LNTOTVOL	-2.143(5)	-2.136(4)**	-1.375	-2.333**	I(1)
LNRESERVE	-1.663(1)	-6.121(0)***	-1.380	-6.152***	I(1)
GAPCHINA	-3.682(4)***	-2.956(3)**	-2.417	-10.133***	I(0)
LNVIX	-0.182(0)	-12.169(0)***	0.065	13.461***	I(1)

*Note: Lags are given in parentheses. ***, ** denotes statistic significance at the 1% and 5% levels respectively. The null hypothesis of the ADF test and PP test is that the variable has a unit root.*

According to Unit root test results (Table 2.7), the variables in this study are a mix of I(0) and I(1) series. The cointegration test methods based on Johansen (1991; 1995) and the Johansen-Juselius (1990) requires that all variables are the same intergration, i.e, I(1). Therefore, this study will apply ARDL modeling approach for cointegration analysis.

2.5.2 Bound Testing Results

The results of ARDL Bounds Test in Table 2.8 shows that the estimated F-statistic (6.28) exceeds the upper bound critical values at even 1% level of significant, meaning that the null hypothesis of no cointegration can be rejected at 1 percent level. As such cointegration examining long-run relationship exists between variables in the model.

Table 2.8 Results of ARDL Bounds Test

Dependent Variable: LNCDS	
Null Hypothesis: No cointegration	
Test Statistic	Value[15]
F-statistic	6.28

Critical Value Bounds

Significance	Lower Bound (I0)	Upper Bound (I1)
10%	2.12	3.23
5%	2.45	3.61
1%	3.15	4.43

*Note: ***, ** show the significant at 1% and 5% level respectively, the number of regressors, k=6, Unrestricted Intercept and No trend.*

2.5.3 Long-run results

The long-run results (Table 2.9) show that variables capturing internal public debt burden (LNDEBT), economic uncertainty (LNTOTVOL), and the global volatility index (VIX) have the expected signs and are statistically significant, whereas the international reserve, which represents financial capacity of the country, Chinese economy and the Default of the VINASHIN (DEFAULT) are found not to have any significant effect of default risk of Vietnam in the long run.

The transmission response of CDS spreads to the domestic debt level is positive and significant at 5 percent level. A 1 percent increase in domestic debt will lead to about 0.43 percent increase in the CDS spreads in long-term. This confirms to the expectation that high expensive domestic debt level can add a further debt-burden on Vietnam's government and therefore leads to higher possibility of government's default on their external debt in the future.

[15] Source of critical values for the bound test: Table C1(iii) of Pesaran, Shin and Smith (2001)

In addition to that, the economic uncertainty variable, which is represented by terms of trade volatilities (LNTOTVOL), has the expected positive sign, though being significant at only 10% level, meaning that higher volatility of terms of trade is associated with higher default possibilities. This result is consistent with the finding of Hilcher and Nosbusch (2010). Specifically, a 1 percent increase in the volatility of terms of trade cause the long-run CDS spread to increase by 0.20 percent. The weak evidence that an increase in terms of trade volatility cause the country's default risk to rise can be explained due to the gradual shift from primary commodities to manufactured commodities in the export activities of Vietnam during the observed period. The positive link between sovereign credit risk and terms of trade volatility can also suggest that CDS spreads appear plausible on economic grounds given that Vietnam is still primary commodity exporter.

Output gap (GAPVN), however, exerts a surprisingly positive effect on the risk of default in case of Vietnam, although the magnitude of the positive impact is relatively weak as a 1 percent change in output gap leads to only a 0.080 percent change in the price of CDS. This might because of the fact that the economic growth of Vietnam is highly volatile and often unsustainable, stemming from the dependence of export base on low value-added primary products, low-level skills of the labor force and the exploitation of natural resources. This, in turn, can make the country more prone to external shocks and the fluctuations of the world economy; and thus increase the possibility of default in the long term. Besides that, the relentless focus on achieving high level of economic growth of Vietnamese government through the use of domestic borrowing in recent years can also have a destabilizing impact on the health of the economy, resulting in a higher sovereign credit risk.

The results also indicate that there is a significant long-run relation between Vietnam's CDS spreads and the global financial market conditions as measured by the VIX. In particular, a 1% increase in the global risk aversion would raise CDS spreads by

0.76% in long-term (significant at 5% level of confidence). This result is in accordance with Pan and Singleton (2008), who suggest that sovereign credit spreads are strongly affected by the VIX index. The significant relationship between Vietnam's CDS spreads and the VIX index could support a view of the global financial market in which foreign investors play a significant role.

Table 2.9 Long-run model for the selected ARDL(4,0,2,0,2,2,1) Based on Akaike Information Criteria

Dependent variable: LNCDS

Independent Variables	Coefficients	T-statistic
LNDEBT	0.429**	2.471
GAPVN	0.080***	2.861
LNTOTVOL	0.202*	1.951
LNRESERVE	-0.311	-0.784
GAPCHINA	0.084	1.248
LNVIX	0.757**	2.328
DEFAULT	0.045	1.143
C	0.339	0.053

*Note: *** and ** denote the significant at 1% and 5% level respectively*

2.5.4 Short-run results

The results of error correction model are presented in Table 2.10.

Table 2.10 Error correction model for the selected ARDL(4,0,2,0,2,2,1) Based on Akaike Information Criteria

Dependent variables: D(LNCDS)

Independent Variables	Coefficients	T-statistic
D(LNCDS(-1))	-0.086	-0.871
D(LNCDS(-2))	-0.227**	-2.489
D(LNCDS(-3))	-0.156*	-1.756
D(LNDEBT)	0.078	1.576
D(GAPVN)	0.004	1.535
D(GAPVN(-1))	-0.007**	-2.565
D(LNTOTVOL)	0.037*	1.682
D(LNRESERVE)	-0.428	-1.442
D(LNRESERVE(-1))	-0.622**	-2.123
D(GAPCHINA)	-0.017	-0.843
D(GAPCHINA(-1))	-0.059***	-3.101
D(LNVIX)	0.316***	4.952
D(DEFAULT)	0.008	1.291
ECT(-1)	-0.180**	-3.047

Diagnostic tests

Breusch-Godfrey Serial Correlation LM Test	F-statistic = 1.132 (0.346)
Breusch-Pagan-Godfrey Heteroskedasticity Test	F-statistic = 0.954 (0.436)
Jarque-Bera Normality Test	χ^2 = 1.707 (0.426)
Ramsey Reset Test (Model Misspecification)	F-statistic = 2.811 (0.065)

*Note: *** and ** denote the significant at 1% and 5% level respectively. Figures in parenthesis are p-value*

The lagged Error correction term (ECT) has a negative sign and statically

significant at 5% level. This again confirms the existence of a stable long-term relationship between dependent and independent variables (Banerjere et al, 1998) and the coefficient of ECT(-1) captures the speed of adjustment towards long-term equilibrium in response to any deviation. In particular, about 18 percent of disequilibria in the price of Credit default swap of the previous month's shock adjust back to the long-term equilibrium in the current period.

According to the results, the lagged output gap of Vietnam is found to be statistically significant with negative expected sign in short-term, but the magnitude of the effect of lagged output gap on the price of CDS is relatively small as a 1 percent change in this variable results in a short-run change of only 0.007 percent in the CDS spread (with 5% level of confidence). This indicates that an increase in output gap - the economy is growing at faster than its long-term average rate - only produce a small short-term improvement in the sovereign creditworthiness of Vietnam. The results also confirm the hypothesis that higher financial capacity (presented by international reserves) is associated with lower risk of default or lower CDS spreads.

Both economic uncertainty (measured by LNTOTVOL) and financial capacity (measured by LNRESERVE) factors are found to have significant impact on the price of Vietnam's CDS in short time with the expected sign. Similar to the long-run results, the short-run results also present a weak association between terms of trade volatility as a 1 percent increase in the volatility only leads to a 0.037 percent higher in the risk of default (with 10% level of significant only). In contrast, there is relatively strong evidence that higher international reserve, which helps to improve the financial condition of the country, is essential for short-term improvement of the country's creditworthiness. Particularly, a 1% increase in the lagged international reserve causes the CDS price to decrease by 0.62% in short-term with 5% level of significant.

For global variables, CDS spreads of Vietnam are found to response immediately to the changes in both the global volatility index (VIX) and Chinese economic conditions

(statistically significant at 1% confidence level). Specifically, a 1% increase in the lagged output gap of China is associated with a 0.062% decrease in the possibility of default for Vietnam and a 1% higher in the global volatility index immediately results in a 0.314% rise in the risk of default for the country.

The default of the VINASHIN appears to not have any significant effect on the movement of Vietnam's CDS price in both short- and long-term. This might because that when the VINASHIN failed to fulfill its debt responsibility in December 2010, the government of Vietnam refused to bail out the company.

2.5.5 Diagnostic Tests

The diagnostics test results also are presented in Table 2.9. According to the results of the diagnostic tests, there is no evidence of serial autocorrelation (Breusch-Godfrey Serial Correlation LM test) and Heteroskedasticity (Breusch-Pagan-Godfrey test). The Jarque-Bera Normality test confirms that the error term is normally distributed. The Reset Test developed by Ramsey (1969)[16] shows that there is no functional form misspecification in the model.

2. 5.6 Stability Tests

The CUSUM and CUSUM of Squares (CUSUMQ) statistics are employed in order to examine the stability of the model and the results are indicated in Figure 2.3 and Figure 2.4. As shown, the graphs of the CUSUM and CUSUMQ statistics remain within the critical boundaries of 5% significance. This suggests that the Null hypothesis of stable parameters cannot be rejected[17], conforming that all coefficients in the ARDL model are stable.

[16] According to Ramsey (1969), the Null hypothesis of the Reset test is that the functional form of the estimations is correctly specified

[17] Bahmani and Oskooee (2004) have noted that if the plot of CUSUM and CUSUMQ statistics stays within the critical bounds at 5% level of significant, the null hypothesis (i.e. all coefficients in the model are stable) cannot be rejected.

Figure 2.3 CUSUM Curve

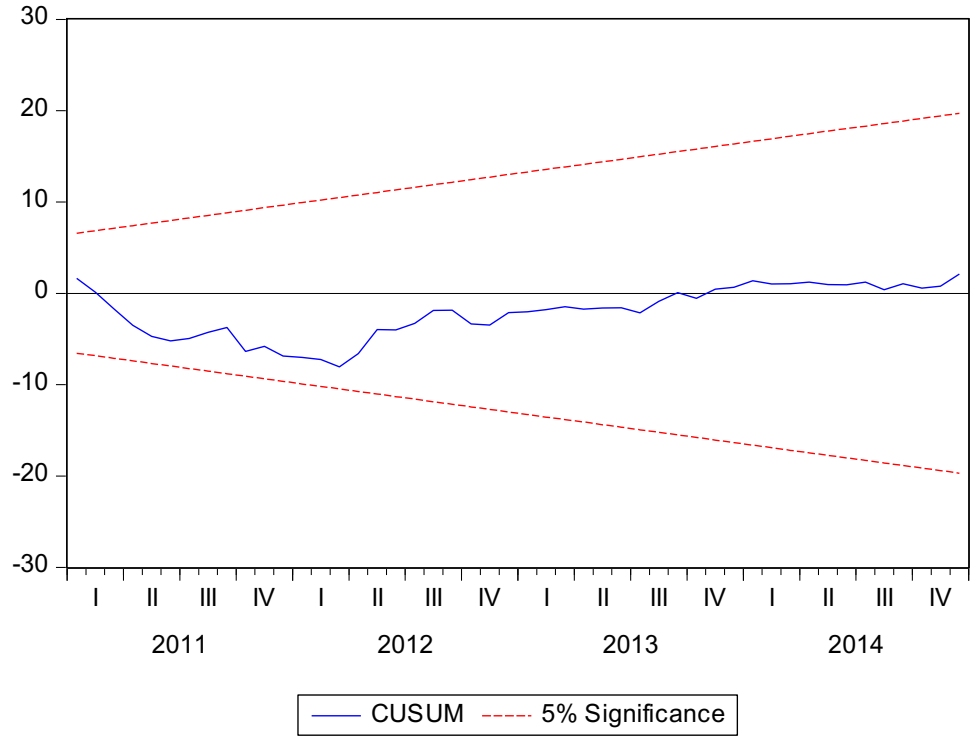
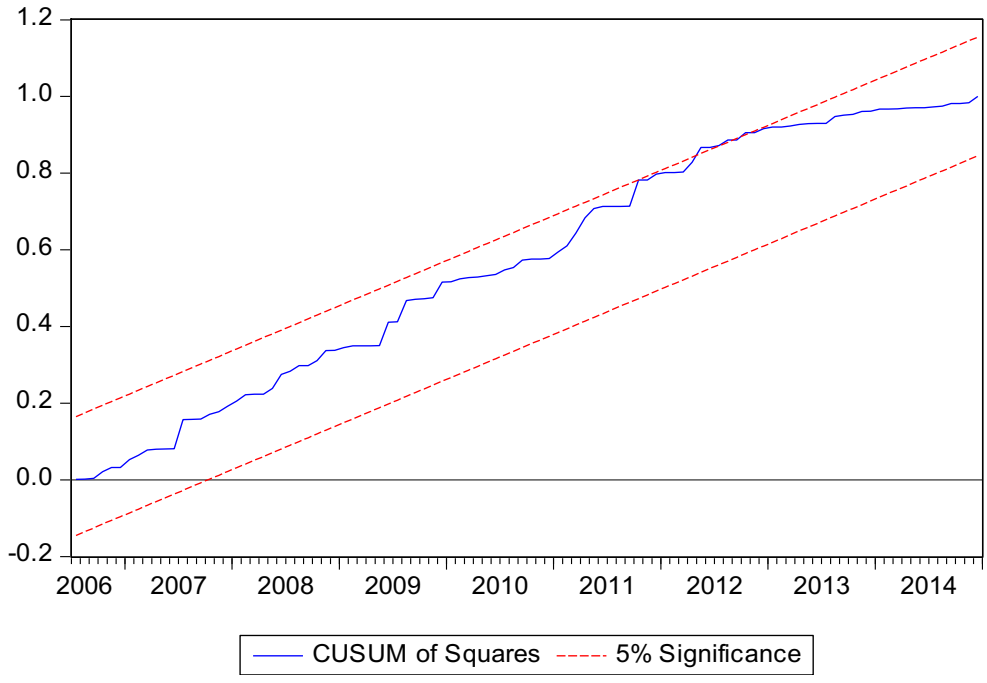


Figure 2.4 CUSUM of Squares Curve



2.5.7 Robustness Check

The robustness of the estimated results is the Toda-Yamamoto causality test

approach[18]. The Toda and Yamamoto causality test has some advantages compared to other causality tests since it can be applied regardless the order of integration and whether the series are cointegrated or not.

Table 2.11: Toda-Yamamoto Tests of Granger Causality

Null Hypothesis	Lag(k)	χ^2-value	P-value	Decision
LNDEBT does not Granger cause LNCDS	4	15.854	0.015**	Reject
LNCDS does not Granger cause LNDEBT	4	4.291	0.637	Accept
GAPVN does not Granger cause LNCDS	4	11.569	0.072*	Reject
LNCDS does not Granger cause GAPVN	4	11.176	0.083*	Reject
LNTOTVOL does not Granger cause LNCDS	4	7.303	0.294	Accept
LNCDS does not Granger cause LNTOTVOL	4	4.562	0.601	Accept
LNRESERVE does not Granger cause LNCDS	4	18.187	0.006***	Reject
LNCDS does not Granger cause LNRESERVE	4	4.678	0.586	Accept
GAPCHINA does not Granger cause LNCDS	4	6.338	0.386	Accept
LNCDS does not Granger cause GAPCHINA	4	7.627	0.267	Accept
LNVIX does not Granger cause LNCDS	4	36.492	0.000***	Reject
LNCDS does not Granger cause LNVIX	4	4.646	0.589	Accept

*Note: *, ** denote the rejection of null hypothesis at the 10% and 5% level, respectively. The optimal lag length is selected by Akaike Information criterion. The maximum order of integration for the group of variables is 1.*

The results of the Toda-Yamamoto causality test (Table 2.11) show existence of causality running LNDEBT to LNCDS at 5% level of significance, but there is no evidence of causality from LNCDS to LNDEBT. This suggests that there is a unidirectional causality that runs from domestic debt to sovereign credit risk. The causality test results also indicate the existence of a unidirectional causality running from LNVIX to LNCDS, and from LNRESERVE to LNCDS at 1% level of significance, and a bidirectional causality between output gap and the price of CDS in Vietnam.

2.6 CONCLUSION AND POLICY IMPLICATIONS

This study aims to investigate the main determinants of sovereign credit risk in

[18] Toda and Yamamoto (1995) procedure to test for Granger causality is based on the estimation of an augmented VAR ($k + d$max) model, where k is the optimal lag length and d is the maximum order of integration in the VAR model.

Vietnam over the monthly period between 2005 and 2014 by employing the ARDL technique. We pay special attention to the effects of domestic public debt and the volatility of the economy (proxied by terms of trade volatility and country's output gap). Our results based on ARDL approach suggest the existence of the short-run and long run causality between variables, in which the global factors, including the global risk aversion and China's output gap, tend to play predominant role in the short-term, while the country-specific factors outperform in the long-term. In particular, we find that the changes in short-run CDS spreads have been largely driven by the change of Chinese economy and the global volatility index. This, again, confirms the strong impacts of Chinese economy on the business cycle of Vietnam as the country's biggest trading partner and the significant role of the global investors in determining the country's credit risk. The empirical results also suggest a positive relationship between domestic debt and the prices of CDS, suggesting that domestic holding of government debts is also an important determinant of the possibility of country's default on its external debt. However, this factor produces its effect in long-term only. Since the effect of credit contraction is greater in case of Vietnam (most local firms rely heavily on credits provided by banks-the main holder of government's domestic debt), an increase in domestic borrowing which adds more pressure for government budget burden would increase the possibility of the country's default on international debts, instead of default on internal debt, and therefore the CDS spreads in the future. In addition, the weak coefficient of the volatility variable in the estimation in both short-term and long-term is an indication that terms of trade volatility play a declining role in predicting sovereign credit risk. Given the fact that Vietnam is still a primary commodity exporter (i.e. the export base still depends on single commodity exports), higher fluctuations in terms of trade would make the country to be more vulnerable to external shocks and results in a higher risk of default, although the effect is relatively small. Unlike previous papers, which find the existence of negative correlation between economic improvement and sovereign credit risk, this paper

identifies that the effect of country's output gap is not persistent. Higher output gap results in lower short-run CDS spreads but higher long-run sovereign default risk, confirming the fact that the economy of Vietnam is highly volatile and uncertainty.

The results of this study provide important implications for policymakers of Vietnam to formulate economic policy. We have identified the main factors behind the widening of Vietnam's CDS spreads over the period from 2005 to 2014. Particularly, high terms of trade fluctuations, high reliance on internal debt to meet the financial gap, unsustainable economic growth and China' output gap are found to significantly effect the creditworthiness of the government of Vietnam. Therefore, in order to reduce the vulnerability of the country to external shocks, it is important to reduce the volatility of the economy by improving the country's export base, specifically increasing the proportion of high value-added and more sophisticated products, enhancing the country's strength such as agriculture and tourism; increase the effectiveness of domestic debt management as well as reduce the economic dependent on China by diversifying the country's trading partners. Moreover, the existence of significant positive link between domestic borrowing and sovereign credit risk provides awareness within the Government of the importance of internal public debt, which has been forgotten or overlooked, in determining the sovereign risk.

CHAPTER 3

DOMESTIC DEBT AND INFLATION IN VIETNAM

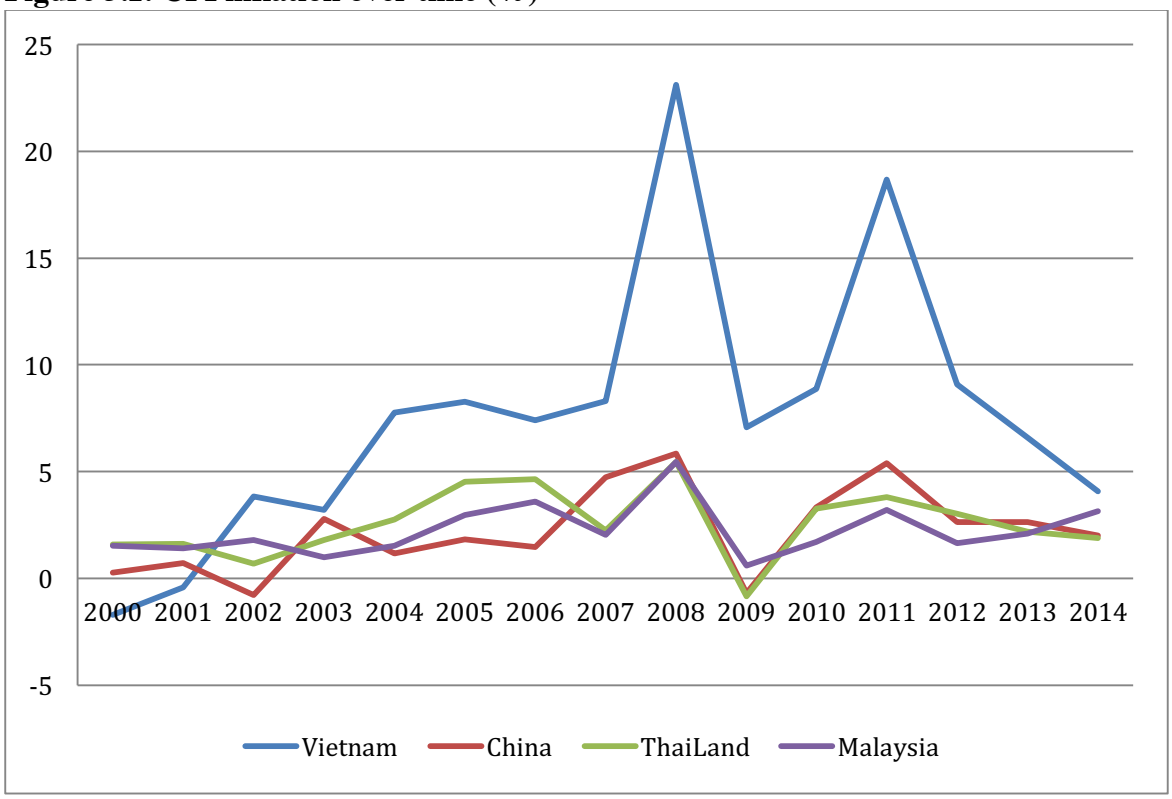
3.1 INTRODUCTION

The economy of Vietnam is facing persistently high inflation during the last couple of years. In 2008, the country's inflation rate went up unprecedentedly in 17 years to two-digit level at 23.12%, making it the worst inflation problems in the Asia region (Figure 3.1). Considering inflation as a monetary phenomenon only, to bring inflation under control, the Central Bank of Vietnam increased the base interest rate from 12% to 14% and refinancing rate from 13% to 15% in late 2008. As a result, the rate of inflation was reduced to a single-digit of 7.06% in 2009 and 8.86% in 2010 before reaching another double-digit rate in 2011 of 18.68%. This indicates that the monetary policy of Vietnamese government seems to ineffectively stabilize the price level or that is to say the government of Vietnam has not addressed the issue of inflation properly. In addition to that, according to the fiscal theory of price level (first discussed in Woodford, 1994), inflation is not only a monetary phenomenon, but also a fiscal phenomenon.

Therefore, this paper aims to investigate whether the increase in internal borrowing to finance fiscal deficit leads to higher inflation in Vietnam. So far, much of the existing studies on domestic debt have been conducted in the context of industrialized countries, while the situation of developing countries (specifically Vietnam) is still very limited due to the lack of reliable data on domestic debt. This study, hence, contributes to the existing literature by empirically testing the effects of an increase in domestic borrowing as compared to international borrowing (measured by the ratio of domestic debt to external debt) on the inflation of Vietnam over the period from 2000Q1 to 2015Q4 by applying a Vector Error Correction Model (VECM) with control variables of budget deficit, bank's credit to private sector and lending interest rate. Granger causality test is also employed to examine the relationship between domestic debt and consumer price index.

The paper is organized as follows. Section 2 provides a better understanding of the condition of budget deficit and inflation during the studied period in Vietnam. Section 3 reviews the existing literature concerning the importance of domestic debt. Section 4 describes the data and methodology used in the study. Section 5 then interpret the results. Finally Section 6 presents conclusions and implications.

Figure 3.1: CPI inflation over time (%)



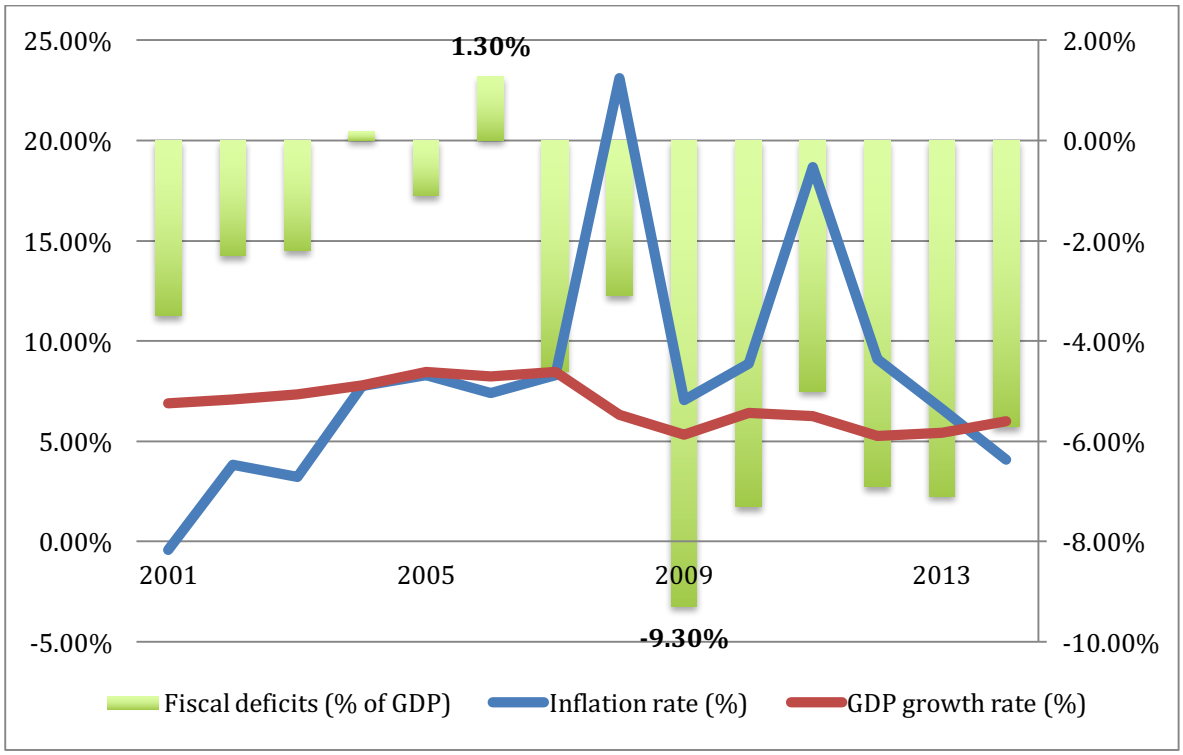
Source: World Bank

3.2 BUDGET DEFICIT AND INFLATION OF VIETNAM

During the period from 2001 to 2014, Vietnam has run an average budget deficit of 4% of GDP and a budget surplus was only recorded in 2006, standing at 1.3% of GDP. In 2009, Vietnam's budget deficit reached a peak of 9.30% GDP as a response to the negative consequences of the 2008 financial crisis (Figure 3.3). In specific, the government's demand stimulus package of about US$8 billion (VND143 trillion), which included tax reduction or exemption, interest rate subsidy and public investment enhancing, was implemented in early 2009. In 2013, another economic stimulus package worth $1.4 billion (VND 30 trillion) was released to revive the real estate market,

resulting in an increase in budget deficit to more than 7% of GDP. These economic stimulus packages, while supporting economic growth, also caused budget deficit to increase and thus led to higher government's debt burden. From Figure 3.2, it could be seen that inflation is likely to increase after a period of high budget deficit. For instance, inflation rate went up unexpectedly to more than 23% in 2008 and 18% in 2011, following the significant expansion of budget deficit in 2007 and 2009. This strengthens a view that high budget deficit could potentially cause inflation to increase in recent years and then results in higher economic instability. From the year of 2000, the government of Vietnam does not finance budget deficit by printing money, however budget deficit is still highly likely to lead to higher inflation.

Figure 3.2: Inflation, Economic growth and Budget imbalance



Source: IMF, MOF

3.3 LITERATURE REVIEW

In theoretical literature, the relationship between government debt and inflation has been first emphasized in the work of Sargent and Wallace (1981), who indicated that tighter monetary policy could not result in lower inflation in both short run and long run

without any fiscal adjustments. In an economy with fiscal dominance and real debt, fiscal authority independently determines the funding of its budget deficit through new bond debt issues and seigniorage, while the monetary authority passively accommodates the actions of fiscal authority by inflation. An increase in fiscal deficit financed by debt, therefore, would rather lead to higher future money growth and subsequently further inflation increase, than higher future taxes.

More recently, as highlighted by Woodford (1994), the effects of government debt on inflation can be explained by the fiscal theory of the price level (FTPL), which indicates that in an economy with nominal debt, the price levels are driven mainly by fiscal policy and government debt rather than monetary policy. This fiscal theory comes in two forms, the weak-form and the strong-form. The weak-form of the FTPL, given assumptions that fiscal policy is exogenous and monetary policy is endogenous, argues that the level of money growth is set to accommodate fiscal policy to maintain government solvency (fiscal dominance) and inflation is, fundamentally, a monetary phenomenon. The strong-form of the FTPL, on the other hand, assumes that both fiscal and monetary policy are exogenous and even if money supply is unchanged in response to the actions of fiscal authority, government debt can independently influence the price level and inflation rate through its impact on aggregate demand and in this case, inflation is not necessarily a phenomenon of monetary origins.

The monetary dominant or Ricardian regime, in contrast, states that fiscal policy has to be adjusted in accordance with the targets of monetary policy and thus fiscal deficits financed by debt have no effect on the price level and inflation rate. Under this regime, households are rational and forward-looking, and they assume that future payment, including interest and principle, from current borrowing would have to be financed by future taxes. In other words, financing government deficits by debt is equivalent to financing by future taxes and government debt is considered as deferred monetization (Barro, 1974). Therefore, an increase in domestic debt does not affect total

savings, consumption and investment in the economy. However, this equivalence theorem relies on a number of assumptions which are unlikely to be found especially in the case of Vietnam, e.g. economic agents face no budget constraints, an infinite time horizon, non-distortionary taxes and perfect capital markets (Veidyanathan, 1993).

In the empirical literature, a number of studies have analyzed the link between public debt and inflation in advanced economies. Most of these studies find that government debt does not have a significant effect on inflation; while some of them find that public debt and inflation are positively correlated. Giannitsarou and Scott (2006), for example, consider a sample of 6 OECD countries from 1960 to 2005 by using the vector autoregression (VAR) methodology developed by Campbell and Shiller (1988). They find that the expansion of government debt in these countries did not cause any significant change in inflation during the observed period. Applying a simple pooled regression, a model of inflation on debt is estimated for G7 countries between 1960 and 1994 by King (1998). Empirical results indicate that higher public debt does not produce inflation via money growth in these countries during 1960-1994. However, when the author divides the sample into two sub-periods, the first period is between 1980-1994 and the second covers 1960 to 1970, the coefficients for highly indebted countries turn out to be significant with positive sign. Similarly, in case of USA, Kliem et al (2013) evaluate the influence of public deficit on inflation over the period 1900-2011. Based on the results of TVP-VAR model, they uncover that public deficit is significantly associated with higher inflation only in the period from mid-1960s up to 1980, after 1980 the link between deficit and inflation remains insignificant. Their findings also suggest that the effect of public deficits on inflation relies strongly on the interaction between monetary policy and fiscal policy in USA after World War II. Nastansky et al (2014) examine the debt-inflation relationship in Germany during the period from 1991 to 2000, utilizing VECM model and impulse response analysis. Their findings show that public debt has a significantly impact on the price level in the long run and the effect of public debt on

inflation rate is mainly determined by central bank independence, the higher the independency of central bank, the lower the potential impact of debt on inflation. There have been some studies that also find no evidence of the relationship between debt and inflation in developed countries such as Bleaney (1996) in case of 15 OECD countries, Joines (1985) in USA, Taghavi (2000) in Germany, Italy, France and the UK.

Regarding to the case of developing countries, there is however relatively little literature on the relationship between government debt and inflation. By employing dynamic panel estimations in 107 economies during the period 1960 to 2001, Catão and Terrones (2005) discover that there is a strong positive link between national debt and inflation in developing and high-inflation countries, while there is no evidence of significant impacts of debt on inflation rate in low-inflation and industrial economies. They argue that developing countries tend to have low level of tax collection, stable economic and political conditions, high inflation, large budget deficits and limited access to external commercial borrowing. As a result, they are likely to depend on monetary financing of fiscal imbalance and this, in turn, leads to inflation tax. In a study of 94 developing and developed countries over the period of 1960-1995, Fischer et al (2002), based on the results of the fixed effects model, also find that the relationship between national debt and inflation in low-inflation countries is relatively weak, while that in high-inflation countries during high-inflation episodes becomes stronger. Adopting the OLS regression estimation, Ahmad et al (2012) show that for Pakistan during 1972-2009, an increase in domestic debt stock and domestic debt servicing significantly leads to a rise in the price level. The authors explain that the expansion of domestic debt with high interest rate and short maturity causes the cost of internal borrowing to increase, resulting in higher budget deficit and the government, consequently, is forced to rely on monetary creation to finance its budget imbalances which drives inflation in the future. Further, given high and certain return on government domestic debt, the holder of debt could receive high return and more income on this instrument, enhancing aggregate demand and

the price level, as a result, would increase. Veiga et al (2014) analyze the debt-inflation relationship using a data set of 52 African countries between 1950 and 2012 and end up with a conclusion that higher public debt is associated with higher inflation rate.

In general, empirical studies tend to support the positive correlation between public debt and inflation in developing countries with high level of debt and inflation, while in case of industrial and low-inflation countries the debt-inflation relationship is relatively weak. Developing economies, which have low tax collection capacity, high inflation rate, large budget deficit, underdeveloped financial system and lower access to the world capital market, has been forced to come to other resources of financing to overcome its budget difficulties, including domestic debt financing and monetary financing. Domestic debt financing often come with high interest rate and short term, which increases the cost of government borrowing, putting additional burden on budget balance and thus in turn fuels inflation in long-run. Monetary financing is, however, inflationary itself due to the creation of money and hence causes the price level to rise immediately.

In case of Vietnam, there has been no empirical evidence on the relationship between debt and inflation, while much of the literature has concentrated on the growth impact of debt, of which there have been two prominent studies. In research of 55 low-income countries, including Vietnam, over the 1970-1999 period, based mainly on the results of System-GMM models, Clements et al (2003) investigated that high levels of external debt can harm economic growth due to its effect on the efficiency of financial resource allocation rather than its crowding-out effects. The study also supports the debt-overhang hypothesis that external debt starts to have negative effects on economic growth when it reaches a threshold level. In a more recent work, Abbas and Christensen (2007) developed a new database of domestic debt of 93 LICs and emerging countries (inclusive of Vietnam) between 1975 and 2004 to analyze the effect of domestic debt on economic growth. By using Granger-causality technique and System-GMM estimations, the author

found that the rising trend in domestic debt is associated with higher economic growth at moderate levels and the growth impact of domestic debts mainly through investment efficiency channel.

The findings of two studies above can be explained by the fact that Vietnam's external debt mainly consists of official debts in the form of Official Development Assistance (ODA) with very low interest rate and long maturity. This has made the government of Vietnam – as characterized by high corruption - less incentive to optimally allocate these resources, leading to the slowdown in economic growth. Domestic borrowing, in contrast, with greater repayment pressure would urge the government to be more careful in using it effectively, resulting in economic growth in the long-run. However, these researches covered the period up to 2004 when the country relied heavily on international borrowing and the market for government bond was underdeveloped, the channel through which government debt can affect the economy, therefore, is limited to the investment only.

However, recently, due to limited access to external sources of funding, the government of Vietnam has increasingly financed its budget imbalances by issuing local currency bonds, which could directly or indirectly affect inflation.

The first mechanism through which domestic debt might affect inflation is monetary supply. In fact, local commercial banks - as a major holder of G-bond - has often used this fixed-income instrument as a collateral for repo transactions with the State Bank of Vietnam, leading to an increase in monetary base and thus creating new money and causing inflation to rise in the future.

As for the other channel, domestic debt in the form of government bonds can also affect inflation through state investment. Budget deficits offset by the sales of government bonds in Vietnam is the direct result of the increasing government expenditure and state investment. However, the investment of state sector is less efficient than the other sectors such as private sector and FDI sector. Based on the data collected

from the General Statistics Office of Vietnam, the capital-output ratio of state sector is much higher than that of private sector during the 2000s (Figure 3.11), meaning that it requires more investment to produce an additional unit of output than private sector. This indicates that funds borrowed by the government have not been used for productive investment activities or translated fully into additional output. Thus increasing in government expenditure through domestic borrowing only lead to a rise in the demand for goods with an adverse consequence on production costs and thus pushing up the price level.

Figure 3.3: The capital-output ratio (%)

Source: GSO

Therefore, this study aims to investigate the effect of domestic debt on inflation and their policy implications in the context of Vietnam from 2000Q1 to 2015Q4 based on the model developed by Nastansky et al (2014). The approach of this paper also differs from existing empirical studies in that it focuses on the impact of the increasing dependence of domestic borrowing as compared external borrowing (as measured by the ratio of domestic to external debt) that is, whether higher reliance on domestic debt to finance budget deficit cause higher inflation in case of Vietnam.

Hypothesis 8: Increasing reliance on domestic borrowing to finance budget deficit leads to a higher inflation in Vietnam.

Hypothesis 9: Higher growth rate of credit to private sector is associated with higher inflation as credit creation through new credits provided by banks results in broader money supply.

Hypothesis 10: Larger government budget deficit cause inflation to increase.

Hypothesis 11: Higher lending rate to private sector leads to lower inflation. Higher lending rate makes the cost of borrowing more expensive and thus discourage private sector from borrowing, reducing the creation of new credit and the supply of money

3.4 DATA AND METHODOLOGY

3.4.1 Data Description

There have been two main definitions of domestic debt, which has been officially adopted by main statistical institutions. The first defines the meaning of domestic debt based on the currency of issuance (with domestic debt considered as debt issued in local currency) (Bank for International Settlements). The second definition is based on the residence of the lender (domestic debt is debt owed to resident creditors) (IMF, Eurostat, UNCTAD). In Vietnam, there is no statistical information on the residence of government debt holders and until recently. Consequently, in this study, domestic debt is defined as government debt issued in the local currency under Vietnamese law.

The study covers the period from 2000Q1 to 2015Q4 and most of the data used in this study came from the International Financial Statistics, while some of them were collected from the General Statistics Office of Vietnam, and the Bloomberg. The definitions and descriptions of variables used in this study are indicated in Table 3.1 and Table 3.2, respectively.

Table 3.1: Definitions and sources of variables

Variable	Definition	Source	Expected sign
CPI	Consumer price index (2005=100)	IFS	
INEX	The ratio of internal debt to external debt	Author's calculation based on the data from Bloomberg, Joint External Debt Hub Database-WB	(+)
CREDIT	Growth rate of credit to private sector	IFS	(+)
DEFICIT	The ratio of budget deficit to GDP	Monthly statistical data of GSO	(+)
RATE	Average bank's lending rate to private sector customers	IFS	(-)

Table 3.2: Descriptive Statistics

Variables	Mean	Std.Dev	Minimum	Maximum	No of Obs
CPI	87.428	36.059	47.595	145.503	64
INEX	43.932	35.258	0.110	118.368	64
CREDIT	6.073	3.438	-1.104	17.554	64
DEFICIT	-4.282	2.772	-10.971	6.210	64
RATE	11.076	2.701	7.05	20.1	64

3.4.2 Estimation Model

Based on the approach model suggested by Nastansky et al (2014), who analyzed the relationship between public debt and inflation in case of Germany by using liner regression in which inflation is seen as a function of public debt and other macroeconomic variables such as long-term interest rate and broad money (M3), the function ascertaining the impact of internal-external debt ratio on the consumer price index in case of Vietnam is estimated as follows:

$$LNCPI_t = \alpha + \beta INEX_t + \gamma CREDIT_t + \delta\, DEFICIT_t + \varphi RATE_t + \varepsilon_t \qquad (1)$$

Where:

CPI_t *is the consumer price index at time t*

$INEX_t$ *is the ratio of internal to external debt at time t*

$CREDIT_t$ *is the growth rate of bank's credit to private sector at time t*

$DEFICIT_t$ *is the ratio of government's budget deficit at time t*

$RATE_t$ *is bank's lending interest rate to private sector at time t*

Nastansky et al (2014) estimated the relationship between variables by using a Vector Error Correction Model, which considers all variables as endogenous variables. The model in this paper uses five potentially endogenous variables including LNCPI, INEX, CREDIT, DEFICIT and RATE. To explore the effectiveness of monetary policy in controlling inflation, the growth rate of credit to private sector (CREDIT) variable will be added to the model, instead of the broad money (M3). This is due to the fact local banks are the major holder of government bond and the main instrument of monetary policy in Vietnam during the estimated period is to control the growth rate of bank credit and also local banks are the major holders of domestic government debt. In addition, in order to understand how fiscal policy stance with respect to domestic borrowing affects inflation, this paper will include the variable of budget deficit to GDP (DEFICIT).

3.5 EMPIRICAL RESULTS

3.5.1 Unit Root Test

In time series analysis, it is important to test for unit roots to avoid spurious relationships (Engle and Granger, 1987). This study employs Augmented Dickey Fuller (ADF) and Phillips-Perron unit root tests to investigate the integration order of the variables. The results of unit root test are indicated in Table 3.3.

Table 3.3: Unit Root Test

Variables	Augmented Dickey Fuller (ADF)			Phillips- Perron (PP)		
	Level	First difference	Integration order	Level	First difference	Integration order
LNCPI	-0.193 (2)	-4.628*** (1)	I(1)	0.233	-3.725***	I(1)
INEX	1.338 (0)	-8.282***(0)	I(1)	1.599	-8.302***	I(1)
CREDIT	-0.616 (7)	-4.271***(6)	I(1)	-1.300	-21.283***	I(1)
DEFICIT	-0.644(3)	-8.396***(2)	I(1)	-1.738	-14.616***	I(1)
RATE	-0.696(2)	-7.267***(1)	I(1)	-1.857	-5.109***	I(1)

*Note: Lags based on Akaike Information Criterion are given on parentheses. ***, **, * denotes statistic significant at the 1%, 5% and 10% levels respectively. The null hypothesis of the ADF test and PP test is that variable has a unit root*

The results of Unit root test indicate that all variables in the study are integrated of order one. Therefore, this study will apply Johansen Cointegration and Vector Error Correction Model (VECM) technique to estimate the impacts of domestic debt on economic growth in case of Vietnam

3.5.2. Vector Error Correction Model (VECM)

Lag Length Selection Criterion

To choose the set of variables to be used in the VECM, it is crucial to determine the optimal lag number. The results of Lag length selection test are presented in Table 3.4. All criterions including Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion produces optimal lag 4. Furthermore, because of the use of quarterly data and short-sample period; the maximum lag length of the VECM hence is limited to 4.

Table 3.4: Lag length selection test

Lag	Final prediction error (FPE)	Akaike information criterion (AIC)	Schwarz information criterion (SC)	Hannan-Quinn information criterion (HQ)
0	59.571	18.276	18.451	18.344
1	0.005	8.945	9.992	9.354
2	0.004	8.517	10.437	9.268
3	0.003	8.302	11.094	9.393
4	0.0004*	6.273*	9.937*	7.706*

*Note: * indicates lag order selected by the criterion*

This paper uses the Trace Cointegration test to identify the cointegration rank and follows the Pantula Principle (Pantula, 1989) to decide the relevant specification of the model in regard to the deterministic components (constant term and time trend). The procedure of this Principle starts with testing the null hypothesis of non-cointegration vector, r = 0 for the most restricted model, if the null hypothesis is rejected, the procedure will move to a less restrictive model. If the null hypothesis of non-cointegration is rejected for the most unrestricted model, the procedure will continue with the null hypothesis of at most one cointerating vector for the most restricted model and so on. The procedure will stop only until the preferred model is selected when the hypothesis is not rejected for the first time.

Table 3.5: Johansen Trace Cointegration test (4 lags)

Model 1: Intercept but no trend in the cointegration equation and in VAR

Null hypothesis	**Trace Statistic**	**Critical value (5%)**	**Eigenvalue**
None	80.274	68.52	-
At most 1	46.603*	47.21	0.429

Model 2: Linear trend in the cointegration equation and an intercept in VAR			
Null hypothesis	**Trace statistic**	**Critical value (5%)**	**Eigenvalue**
None	105.965	87.31	-
At most 1	64.277	62.99	0.501
At most 2	42.156*	42.44	0.308

The results for Johansen Cointegration test in Table 3.5 indicate the presence of at least one cointegrated equation in model 1 and two cointegrated equations in model 2. The null hypothesis is not rejected for the first time in model 1. Subsequently, Model 1 (an unrestricted intercept in the cointegrated VAR, but not a trend in the cointegrating relation) is selected based on the Pantula Principle. The result of the Trace test for model 1 provides an evidence of one cointegrating relation among the time series variables such as LNCPI, INEX, CREDIT, DEFICIT and RATE.

Long-run Cointegrating Equation for Consumer Price Index is as follows:

$$LNCPI = 0.49 + 0.03INEX + 0.751CREDIT + 0.055DEFICIT - 0.259RATE \quad (2)$$
$$(0.001^{**}) \quad (0.127^{***}) \quad (0.148^{**}) \quad (0.014^{*})$$

*Note: Standard errors of the coefficients are in the parentheses, ***, **, * indicates the test statistics are significant at the 1%, 5% and 10% level, respectively.*

As we can see in equation (2), domestic borrowing to finance budget imbalance has a significant positive effect on consumer price index in Vietnam in the long term. A 1% increase in domestic debt (relative to external debt) leads to a 0.031% rise in the consumer price index. This can be explained due to the fact that through the open market operation, commercial banks – the largest holders of Vietnamese government bonds – have often used government bonds as collaterals to obtain funding from the State Bank and in exchange they pay rediscounted interest rate to the State Bank, which increases the money base in the economy, leading to a rise in money supply and thus results in higher inflation rate. On the supply side, domestic borrowing by the government through the

sales of bonds is mainly for the investment of public sector, which largely leads a rise in demand for goods, rather than creating additional output and consequently results in unavoidable increase in the price level.

Larger budget deficit also contributes to higher price level in the long run. Specifically, a 1% expansion in budget deficit is correlated with a 0.055% increase in the consumer price index. Monetary policy variables, including the growth rate of credit to the rest of the economy and bank's lending rate, are found to significantly affect consumer prices, with expected sign. A 1% increase in the growth rate of bank credit causes consumer prices to increase by 0.751%, while a 1% higher in bank's lending rate results in a decline of 0.259% in price level. This provides evidence that inflation in Vietnam from 2000 to 2015 is not only a monetary phenomenon, but also a fiscal phenomenon in the long run, although the quantity of fiscal effect (domestic debt and budget deficit) is relative low in comparison to that of monetary effect (bank credit and lending rate).

Table 3.6 presents the result of Granger Causality test based on the VECM. The coefficient of error correction term (-0.057) in the equation of consumer price index is negative and statistically significant at 1% level, this shows that the deviation from short-run to long-run are corrected by 5.7% per quarter. In short term, only fiscal deficit and the growth rate of bank credit significantly cause the change in the consumer price index based on the Granger causality test results. Furthermore, the causality running from budget deficit to price level is significant at 5% level, while the causality from bank's credit is found to be significant only at 10% level. This suggests that the immediate effect of fiscal policy on the price level is stronger than that of monetary policy in Vietnam between 2000 and 2015. The test results also confirm a one-way causality from budget deficit to bank credit and from budget deficit to the bank's lending interest rate, indicating that the monetary policy in Vietnam is likely to change in response to fiscal policy, or that is to say there is a presence of fiscal dominance in the economy of Vietnam during the

time spans. This, in addition, suggests that larger deficit, caused directly by higher government spending, results in an increase in the aggregate demand in the short run, which in turn fuels inflation. There is also a reverse causality from the price index to budget deficit, unidirectional causality from budget deficit to the ratio of internal-external debt and from bank's lending rate to the internal-external debt ratio, meaning that the source of financing (between domestic and external source) is affected quickly by the changes in lending interest rate and budget balance.

Table 3.6: Granger Causality Test based on VECM model

Dependent variables	**Independent Variables** $\chi 2$ **— statistics of lagged first differenced term**					**ECM (-1)**
	ΔLNCPI	ΔINEX	ΔCREDIT	ΔDEFICIT	ΔRATE	
ΔLNCPI	-	6.257 (0.181)	8.869* (0.064)	10.382** (0.035)	1.279 (0.865)	-0.057*** (0.000)
ΔINEX	3.918 (0.417)	-	7.230 (0.124)	14.295*** (0.006)	13.671*** (0.008)	18.041** (0.015)
ΔCREDIT	5.361 (0.252)	5.117 (0.275)	-	18.690*** (0.001)	0.701 (0.951)	-0.475*** (0.000)
ΔDEFICIT	8.849* (0.065)	1.133 (0.889)	3.715 (0.446)	-	4.585 (0.333)	0.220 (0.949)
ΔRATE	13.947*** (0.007)	2.103 (0.717)	12.059** (0.017)	11.951** (0.018)	-	-3.603*** (0.001)

*Note: ***, **, * indicates the test statistics are significant at the 1%, 5% and 10% level, respectively. P-values are in the brackets.*

3.5.3 Diagnostic tests

The results of the diagnostic tests to check validity of the model specification are summarized in Table 3.7. The test results for residual show that the residuals are serially uncorrelated, normally distributed and homoscedastic.

Table 3.7: Diagnostic tests

Test		**P-value**
Lutkepohl Normality test Ho: residuals are multivariate normal	Jarque – Bera statistic = 2.959	0.227

White heteroskedasticity Test Ho: No cross terms	Chi-square = 39.708	0.572

Breusch – Godfrey Serial Correlation LM test

Lags	LM-statistic	P-value
1	25.819	0.417
2	27.302	0.341
3	37.076	0.057
4	*30.835*	*0.195*

Note: Null hypothesis of the LM test is that there is no serial correlation

3.5.4 The impulse response analysis

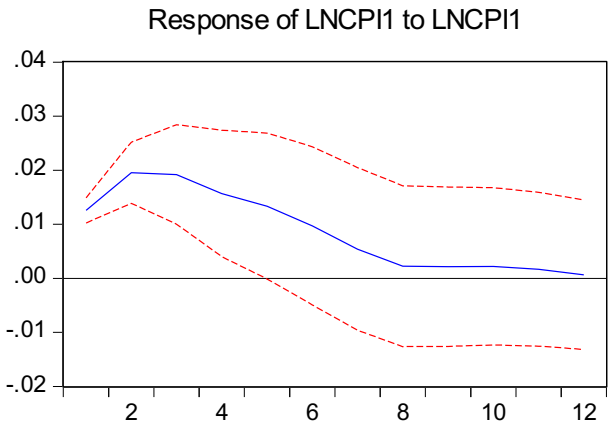
In order to analyze how consumer price level responds when there is a shock in control variables, the generalized impulse response analyzing using vector autoregressive (VAR) developed by Pesaran and Shin (1998) is applied. The main advantage of the generalized impulse responses analysis is that it is not affected by the ordering of variables.

From the results of the impulse responses function presented in Figure 3.12, it can be seen that a domestic debt shock generates directly an increasing reaction on consumer price index. Similarly, the response of the price level shock to a fiscal deficit impulse is also positive, supporting the results of VECM estimation. Interestingly, from the result of the response of inflation to domestic borrowing (INEXRATIO), it can be seen that the response of inflation to the movement of domestic debt level shows a U-shape pattern, as the positive effect of domestic borrowing on inflation decreases from the third period to sixth period, but increase again from seventh period onwards. This means that inflation respond in a larger magnitude to the movement of domestic debt level in the long-term. This might be explained by the notion that the accumulated of expensive domestic debt cause inflation to increase through the mechanism of public investment and monetary base. However, since increasing reliance on domestic borrowing with higher cost of funding would cause a decrease in fiscal space and an increase in budget burden, the

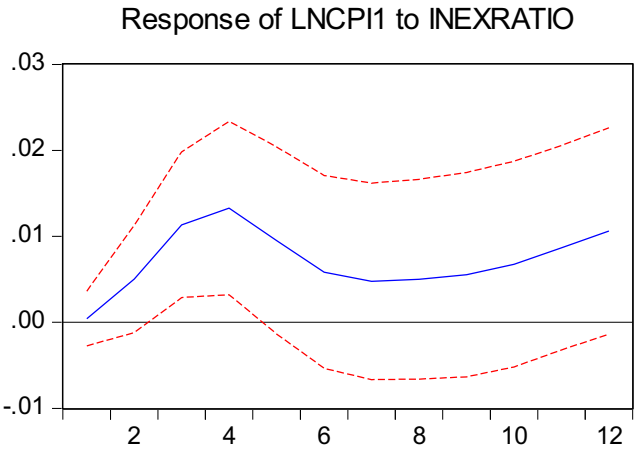
government then might increase inflation to reduce the real value of its debt burden and consequently result in further increase in the price level.

Figure 3.4: Generalized impulse response function

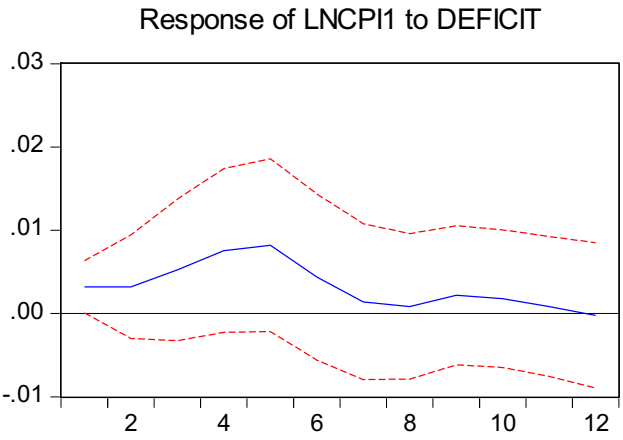
Response to Generalized One S.D. Innovations ± 2 S.E.



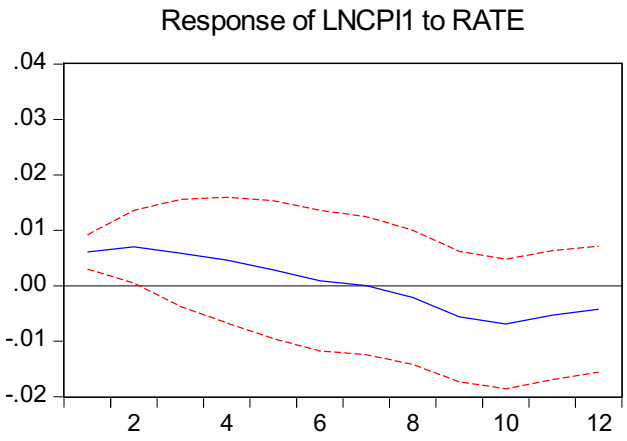
Response to Generalized One S.D. Innovations ± 2 S.E.



Response to Generalized One S.D. Innovations ± 2 S.E.



Response to Generalized One S.D. Innovations ± 2 S.E.



3.6 CONCLUSION AND POLICY IMPLICATIONS

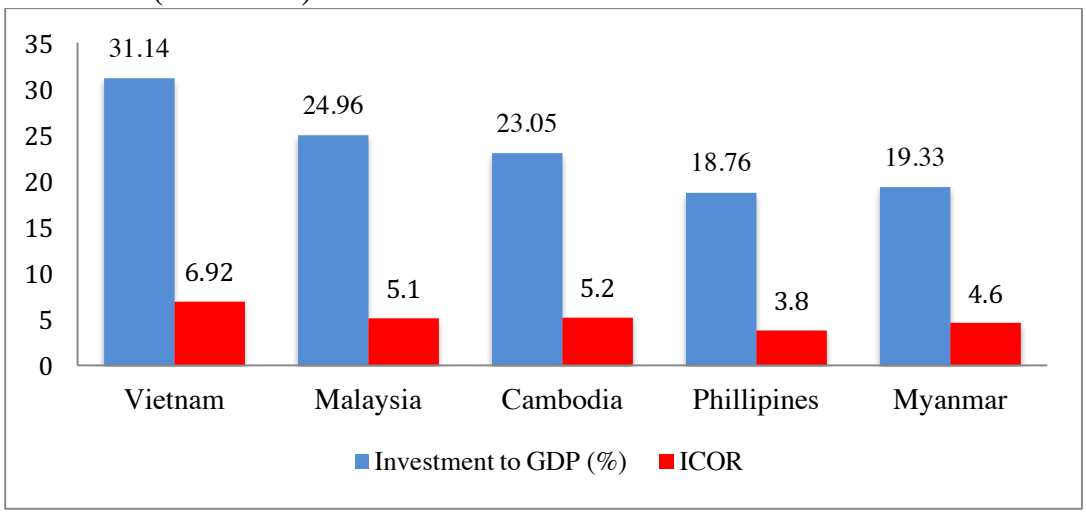
This study empirically investigates the effect of domestic borrowing (relative to external borrowing) on the consumer price index and the implication of debt financing in Vietnam over the period from 2000Q1 to 2015Q4 by applying a Vector Error Correction Model. The estimated results indicate that higher consumer price index is accompanied by both fiscal and monetary expansions in Vietnam in long run during the study period, although the effect of fiscal actions is lower than that of monetary actions. Specifically, greater reliance on internal source of financing and a further deterioration in the budget position leads to an increase in the price level. While credit channel (bank credit growth) and interest channel (lending interest rate) - as important channels of monetary transmission in the country in recent years - were also found to significantly influence the price level in long term. In particular, an increase in bank credit growth cause long-run consumer price to increase; and a rise in bank' lending rate, on the other hand, leads to a decrease in the price index.

In short run, the results of the Granger causality test confirms the presence of a bi-directional causality between budget deficit and the price level and an unidirectional causality from bank credit growth to consumer price index. The test results also suggest that fiscal policy is likely to have stronger immediate effect on consumer price level than

monetary policy. Furthermore, budget deficit is found to Granger cause the change in bank credit growth and lending interest rate in short time, confirming the possibility of fiscal dominance in case of Vietnam.

In general, the study provides evidence that an increase in internal debt relative to external debt is inflationary in Vietnam in long run, while deterioration in budget deficit is inflationary in the both short and long term. Domestic borrowing might affect long-term inflation of Vietnam through its effects on aggregate demand and the production costs, resulting in both demand-pull inflation and cost-push inflation. Indeed, during the period from 2011 to 2014, the incremental capital output ratio (ICOR) in Vietnam was 6.92 (in which the ICOR in the state sector is two or three times higher than that in private sector and FDI sector) and the ratio of investment to GDP was 31.14%, significantly higher than those of other neighboring economies such as Malaysia, Myanmar, Philippines and even Cambodia (Figure 3.5). This means that the recent economic growth of the country has required a considerable amount of investment – financed largely through the sales of domestic debt- or that is to say in order to generate an additional unit of income, Vietnam has consumed more financial resources as compared to other Asian economies which have similar stage of development. The high ICOR in Vietnam indicates the inefficiency of investment in the economy, particularly the investment of the state sector, which is financed mainly through domestic borrowings, due to the wasteful use of financial resources, poor supervision and management in the allocation of debt funding, and the corruption. This in turn contributes to the increase in not only domestic consumption but also the higher production cost, leading the rise in inflation in long-term.

Figure 3.5: Incremental capital output ratio of Vietnam in comparison with other Asian countries (2011-2014)



Source: World Bank

Furthermore, a significant correlation between monetary expansion and consumer prices was found in Vietnam, but monetary policy is not a leading indicator of inflation in short time. This renders that in Vietnam, not only monetary policy but also fiscal policy play an important role in maintaining price stability. Besides that, since 2007, the economic policy of Vietnam has mainly focused on increasing aggregate demand to boost economic growth, leading to the situation that a large part of budget deficits is financed through the domestic borrowing from local banks, new money supply then will put more pressure on inflation and the State Bank will be unable to maintain the stability of consumer price immediately.

From the policy perspective, the findings of this study highlight that greater central bank autonomy with a concentration on stabilizing inflation is an importance factor to reduce the potential effect of high budget deficit and domestic borrowing on inflation given that Vietnam cannot give up borrowing to finance its budget deficit and promote economic growth. Further research on the level of central bank independence and its relation with budget deficits and inflation should also be conducted in the context of Vietnam.

CHAPTER 4

PUBLIC DEBT AND BANKS' NON-PERFORMING LOANS IN VIETNAM

4.1 INTRODUCTION

In recent years, the continuous rising of non-performing loans (NPLs) has turned to be a major issue of concern for the global economy, especially since the start of financial crisis in 2008. It is mostly due to the fact that non-performing loan plays an important role in measuring the health and soundness of banking system as well as in predicting financial crisis (Caprio and Klingebiel, 1996; Kaminsky and Reinhart, 1999). The crisis in East Asia, especially in Thailand, Malaysia, Indonesia and South Korea in 1997-1998 offered a powerful evidence that financial crisis were preceded by huge amount of bad debts. Before the crisis, domestic banks in those countries were poorly capitalized, weakly managed and running high level of non-performing loans. The main indicator, total non-performing loans as percentage of total loans was about 50.1% in Thailand, 25% in Indonesia, 14.6% in Malaysia, and 7.4% in South Korea (Takayasu and Yokoe, 1999). Holding large quantity of NPLs, many financial institutions in those economies quickly experienced erosion in their profits and even some of them went to bankrupt during the crisis. The banking sector, in turn, faced serious risk of systemic failure.

In the Europe, since the onset of the recent crisis, the average rate of NPLs as a percentage of GDP went up from just above 3% in 2007 to more than 11% in 2011, before declining to 9 percent in 2014 (Global Financial Stability Reports). The high amount of NPLs has made European banks more vulnerable to macroeconomic shocks. Besides that, the negative feedback effects from banking sector to the real economy could place a drag on economic recovery and generate further damage. Taking into consideration the gravity of the situation, Governments in these countries have addressed the urgent resolution of the high NPLs problem as a top priority (European Bank

Coordination Vienna Initiative, 2012)[19]. In addition to that, the increase in the stock of non-performing loans following the sovereign debt crisis in Eurozone has formed a starting point for policy makers and researcher to identify the linkage between government debt and bank's non-performing loans. As pointed out in the research of Reinhart and Rogoff (2010), who examined the spillover effect from public debt crisis on banking crisis in 70 economies over a period of 2 centuries, much of banking crisis occurred during the period of public debt crisis.

Mired in the fallout from the unprecedented global economic crisis since 2008, the economy of Vietnam is now under severe pressure and threatened by aggressive level of risk related to large public debts and huge amount of non-performing loans in the banking system. According to the new calculation implemented by the Ministry of Planning and Investment, the total public debt as percentage of GDP was 66.4% in 2014, exceeding the 65% threshold set by the National Assembly. In addition to that, by December 2012, 4.05% of total loans issued by the banking system were classed as non-performing loans (State Bank of Vietnam)[20] and this reported level is far below the number reported by international rating agencies such as Moody and Fitch Ratings[21].

As the problem of NPLs threatens the sustainability of country's economy, the government of Vietnam has took certain actions to resolve the case, including issuing a 5-year financial restructuring plan and setting up Vietnamese Asset Management Corporation (VAMC). However, despite the government involvement, domestic banks are still in poor condition ridden by large amount of NPLs. In 2014, after 2 years of

[19] European Bank Coordination "Vienna" Initiative, Working Group on NPLs in Central, Eastern and Southeastern Europe, March 2012, IMF.

[20] The calculation of non-performing loans in Vietnamese banks does not conform to the international standards since it is based on 90 days overdue loans without considering repayment ability of the borrowers, collateral coverage and other factors (Point 6 of Article 2 of Chapter 1 and Point 1 of Article 6 of Chapter 2 of Decision No 493/2005/QD-NHNN dated April 22, 2005 on the classification of debts issued by the State bank of Vietnam)

[21] According to the Fitch Ratings, the ratio of non-performing loans in Vietnamese banks in September 2012 was about 15 percent.

implementing the restructuring plan and more than 1 year since the VAMC was established, the overall ratio of NPLs in the Vietnam banking sector reached a new high of 4.83% for the first time ever (SBV). This has then opened a debate among economists and the public on to what extent does the government of Vietnam properly acknowledge the roots of NPLs problem.

Therefore, the aim of this study is to examine the effect of overall public debt[22]and bank' bad debts and the determinants of non-performing loans in 32 Vietnamese banks from 2004 to 2014 by employing the dynamic system-GMM (Generalized Method of Moment) panel estimators developed Blundell and Bond (1998). Although there has been a number of works studying banking credit risk in case of Vietnam, however, this study is the first study investigating the sensitivity of non-performing loans to both macro- and microeconomic variables, with main concentration on the impact of high public debts. Apart from that, this paper may help policymakers to identify and frame the problem of NPLs and to design better reforming procedures.

The structure of this study is as follows. Section 2 provides a brief introduction of the non-performing loans situation in Vietnamese banks. Section 3 discusses a literature review about the determinants of non-performing loans. The data and Empirical methodology is presented in Section 4. Section 5 illustrates the empirical results. Finally, conclusions and policy implications are indicated in Section 6.

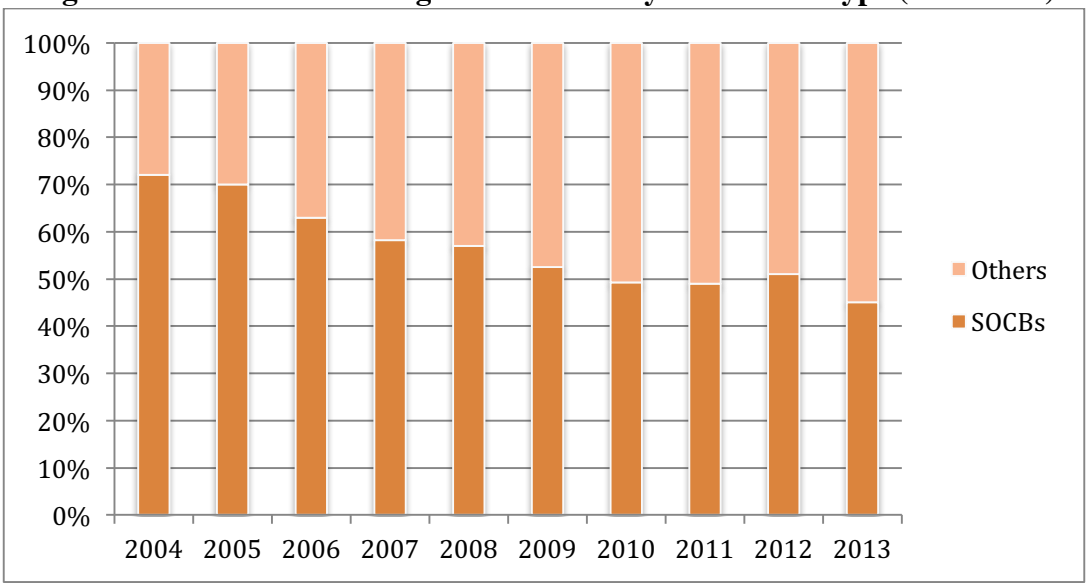
4.2 NON-PERFORMING LOANS: THE SITUATION OF VIETNAM

The banking sector of Vietnam is characterized as inefficient and constrained by under-capitalization and weak banks' balance sheet. The State-owned commercial banks (SOCBs) still dominate the market in terms of market share, total outstanding credit and deposits. According to the data of the State Bank of Vietnam, the SOCBs account for

[22] Unlike the two previous chapters which concentrate mainly on domestic debt, this chapter aims to determine the effect of total public debt of Vietnam (including external and domestic debt) due to the fact that debt owned by SOEs - largely come from external lenders- is not included into total public debt of the country and these enterprises also account for a significant part of local banks' non-performing loans.

about 44% of total banking assets in 2014 and approximately 45% of total credit market (Figure 4.1)

Figure 4.1: Vietnam Banking Sector Loans by Institution Type (% of total)



Source: State Bank of Vietnam

In the mid and late 2000s, the Vietnamese banking system experienced overheating credit growth with an average annual increase of 40%. Beginning with Vietnam's entry into the WTO, many new banks opened and a large amount of bank loans was being allocated to both the state-owned enterprises (SOEs) and private sectors. Indeed, the extraordinary upsurge of lending was mainly due to the government policy, which has been to use political influence over bank's funding to ensure that financial resources are allocated to priority industries and to consider SOEs as a pillar of the economy. According to the World Bank data, about 40% of total country's investment capital had been made to SOEs and some of 60% of bank credit was channeled to SOEs between 2004 and 2009 (Rovnick, 2012)[23].

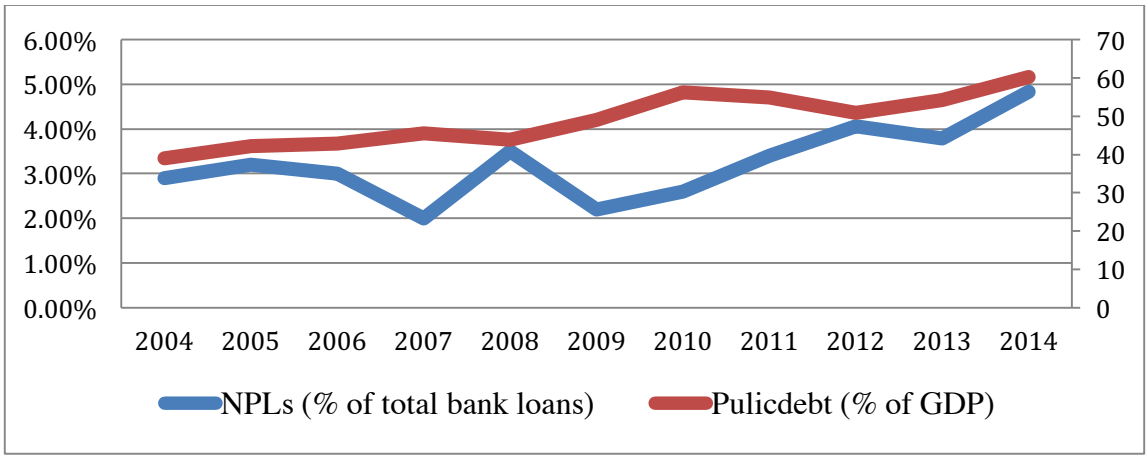
However, SOEs in Vietnam are found to be operationally less effective, financially less secure and mixture of large-scale corruption. According to the government statistics, the turnover to capital ratio of SOEs, on average, was only 1.1% in 2009, while this ratio in all businesses was much higher at 21%. These enterprises also

[23] Rovnick ,N. (2012): Inside Vietnam's hush-hush banking crisis

accounted for just 27% of GDP, 37% of profit before tax and 25% of total sales revenues. Once the global economic and financial crisis had exploded in 2008, as the national economy slowed down, the movement of SOEs into non-core markets, as encouraged by the government, failed completely. At the end of 2011, 13 state-run corporations incurred a huge loss of nearly VND 49 trillion (US 2.3 billion) and in the meanwhile, they poured a total sum of VND 23.7 trillion (contributing to 7% of total state-sector investment) in five unrelated sectors including banking, securities, real estate, investment funds and insurance[24].

Altogether, with a dramatic fall in housing prices in late 2010 and early 2011, many of bank loans turned to be non-performing, especially those made to unprofitable state-owned enterprises and real estate organizations. According to the State Bank of Vietnam (hereinafter referred to as SBV), the ratio of non-performing loans to total loans in banking market in 2011 was estimated around 3.4% in which nearly 70% of non-performing debts came from SOEs (Figure 4.2). Furthermore, the level of overall banking non-performing loans of Vietnam has been one of the Asia' highest ratio (Figure 4.3). However, this reported non-performing loans ratio was believed not to fully reflect the true troubled situation of the Vietnam's banking sector and far lower than the number of 13% estimated by International Rating Agencies (Figure 4.4).

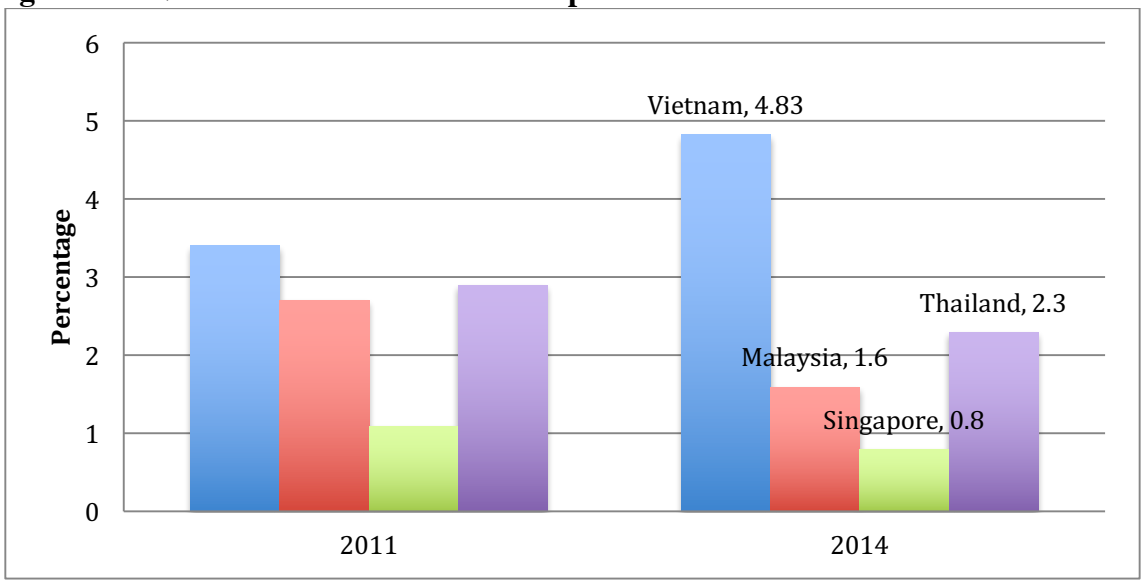
Figure 4.2: Official Non-performing loans ratio



[24] State-owned Enterprises reform in Vietnam, Ministry of Finance

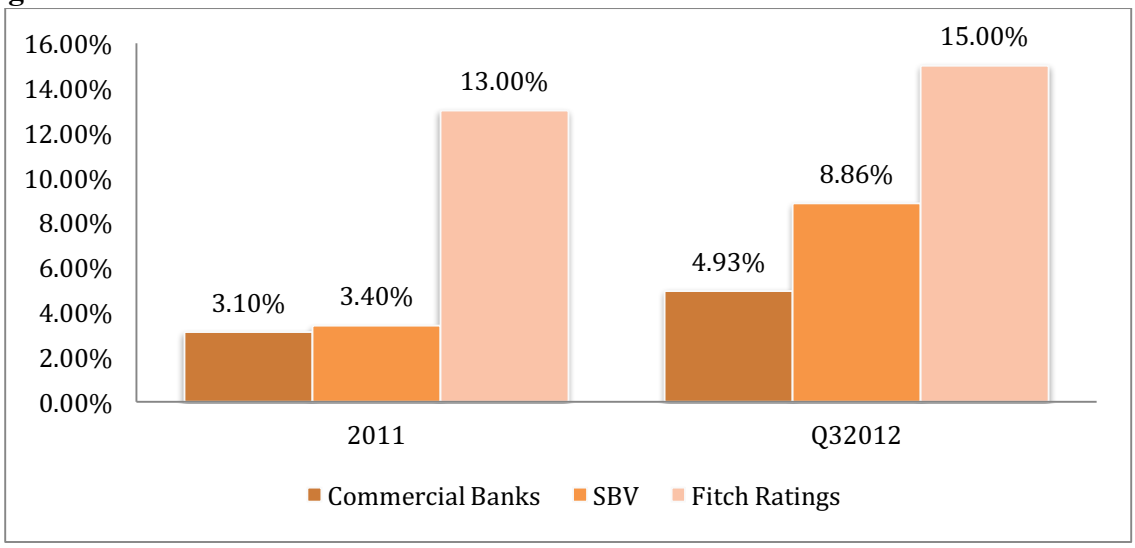
Source: SBV's official data

Figure 4.3: NPL to Total loan ratio in comparison to other countries



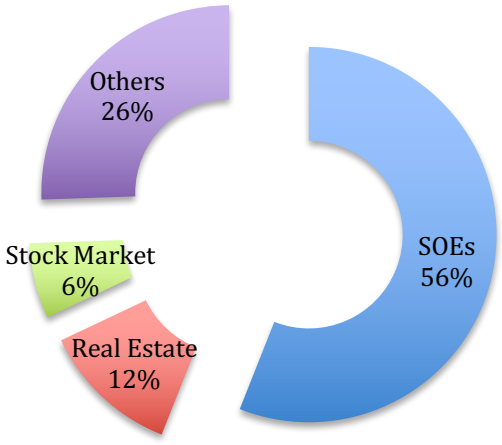
Source: World Bank

Figure 4.4: The NPL ratio from different sources



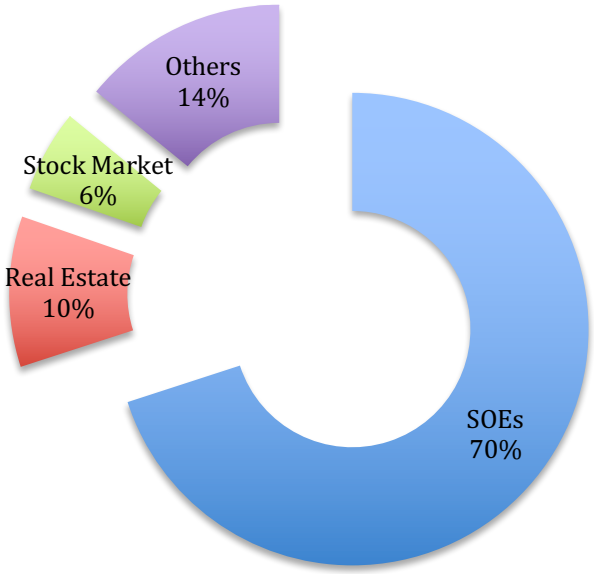
Source: SBV, Fitch Ratings

Figure 4.5: The share of banks' loans in 2011



Source: SBV, 2011

Figure 4.6: The allocation of Non-performing loans in 2011



Source: SBV, 2011

With the growing issues in the banking industry from 2011, a five-year financial restructuring plan has been issued in 2012 in an attempt to strengthen banking system - which was saddled with bad debts, and improve the market discipline. According to the plan, domestic commercial banks were classified into three groups with different level of risk: large and financially healthy banks, banks with temporary liquidity shortages, and sub-standard banks. Healthy credit institutions were instructed to enhance their competitiveness to become the pillars of the banking sector and to support credit institutions that lack liquidity or acquire less well-performing banks. Banks that lack liquidity were refinanced directly by the Central Bank to enhance their solvency and get back to normal. Sub-standard banks were given access to special loans from the State Bank and other banks but under the strict supervision of the State Bank, merged into others or, acquired by stronger healthy banks on a voluntary manner.

In addition to that, the Vietnamese government also created a state-run debt management company called Vietnamese Asset Management Corporation (VAMC) in

2013 to handle the high level of NPLs. The main responsibilities of the company are purchasing bad loans from local banks and restructuring them. In exchange, domestic banks will be provided with special interest-free bonds issued by VAMC with duration of up to 5 years and a face value equal NPL's book value. These bonds can be repurchased (repo) at 70% of the net value with the SBV for liquidity.

Since the creation of VAMC in 2013, about VND 243 trillion (US 10.6 billion) worth of bad debts has been acquired, meanwhile only VND 22.7 trillion in NPLs, or nearly 10% of total bad debt managed by VAMC have been restructured or sold. The maximum tenor of special VAMC bonds is only 5 years, meaning that after 5 years if VAMC cannot restructure the debts, they will be returned to the banking system. It, therefore, emerges clearly that VAMC only help Vietnamese banks to offload bad debts from their balance sheet and enhance liquidity for a limited time.

Moreover, despite the implementation of banking restructuring plan and the operation of VAMC, the problem of non-performing loans still persist in the banking industry. As end of 2013, the overall level of NPLs declined slightly from 4.06% in 2012 to 3.79%. However, this downward trend was reversed immediately in 2014, as NPL ratio increased back to a new highest level of 4.83% (SBV's official data), approximately equals only one-third the percentage estimated by international rating agencies.

As bad debts continue to accelerate in Vietnam, concerns have been raised regarding how VAMC can solve and restructure the debts and does the company fully help the banking market to handle the origin of non-performing loan problems. According to the FT Confidential Research[25], the much-trumpeted decline of the official Vietnam's NPLs rate in 2013 does not mean that bad debt has been resolved or paid off; it has simply been shifted from one balance sheet to another. Consequently, if the government does not appropriate take a tough stance to address this issue, the repeated emergence of non-performing loans will be inevitable and just a matter of time.

[25] "Vietnam's troubled banking sector – no easy fix". FT Confidential Research, 2015

4.3 LITERATURE REVIEW

There are two sets of influencing factors, which have been the subject of recent empirical studies on the determinants of non-performing loans, including bank-specific factors and macroeconomic factors.

4.3.1 Bank-specific factors

Cost inefficiency (as measured by cost to income ratio)

Within the inefficiency literature, there have been several hypotheses that link bank's credit quality with cost inefficiency, including "bad luck" hypothesis, "bad management" hypothesis and "skimping" hypothesis (Berger and DeYoung, 1997).

Bad luck hypothesis predicts that non-performing loans and bank inefficiency are positively related. That is, under adverse economic circumstances, which are beyond the control of banks, the amount of non-performing loans for banks is likely to increase. Banks, then, have to spend more resources to deal with failing loans and this, in turn, causes an increase in cost inefficiency.

Similarly, the positive relationship between NPLs and cost inefficiency is also suggested by *bad management hypothesis* but with the opposite temporal ordering. Under this hypothesis, low level of bank efficiency increases the amount of non-performing loans after a lag. Given the argument that in poor managed banks, lower level of cost efficiency indicates lower quality of senior managers who have difficulties in controlling operating costs, monitoring loan portfolio as well as evaluating credit risk, the quality of bank credit then will be hampered by inadequate allocation of resources.

In contrast, the *skimping hypothesis* assumes the reverse connection between NPLs and cost inefficiency. Under the skimping hypothesis, the amount of financial resources allocated to monitor credit risk affects both the level of risky loans and cost inefficiency. There always exists a trade-off between short-term operating costs and long-term bad loans. Banks may devote fewer resources to loan portfolio management, even if this causes a higher volume of non-performing loans in the future. As a result, banks

appear to be cost efficient in the short run, but there will be a growing amount of non-performing loans in the long-term. Thus, under skimping hypothesis, low cost inefficiency may escalate the level of non-performing loans.

Hypothesis 12: Higher cost to income ratio is associated with lower level of bank's non-performing loans.

Bank's size effect

Salas and Saurina (2002) estimate dynamic panel GMM model and find an evidence of negative correlation between bank's size and NPLs in Spanish commercial and savings banks from 1985 to 1997. The authors explain that large banks are likely to hold relatively less risky portfolios since they tend to be more diversified in lending activities than the small ones. This finding is consistent with the studies of Hu, Li and Chiu (2004) who have shown that the level of non-performing loans in Taiwanese commercial banks from 1996 to 1999 decrease as the government ownership in domestic banks increases based on the results of both random-effects and fixed-effects model. On the opposite direction, Stern and Feldman (2004) argue that large banks, that have government backing in case of losses due to too big to fail policies, may have incentives to take on excessive risk and this may results in the growth of NPLs.

In Vietnam, Government intervention in banks' credit decision-making through directed lending to failing SOEs has decreased in recent years but still persist. The four largest State-owned commercial banks (SOCBs) somewhat rely on political connections in determining loan access and are encouraged to provide large lending to state-dominated and favored industries. The traditional customers of the SOCBs are SOEs, while Join-stock commercial banks give more emphasis to Small and Medium Enterprises. In the meantime, big banks in Vietnam also have government supports in case of difficulties due to its' systemically important and quasi-policy roles in domestic economy. Consequently, the overall impact of bank's size on non-performing loans in Vietnamese banks is expected to be ambiguous.

Hypothesis 13: Bank with larger size tends to incur lower non-performing debts due to government's financial supports.

Return on Asset

Return on Asset measures performance efficiency of a bank in generating profits from total assets and the higher ratio of ROA, the better management is in utilizing bank's asset base. The existing studies have found contradictory evidence on the effect of bank's profitability on NPLs ratio.

Boudriga et al (2009) in the study of 46 commercial banks from 12 Middle East and North Africa countries between 2002-2006 using a random-effects panel model and Selma and Jouini (2013) in case of 85 banks in Italy, Greece and Spain from 2004 to 2008 through the application of fixed-effects method, find that bank's earnings and NPLs ratio are negatively correlated. One possible explanation for this relationship is that profitability deterioration may induce banks to take riskier portfolio strategy, resulting in higher level of NPLs. Meanwhile, better performance in the past might reduce the pressure that banks are under to make higher profit and mitigate the exposure of banks to credit risk, which in turn will results in lower NPLs.

In contrast, according to Rajan (1994), an increase in current profit may result in a growth in the level of NPLs in the future because bank's managers may convince potential investors regarding profitability, financial position and future prospects of the economy; and uses a more lenient credit policy to keep income flowing, which leads to the current cost efficiency and future increase of NPLs.

Hypothesis 14: Banks which have higher profit (i.e. higher return on asset ratio) have lower ratio of bad debts.

4.3.2 Macroeconomic effects

Economic growth

Economic growth may have a negative relationship with the NPLs. This is mainly due to the fact that economic growth improves debt servicing capacity of the borrower,

consequently level of NPLs will decrease (Pestova and Mamonov ,2012; Klein, 2013; Salas and Saurina, 2002; Louzis, Vouldis and Metaxas, 2010; Nkusu, 2011)

Hypothesis 15: Economic growth leads to a decline in the level of non-performing loans of local banks.

Public debt

In recent years, there have been an increasing number of literatures on the relationship between sovereign debt and non-performing loans of banks. According to these studies, large public debt can lead to an increase in bad debts in the banking sector through two channels.

The first channel is through the liquidity effects as indicated in the study of Reinhart and Rogoff (2010), who analyzed the link between public debt crisis and bank crisis by using a dataset of 70 economies spanning over 2 centuries and emphasized that in most cases acceleration in public debt is an antecedent to banking crises. The authors explained that public debt might decrease bank's credit rating and increase bank's funding costs. Operating under the pressure of liquidity, domestic banks have to limit their lending and as borrower cannot refinance their debts, non-performing loans might increase.

The other channel is associated with the crowding out effects on government spending. Building on the theory of crowding out effects, Perotti (1996) argued that high level of public debt would force the government to pursue a strict fiscal policy to diminish its expenditures (wage and social benefits). As a result, borrowers' income would decrease considerably, leading to the deterioration in their debt servicing ability and non-performing loans therefore might increase.

Along with empirical studies, public debt crisis over a period from 1978 to 1998 would fully support the linkage between banking crisis and debt crisis. Table 4.1 classifies the 39 debt crisis episodes that happened between 1978 and 1998 into 4 groups. These are public debt crisis only, banking and currency crises both occurred during debt

crisis, banking crisis occurred during debt crisis, and finally currency crises started with debt crisis. Surprisingly, above 64 percent of sovereign crisis episodes experienced a banking crisis.

Table 4.1: Incidence of Public Debt crisis

	Public debt crisis only	Debt, Banking and Currency crises	Debt and Banking crises	Debt and Currency crises
Observations (total 39)	3	19	25	30
Percent	-	48.7%	64.1%	76.9%

Source: Bank of England[26]

In Vietnam, during periods of public debt expansion, the government might limit their spending by reducing financial support (for example: loan guarantees, additional capital, and debt repayment extension or debt transfer) for SOEs. Given that about 60 percent of bank loans is held by SOEs, which appear to be inefficient and poorly managed, the decline in financial assistance from the government would make loan repayment highly difficult.

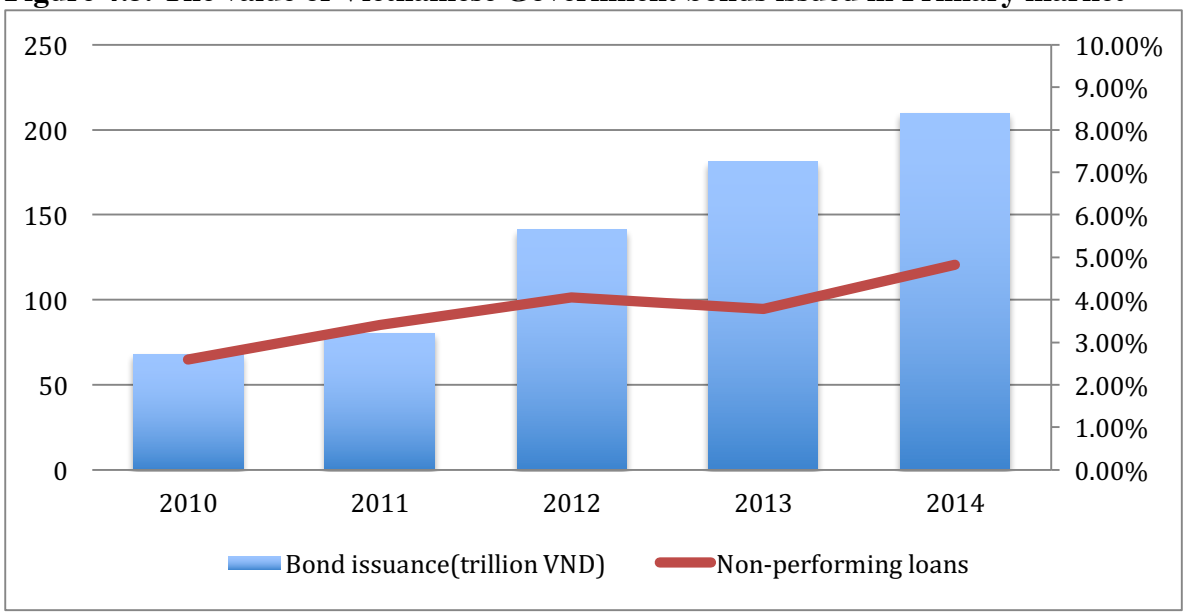
However, it should be noted that during economic downturn, Vietnamese banks have increased their holding of government debt (in form of sovereign bonds) to diversify overall portfolio and reduce risk. According to the Ministry of Finance, at the end of 2013, about VND 181 trillion (US$ 8.2 billion) of government domestic debt were mobilized in the primary market, more than double in comparison to 2011 (Figure 4.8). The debt market surged partly in response to the increasing demand from local banks, which hold nearly 90 percent of all government bonds. Given the weak economic environment and excessive accumulation of non-performing loans in the banking system in 2011, the State bank of Vietnam assigned credit growth limits of 12 percent to each local bank for the full year of 2013. Then, instead of lending, Vietnamese banks have turned to investing in government bonds, which are considered as very liquid assets. Investing in Government

[26] Paoli et al (2009): "Output cost of sovereign crises: some empirical estimates". Working paper No 362. Bank of England.

debt with a constant flow of income would give banks less incentive to lend to risker projects and as a result, non-performing loans might be reduced.

Hypothesis 16: The correlation between public debt and non-performing loans in Vietnam is positive.

Figure 4.8: The value of Vietnamese Government bonds issued in Primary market



Source: Ministry of Finance

Credit to government and state-owned enterprises

The link between bank's credit and NPLs has been indicated in several existing studies. For example, Nkusu (2011) accesses the effects of macro-financial fluctuations on the ratio of NPLs by using a panel vector autoregressive model for a sample of 26 developed countries over the period from 1998 to 2009. The author finds that in economic booms, higher lending as a percent of GDP causes contemporaneous NPLs to decrease, but the magnitude of this effect is quite weak. Given the fact in economic fortunes, due to competitive pressure and optimism about the economic prospects, credit standards are being eased and debtors can easily apply for additional loans to refinance previous debts and therefore the likelihood that they would run into debt troubles might be diminished.

In case of Central, Eastern and South Eastern Europe from 1998 to 2011, Klein (2011) show that an increase in the ratio of bank loans to assets positively links with growth in NPLs after a lag based on the results of the fixed effects and difference GMM

estimations. This is due to the fact that excessively high credit growth during economic upturns can be interpreted as indicative of inappropriate risk management and a loosening of lending standards and therefore it would have a lagged positive effect on NPLs. This finding is in line with the results reported in Espinoza and Prasad (2010) for 80 Banks in the Gulf Cooperative Council region over the period from 1995 to 2008. Using a number of econometric estimations including OLS, fixed effects, difference GMM, system GMM and a panel VAR model, they discover that the second lag of loan growth reduce the borrower's ability to repay a bank loan by increasing their debt burden and hence may lead to a higher NPLs ratio.

In case of emerging economies between 1996 and 2010, De Bock and Demyanets (2012) apply a system GMM model and provide some evidence that the ratio of foreign portfolio and bank flows to GDP - as an indicator of foreign funding for credit growth – has significant negative correlation with banks impaired loans, while the ratio of bank credit to private sector to GDP is weakly significant with a positive sign.

Unlike previous studies, this paper uses the ratio of credit to government and State-owned Enterprises to GDP since these enterprises accounted for nearly 60% of total bank's loans in 2011 and about 70% of bank's non-performing loans belonged to them, while in other countries, especially in emerging European economies, high ratio of non-performing loans comes from by Small and Medium Enterprises.

Hypothesis 17 : An increase in credit to the state sector and SOEs raise the non-performing loans of banks.

Production inefficiency of SOEs

Performance of SOEs is measured by the ratio of State budget-funded investment in SOEs to GDP of the SOEs. The higher the ratio of investment to GDP, the worse performance of the SOEs is.

The government of Vietnam has addressed the role of SOEs as a leading force of national economy. Since the beginning of 2000s, the degree of openness of the Vietnamese economy has increased significantly in terms of both trade and foreign capital flows. In order to compete with foreign counterparts, the government has encouraged SOEs to expand outside their core operating business into unrelated markets through preferential supports such as high proportion of state budget-funded investment, low-interest and large bank loans. According to the statistic of the General Statistics Office (GSO), in 2012, SOEs contributed to more than 50% of total state budget-funded investment, while accounted for just about 30% of the country's GDP and also the share of state-run company loans of total bank loans was about 60%.

However, the leaders or managers of SOEs in Vietnam were appointed by political appointees and characterized as bureaucrats rather than entrepreneurs. Therefore, it will become increasingly obvious that the larger financial resources government pours into SOEs (whose directors are not experienced and qualified enough in handling and controlling such large amount of money), the higher losses occur. An interesting evidence for that point of view is $1.5 billion of wrongful spending made by SOEs and nearly $9 billion of non-performing loans owned by SOEs (equals 70% of the country's total bad debts) in 2012 (Government report, SBV).

Hypothesis 18: Since the loans for state-run companies account for nearly 60% of total loans provided by all banks in Vietnam, higher production inefficiency of SOEs is associated with increased future NPLs.

Table 4.2: Previous studies on the determinants of NPLs

Study	Methodology	Data sample	Main Findings
Atlunbas et al (2007)	Seemingly Unrelated Regression (SUR) approach	European banks, 1992-2000	Skimping hypothesis
Berger and DeYoung (1997)	Panel Granger causality framework	US commercial banks, 1985 - 1994	Bad management, bad luck, moral hazad hypothesis
De Bock and Demyanets (2012)	System GMM model	25 Emerging economies, 1996-2010	Credit to private sector (+), foreign portfolio and bank flows (-), term of trade growth (-), US dollars per national currency (-)
Espinoza and Prasad (2010)	OLS, fixed effects, difference GMM, system GMM	80 Banks in the Gulf Cooperative Council, 1995 - 2008	Second lag of credit growth (+) , non-oil GDP growth (-), VIX (+), first lag of cost to average asset ratio (+)
Fiordelisi et al (2011)	Panel Granger causality framework	26 European Union countries, 1995-2007	Bad management effect
Klein (2013)	Panel VAR analysis	CESEE countries, 1998-2011	Change in credit to GDP ratio (-), GDP growth rate (-), unemployment rate (+), inflation rate (+)
Kwan and Eisenbeis (1997)	Simultaneous equation framework	352 banking organizations in US, 1986-1991	Bad management hypothesis
Louzis, Vouldis and Metaxas (2010)	Baseline model	9 Greek commercial banks, Q12003-Q32009	Bad management, size effect hypothesis, GDP growth rate (-), Unemployment rate (+), Real interest rate on commercial loans (+)
Mamonov (2012)	One-step difference GMM procedure for	500 banks in Russia (85-90% of total	Bad management

	dynamic panel data	assets), 2004Q1-2011Q2	
Makri, Tsagkanos and Bellas (2014)	GMM difference estimation	14 European countries, 2000-2008	Public debt to GDP ratio (+), GDP growth rate (-), unemployment rate (+)
Quagliariello (2007)	GARCH model	900 intermediaries in Italy, 1990Q1-2005Q1	Industrial production change (-), Inflation uncertainty (-), share price change (-)
Rossi, Schwaiger and Winkler (2005)	Granger causality framework	278 banks from 9 transition economies, 1995-2002	Bad luck, skimping hypothesis, GDP growth rate (-), volatility of official exchange rate (+), real lending rate (+)
Salas and Saurina (2002)	Arellano-Bond (1988) model (dynamic panel model)	Spanish commercial and saving banks, 1985-1997	Moral hazard, size effect hypothesis, GDP growth rate (-), household debt to GDP (-) for saving banks, debt-equity ratio (+) for saving banks
Williams (2004)	Granger causality framework	European savings banks, 1990-1998	Bad management
Vogiazas and Nikolaidou (2011)	Least Squared regression	Bulgarian economy, 2001-2010 (monthly data)	Unemployment (+), Loan growth (-), Third lag of Reall Effective Exchange rate (-), Global financial crisis (+)
Vo, Le and Ho(2014)	Panel regression model	8 listed banks in Vietnam (50% of total assets), 2008Q4-2013Q2	GDP growth rate (-), lending rate (+)

4.4 DATA AND EMPIRICAL APPROACH

4.4.1 Data

This study will use a panel dataset of 32 Vietnamese banks, including 4 State-owned banks and 28 joint stock commercial banks over the period from 2004 to 2014. The list and description of variables used are indicated in Table 4.3 and Table 4.4.

Table 4.3: List of sampled banks

No	Name of Bank	Bank type	Data period
1	VietinBank	SOCBs	2004-2014
2	VietcomBank	SOCBs	2004-2014
3	Bank of Investment and Development of Vietnam	SOCBs	2004-2014
4	AgriBank	SOCBs	2004-2014
5	Military Bank	JSCBs	2004-2014
6	SacomBank	JSCBs	2004-2014
7	Saigon-Hanoi Bank	JSCBs	2006-2014
8	Asia Commercial Bank	JSCBs	2004-2014
9	TechcomBank	JSCBs	2004-2014
10	EximBank	JSCBs	2004-2014
11	Vietnam Prosperity Bank	JSCBs	2004-2014
12	Saigon Commercial Bank	JSCBs	2006-2010,2012-2014
13	Housing Development Bank	JSCBs	2006-2014
14	DongA Bank	JSCBs	2004-2014
15	Vietnam International Bank	JSCBs	2004-2014
16	KienlongBank	JSCBs	2004-2014
17	MaritimeBank	JSCBs	2006-2014
18	SouthernBank	JSCBs	2005-2013
19	SeaBank	JSCBs	2004-2014
20	LienVietPost Bank	JSCBs	2008-2014
21	AnBinh Bank	JSCBs	2009-2014
22	OceanBank	JSCBs	2008-2014
23	Mekong Development Bank	JSCBs	2008-2014
24	Saigon Bank for Industry and Trade	JSCBs	2008-2014
25	Orient Commercial Bank	JSCBs	2006-2014
26	National Citizen Bank	JSCBs	2005-2014
27	NAM A Bank	JSCBs	2004-2014
28	Viet A Bank	JSCBs	2004-2014
29	PG Bank	JSCBs	2006-2014
30	WesternBank	JSCBs	2004-2012
31	Dai A Bank	JSCBs	2007-2012
32	Viet Capital Bank	JSCBs	2006-2014

Note: SOCBs refers to State-owned Commercial Banks, while JSCBs refers to Joint Stock Commercial Banks

Table 4.4: Definition of Variables

Variables	Definition	Source	Expected sign
NPL(-1)	Lagged of the logit transformation of the non-performing loans to total loans ratio	Bank's annual report	(+)
DEBT	Net public debt to GDP ratio	Ministry of Finance	(+)/(-)
INFSOE	Inefficiency of State-owned Enterprises	Vietnam General Statistics Office	(+)
GDP	The annual growth rate	WDI	(-)
CRESOE	Credit to government and State-owned Enterprises to GDP	Global Financial Development	(+)/(-)
SIZE	Bank's asset to total banking asset ratio	Bank's annual report	(+)
ROA	Pre-tax profit to total asset ratio	Bank's annual report	(-)
COST	Cost to income ratio	Bank's annual report	(+)/(-)
Dummy Variables			
YR2008	Dummy variable for year 2008 (Financial crisis)		(+)
YR2011	Dummy variable for year 2011(Housing bubble burst)		(+)
YR2013	Dummy variable for year 2013 (Creation of VAMC)		(-)

4.4.2 Methodology

Based on the existing literature, the empirical estimation of non-performing loans' determinants is as followed:

$$y_{it} = \alpha y_{i,t-1} + \beta X_{i,t-1} + \theta M_{t-1} + \delta X_{i,t} + \gamma M_t + \sigma_t + \rho_i + \varepsilon_{it}, \quad |\alpha| < 1,$$

Where:

y_{it} is the logit transformation of the NPLs ratio of bank i at time t, (i.e. $\log(\frac{NPLs}{1-NPLs})$)

$y_{i,t-1}$ is the lagged logit transformation of the NPLs ratio of bank i,

X_{it} is a vector of bank-specific factors

$X_{i,t-1}$ is a vector of lagged bank-specific controls

M_t is a vector of macroeconomic variables

M_{t-1} is a vector of lagged macroeconomic factors

σ_t is sets of time dummies

ε_{it} is disturbance term

ρ_i is a bank effect

When analysing the relationship between NPLs and macro- and micro-factors, several issues may arises such as:

- Causality may run in both directions;
- Possibility of autocorrelation between lagged dependent variable and the fixed effect which may result in dynamic panel bias;
- Difference between T (time) and N (number of banks) dimensions in the dataset. There are more banks (N) than years (T).

The OLS technique is not suitable for the estimation of a dynamic panel model because of strict exogeneity of the regressors assumption and the correlation between lagged dependent variable ($y_{i,t-1}$) and the disturbance term (ε_{it}) which may causes the OLS estimates to be biased and inconsistent.

The system-generalized method of moments (GMM) estimators as extent developed by Blundell and Bond (1998) are the most appropriate amongst its counterparts to overcome the above problems by instrumenting the predetermined and endogenous variables with their own lags (Bond, 2002; Roodman, 2006; Sarafidis et al., 2006 and Baltagi, 2008). The system-GMM estimators have one-step and two-step variants. Although the two-step system GMM theoretically is considered more efficient than one-step estimates, there is some evidence that two step standard errors tend to be biased downwards in small samples while those for one-step counterpart are effectively unbiased (Arellano and Bond, 1991). In addition, one of the main weaknesses of the system-GMM is the presence of too many instrument sets whose number increases quadratically with T. This potentially causes the two-step system GMM models less reliable for making inference. A large instrument count in system

GMM estimates is likely to overfit endogenous variables and weaken the correctness of estimation results (Roodman, 2008).

Therefore, in what follows the study will employ one-step system GMM estimator with robust standard error and the collapsing method as suggested in Roodman (2009) to decrease the instrument count. The lag range used in the instrument matrix is also restricted between lag 2 and lag 4 and in order to ensure that time specific effects do not drive the results; year dummies are included in the study as exogenous instruments.

The validity of instruments is tested using the Hansen test of over-identifying restrictions (Arrelano and Bond, 1991). First-order and second-order serial correlation related to the estimated residuals in first differences is tested using AR(1) and AR(2) statistics. The system GMM estimator is consistent and efficient if there is no second-order serial correlation in the residuals (AR(2) test) and the instrumental variables are valid (Hansen test).

4.5 ESTIMATION RESULTS

4.5.1 Summary statistics

Table 4.5 shows the statistical summary of variables used in the study. Total number of observations for each variable is 310.

Table 4.5 Descriptive statistics

Variables	Unit	Obs	Mean	Standard deviation	Minimum	Maximum
NPL	%	310	2.22	1.88	0	15.7
DEBT	%	310	49.72	6.26	38.95	60.3
INFSOE	%	310	13.85	9.02	5.58	37.56
GDP	%	310	6.31	0.92	5.25	8.46
CRESOE	%	310	9.56	1.79	6.13	13.41
SIZE	%	310	3.54	5.32	0.02	29.57
ROA	%	310	1.29	0.85	0	5.96
COST	%	310	47.48	15.37	16.26	99.45

4.5.2 Correlation matrix

Table 4.6 shows the correlation coefficients of the variables used in this study. From this result, it can be seen that the correlation coefficients between explanatory variables are relatively low except for the relationship between GDP and DEBT (-0.52), GDP and CRESOE (-0.69), and ROA and COST (-0.61).

Table 4.6 Correlation matrixes of key variables

Variables	NPL	DEBT	INFSOE	GDP	CRESOE	SIZE	ROA	COST
LNPL	1.00							
DEBT	0.26	1.00						
INFSOE	-0.06	-0.14	1.00					
GDP	-0.33	-0.52	-0.27	1.00				
CRESOE	0.34	0.66	-0.21	-0.69	1.00			
SIZE	0.16	-0.07	-0.002	0.04	-0.08	1.00		
ROA	-0.29	-0.29	0.09	0.25	-0.38	-0.24	1.00	
COST	0.19	0.24	-0.06	-0.27	0.39	-0.03	-0.61	1.00

4.5.3 Determinants of Non-performing loans

The empirical results on the determinants of non-performing loans for the whole sample are indicated in Table 4.7 and for Joint Stock Commercial banks are in Table 4.8. The results for both all sample and sub-sample of JSCBs indicate that the Hansen test of over-identifying restrictions fails to reject the null-hypothesis that the instruments as a group are exogenous, meaning that there is no problem with the validity of instruments used in the estimations. The AR(1) test for autocorrelation of the residuals rejects the hypothesis that the errors are not auto- correlated in first order, while the AR(2) test cannot reject this hypothesis in the second order. Therefore, the system GMM estimators used in this study are consistent.

In general, macroeconomic factors appear to be important determinants of banks' non-performing loans, while bank-specific indicators are shown to exert no significant impact on the quality of bank's credit for the entire sample. Surprisingly, the creation of Debt Management Company (VAMC) – as proxied by YR2013 variable - has been shown to not have any statistically significant effects on banks' NPLs.

The lagged non-performing loans have a positive and statistically significant coefficient (ranging from 0.46 to 0.93) across all estimated models. This indicates an evidence of high auto-correlation of NPLs as expected and the Vietnam's banking sector is likely to be adversely affected (prolonged) by a shock to NPLs.

Contrary to other previous studies mentioned above, government debt burden, as measured by the ratio of overall public debt to GDP, was found to be negatively correlated with contemporaneous non-performing loans, but positively correlated with future one. This might be explained by the fact that in Vietnam during weak economic conditions saddled with high stock of bad loans, an increase in government debt is associated with the rising demand for a safe investment instrument from local banks to remain their liquidity and profitability. Furthermore, given that Vietnam's regulation on government public debt does not include the debt of the SOEs[27], SOEs, as major customers of SOCBs, still receive strong financial support such as debt repayment extension or debt transfer from the government when they are run into troubles and all these supportive methods would be directly counted in the public debt. Or that is to say, the risky debt is simply transformed from SOEs to the government. Therefore, an increase in public debt would leads to a decrease in the current level of non-performing loans in banks.

[27] According to the Article 1 of Chapter 1 of the Law on Public debt management No 29/2009/QH12 issued by the Vietnam National Assembly in June 17th 2009, Vietnam public debt includes Government debt, Local government debt and Government guaranteed debt.

The most vivid example would support this view is that in 2007, the overdue debts and non-performing debts at Vietnam Development Bank (VDB) reached a high level of 8.9%, but then quickly decreased to a lower value of 3.75% in 2009. This falling down of NPLs' ratio was mostly due to a demand stimulus package of the Government which allowed VDB to raised their fund by issuing valuable papers and receiving ODA for lending and extending SOEs' debt repayment (The Saigon Times Daily, 2012)[28]. Those are the loans that the Vietnamese government has guaranteed to repay to the creditors, or in other words they are public debts. As a result, the ratio of public debt to GDP of Vietnam rose significantly during that time from 45.6% in 2007 to 49 % in 2009 (MOF).

Nonetheless, to the extent that high level of public debt could crowd out government spending with an adverse consequence on the capacity to rollover bank loans of borrowers, specifically the SOEs, high public debt then would result in larger subsequent period's NPLs. Another explanation for positive relationship between the level of public debt and NPLs in the next period is that high public debt might cause sovereign credit rating to decrease and thus has adverse effect on bank's credit rating and bank's funding costs consequently might go up. Operating under the pressure of liquidity, domestic banks have to limit their lending and as borrower cannot refinance their debts, non-performing loans might increase

The estimations also show that economic growth is negatively related to NPLs. This is consistent with previous findings, which suggest that economic growth enhances a borrower's ability to repay their debt and as a result, NPLs will be reduced. However, unlike most of the previous literature, the effect of past economic growth on current NPLs is positive and significant. Perhaps because of higher GDP growth rate leading to increasing optimism about economic outlook, local banks in Vietnam are likely to boost their lending by relaxing credit standards on loans to gain market

[28] "The National Assembly warns against SOE debts". The Saigon Times, 2012.

share and increase profit. This excessive lending can be a matter of poor and inefficient credit risk management, which causes NPLs to increase in the future. The results also suggest that economic growth only has a short-lived positive effect on the evolution of non-performing loans in Vietnam.

As expected, the performance of SOEs (INFSOE) also contributes to the movement of NPLs in Vietnamese banks: the more inefficient a SOEs is, the more non-performing loans a bank has. Credit to SOEs and the government appears to have no effect on the level of bank's non-performing loans. This might due to the fact that this variable cannot capture the exact amount of each bank's loans located to the SOEs.

The bank-level factors such as ROA, bank size and cost-to-income ratio were not found to have any significant influence on bank's credit risk in all bank's estimation.

Table 4.7: Determinants of Non-performing loans (All Banks)

Variables	One-Step System GMM			Two-Step System GMM		
	1	2	3	4	5	6
NPL(-1)	0.577***	0.457**	0.926**	0.623***	0.582***	0.912**
	(0.001)	(0.048)	(0.011)	(0.000)	(0.000)	(0.020)
DEBT	-0.033**	-0.041*		-0.031*	-0.037*	
	(0.028)	(0.069)		(0.079)	(0.060)	
DEBT(-1)	0.082***	0.119**		0.076***	0.100**	
	(0.000)	(0.012)		(0.001)	(0.011)	
INFSOE(-1)	0.011**		0.029***	0.010*		0.027***
	(0.010)		(0.002)	(0.052)		(0.001)
GDP			-0.523***			-0.468**
			(0.003)			(0.016)
GDP(-1)			0.280**			0.275**
			(0.039)			(0.039)
CRESOE(-1)		-0.039			-0.074	
		(0.434)			(0.221)	
SIZE(-1)	0.015			0.015		
	(0.263)			(0.277)		
ROA(-1)	-0.171	-0.035	-0.359	-0.168	-0.029	-0.356
	(0.253)	(0.868)	(0.221)	(0.117)	(0.829)	(0.272)
COST(-1)		0.010			0.133*	-0.004
		(0.372)			(0.077)	(0.710)

YEAR2008	0.805***	0.648**	0.853**	0.934***	0.821***	0.841**
	(0.001)	(0.044)	(0.042)	(0.001)	(0.009)	(0.020)
YEAR2011		-0.335	0.606***		-0.175	0.596***
		(0.192)	(0.000)		(0.458)	(0.000)
YEAR2013			-0.355			-0.289
			(0.148)			(0.194)
Cons	-4.012***	-5.883**	1.492	-3.606***	-4.519**	1.053
	(0.002)	(0.031)	(0.202)	(0.000)	(0.023)	(0.437)
No.Obs	277	277	277	277	277	277
No.Groups	32	32	32	32	32	32
No.Instruments	22	23	24	22	23	24
Overidentification tests:						
AR(1) p-value	0.015	0.004	0.035	0.005	0.014	0.047
AR(2) p-value	0.112	0.179	0.504	0.236	0.2667	0.515
Hansen test p-value	0.226	0.535	0.279	0.226	0.535	0.279
Weak instrument robust test:						
Wald test p-value	0.000	0.000	(0.000)	0.000	0.000	0.000
Confidence set for Wald test	[-0.06, 1.22]	[-0.41, 1.33]	[-0.41, 2.27]	[-0.58, 0.24]	[-0.17, 1.33]	[-0.54, 2.37]

*Note: ***, **, * denotes significance at the 1%, 5% and 10% level, respectively*

P-value in parentheses

The AR(1) and AR(2) tests indicate the p-value for first and second order residual autocorrelation in first differenced equation

The null hypothesis of Hansen test is the validity of the over-identifying restrictions

The null hypothesis of Wald test that all parameters poorly identified is rejected given that identification of parameters in the IV estimation is assumed to be strong). The confidence intervals of the Wald test are wider than that derived from weak-instrument robust tests, meaning that instruments are strong.

The estimated results for Joint Stock Commercial Banks are indicated in Table 4.8, which shows that similar to the whole sample, only macroeconomic factors affect the bank's credit quality.

Staring with the macroeconomic effects, the results for JSCBs also indicate that higher public debt is associated with lower contemporaneous NPLs but higher NPLs in subsequent period.

The quality of bank's loans displays a similar pattern of behavior in response to the change in economic growth as in the investigation of the entire sample, although the explanatory power of lagged economic growth is less significant in sub-analysis of JSCBs than in all banks' estimations. This might indicate that during economic upturn, Joint Stock Commercial Banks tend to be more cautious when

making lending decisions than State-owned Commercial Banks because of having less favorable government treatments. The inefficiency of SOEs is found to positively affect the quality of bank loans and the magnitude of the estimated coefficient of this factor seems to remain unchanged in comparison to the whole sample. Based on the results of One-step system GMM estimations, bank-specific factors including bank's size, bank profitability and cost inefficiency do not have any effects on the level of non-performing loans of banks.

Table 4.8. Determinants of Non-performing loans (Joint Stock Commercial Banks)

Variables	One-Step System GMM			Two-Step System GMM		
	1	2	3	4	5	6
NPL(-1)	0.613***	0.402*	0.842**	0.614***	0.472**	0.773**
	(0.002)	(0.078)	(0.012)	(0.000)	(0.046)	(0.017)
DEBT	-0.037**	-0.023		-0.037**	-0.022	
	(0.017)	(0.209)		(0.018)	(0.323)	
DEBT(-1)	0.090***	0.107***		0.087***	0.087***	
	(0.000)	(0.000)		(0.000)	(0.003)	
INFSOE(-1)	0.013***		0.030***	0.012**		0.028**
	(0.003)		(0.005)	(0.010)		(0.023)
GDP			-0.583***			-0.528**
			(0.003)			(0.018)
GDP(-1)			0.295			0.288*
			(0.100)			(0.051)
CRESOE(-1)		-0.032			-0.057	
		(0.647)			-0.443	
SIZE(-1)	-0.008			-0.092		
	(0.925)			(0.338)		
ROA(-1)	-0.175	0.059	-0.298	-0.179	0.033	-0.290
	(0.276)	(0.792)	(0.345)	(0.114)	(0.847)	(0.223)
COST(-1)		0.014			0.016**	
		(0.199)			(0.045)	
YEAR2008	0.928***	0.816**	0.868**	0.905	0.988***	0.892**
	(0.001)	(0.020)	(0.063)	(0.001)	(0.002)	(0.022)
YEAR2011		-0.261	0.660***		-0.122	0.673***
		(0.177)	(0.000)		(0.564)	(0.000)
YEAR2013			-0.336			-0.221
			(0.198)			(0.424)
Cons	-4.005***	-6.963***	1.203	-3.745***	-5.575***	0.545
	(0.005)	(0.009)	(0.372)	(0.000)	(0.007)	(0.609)
No.Obs	277	277	277	277	277	277
No.Groups	28	28	32	28	32	32
No.Instruments	22	23	20	22	23	20

Overidentification tests:						
AR(1) p-value	0.018	0.018	0.045	0.010	0.014	0.035
AR(2) p-value	0.062	0.151	0.434	0.138	0.2667	0.546
Hansen test p-value	0.336	0.249	0.293	0.336	0.535	0.142

*Note: ***, **, * denotes significance at the 1%, 5% and 10% level, respectively*

P-value in parentheses

The AR(1) and AR(2) tests indicate the p-value for first and second order residual autocorrelation in first differenced equation

The null hypothsis of Hansen test is the validity of the over-idenfitying restrictions

4.5.4 Robustness check

The robustness of the results has been examined by using Arellano-Bond two-step system GMM estimator to re-investigate the determinants of bank's impaired loans (shown in equations 4, 5 and 6 in both Table 4.7 and Table 4.8) or alternatively by changing control variables used in the equation. The results, which are indicated in both Table 4.7 and 4.8, show that there are no major changes in the signs as well as the significance of the correlation coefficients. This indicates that the results of this study are robust across different model specifications.

4.6 CONCLUSION AND POLICY IMPLICATIONS

This paper investigates the main determinants of NPLs over a period of 11 years from 2004 to 2014 across 32 Vietnamese Banks by using one-step system GMM estimators. The main finding of this study is that macroeconomic factors contribute strongly to the evolution of NPLs of banks. In particular, in line with the previous studies, the results show that larger public debt leads to an increase in the level of NPLs in the subsequent periods and, as predicted, the ratio of NPLs is likely to rise when the operation of the State-run companies becomes inefficient.

However, contrary to the results of the existing works which reveal that economic growth cause NPLs of banks to decrease by enhancing the capacity of borrowers to service their debt, the results in the sample of Vietnamese banks indicate that higher economic growth is associated with lower current NPLs, but higher future NPLs. This suggests that the short-lived impact of economic growth in mitigating the

problem of NPLs seems to be stronger through its effect on the expansion of bank credit, which increases the borrower's ability to rollover their loans, rather than borrower's effectiveness. As a consequence of over-lending led by less stringent credit appraisal during economic booms, investment portfolio of banks tends to be shifted toward riskier projects and thus results in higher NPLs in next periods.

Regarding debt burden impact, this paper confirms a negative correlation between public debt and contemporaneous NPLs, suggesting that larger public debt is associated with lower current NPLs. Indeed, the decrease in the stock of current NPLs resulted from the increasing accumulation of public debt does not mean that the issue of NPLs faced by Vietnamese banks has been resolved properly, it is simply transferred from banks' balance sheet to sovereign in form of public debt. Given that higher debt burden crowds out government spending, financial resources for supporting failing SOEs or banks will be reduced, causing NPLs to increase in the future. This study also finds that the quality of bank's asset tends to be sensitive to the efficiency of the State-owned enterprises, as predicted. Higher inefficiency of SOEs, as measured by the ratio of State budget-funded investment in SOEs to SOE's GDP, leads to higher NPLs, although the explanatory power is relatively low. The operation of VAMC - created by the government of Vietnam to handle the issue of large NPLs in banks – is shown to have a surprisingly insignificant effect on the evolution of NPLs.

Finally, from a policy perspective, the findings of this study imply that the policy makers of Vietnam should strengthen banking supervision to prevent excessive lending in boom times and tighten banks' credit standards. Furthermore, the intervention of government in bank's lending decision should be eliminated to ensure the competitiveness of domestic banks. The calculation of public debt should also follow the international standards, which include the debts owed by State-owned Enterprises to propose better strategies of debt management. Given the high level of

banks' NPLs in Vietnam strongly associated with the poor operation of SOEs, the Government of Vietnam needs to put the process of restructuring the SOEs in an urgent order.

CHAPTER 5

CONCLUDING REMARKS

This thesis provides general understanding about the current situation of Vietnam's public debt and its effects on both macroeconomic stability and financial market risk in a context of Vietnam's economy. In general, the thesis investigates that greater reliance on domestic borrowing in the form of government bonds to fill the financial gap is one of the main contributors for the increasing solvency risk and economic instability in long term in Vietnam, while an increase in the overall level of public debt causes the ratio of non-performing loans in local banks to increase in the subsequent period. From policy perspectives, the main findings of this thesis suggest that in order to avoid sovereign default, it is important to improve the country's export base, the effectiveness of domestic debt management and to reduce the economic dependent on China by diversifying the country's trading partners. Moreover, the intervention of the Government on bank's lending decision should be eliminated; the efficiency of public spending should also be enhanced, giving central bank more autonomy to limit the potential impact of high fiscal deficit and internal borrowing on inflation. In addition to that, the government should also enhance the supervision and management in using funds borrowed from internal resources, reduce spending on unproductive investments and encourage private sector to participate in public investment.

However, this paper does have some limitations. Due to the availability of data, this dissertation is conducted for relatively short observation time spans and some of the data used is in the estimations collected from different secondary sources such as IMF, Bloomberg, CEIC and the World Bank. Therefore, further research with longer time period and higher quality of data should be implemented. The information on the level of credit to state-owned enterprises of specific banks is also needed. Moreover, since the issue of Central bank independence has been referred, the study

on the level of central bank independence and its relation with budget deficits and inflation should also be conducted in the context of Vietnam. Finally, the main purpose of increasing debt financing is to boost economic growth, hence there is a need for the study determining the effect of domestic debt on Vietnam's economic growth.

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