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THE EFFECTS OF PUBLIC DEBT, CORRUPTION ON ECONOMIC GROWTH IN COUNTRIES IN THE WORLD

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SUMMARY OF ECONOMIC DOCTORAL THESIS

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CHAPTER 1: INTRODUCTION OF RESEACH

1.1. RATIONALE OF THE STUDY

In the past decades, many studies on the impact of public debt on economic growth have been carried out by researchers around the world. The research results focus on two directions: public debt promotes economic growth and vice versa, public debt hinders economic growth of a country. However, studies show that public debt only has a limited effect on promoting economic growth. According to Abbas et al. (2007), Dreger (2013), and many others shows that the relationship between public debt and economic growth is nonlinear. In addition, the above research results shown that the public debt threshold is not unique and does not change over the study period. Moreover, it is necessary to examine the impact of public debt under corruption conditions to see that the real nature of public debt is not a serious problem if it is used effectively, especially low-income and middle-income countries. If public debt is affected by corruption, the issue becomes more important and deserves more attention.

From the above results, the author realizes that the topic of public debt and corruption are always topical and need to be studied in combination. Therefore, the author determines that this is a research gap that needs to be further studied to clarify issues related to this topic through the thesis with the topic "***The effects of public debt, corruption on economic growth in countries around the world***".

1.2. RESEARCH OBJECTIVES

The study has the following major purposes:

The study has the following major purposes:

Firstly, to analyze the nonlinear relationship between public debt and economic growth to determine a reasonable threshold for public debt (if any) of groups of countries.

S*econdly*, to analyze the impact of corruption on economic growth of groups of countries.

Thirdly, to analyze the impact of public debt on economic growth as a function of corruption in groups of countries

Finally, to propose policy implications from research results received for groups of countries.

1.3. OBJECT AND SCOPE OF THE RESEARCH

1.3.1 Research object

The research object of the thesis is public debt, corruption and economic growth. In addition, the research object of the thesis also includes the relationship between public debt and economic growth, between corruption and economic growth, between public debt, corruption and economic growth.

1.3.2 Research Scope

The scope of the thesis is public debt, corruption and economic growth in 86 countries around the world, which are classified into three groups including 36 high-income economies (HICs), 29 upper-middle-income economies (UMICs) and 21 lower-middle-income economies (LMICs) from 2000 to 2019.

1.4. RESEARCH METHODOLOGY

The thesis uses a quantitative analysis method to determine the effect of public debt, corruption, the interaction between public debt and corruption (and some other control variables in the model) on economic growth through analysis of linear regression models for unbalanced dynamic panel data. Specifically, the author estimates the regression coefficients of the explanatory and control variables through POLS estimator, REM model, FEM model and DGMM estimation method.

1.5. NEW CONTRIBUTIONS OF THESIS

Scientific significance of the thesis

According to the author's research, the studies in the world as well as in Vietnam mostly focus on studying the individual impact either between public debt and economic growth or between corruption and economic growth. There are few studies evaluating the simultaneous effect of macro factors related to economic growth, so the author's study on the simultaneous impact of macro factors such as public debt and corruption as well as the impact of public debt with different corruption conditions to economic growth can contribute an additional research aspect to previous studies on factors affecting economic growth in groups of countries in general and each country in particular.

Practical significance of the thesis

Confirm the nonlinear relationship between public debt and economic growth, determine the threshold of public debt that changes over time, consider the influence of corruption on the impact of public debt to economic growth, highlighting the difference in research results for three groups of countries, confirming that the public debt policy Vietnam has been implementing is appropriate and the thesis results are references for interested parties on this topic.

1.6 STRUCTURE OF THE THESIS

This thesis is designed with 5 chapters excluding the introduction, references and appendices, including Chapter 1: Introduction to the research topic; Chapter 2: Theoretical overview of public debt, corruption, economic growth; Chapter 3: Model, variable description and research methods; Chapter 4: Research results and discussions; Chapter 5: Conclusion and policy implications.

CHAPTER 2: THEORETICAL OVERVIEW OF PUBLIC DEBT, CORRUPTION, ECONOMIC GROWTH

2.1 THEORY OF ECONOMIC GROWTH

2.1.1 Concepts and methods of measuring economic growth

2.1.1.1 Concepts of economic growth

2.1.1.2 Methods of measuring economic growth

2.1.2 Theory and model of factors affecting economic growth

2.1.2.1 Keynesian growth theory. Harrod-Domar model

2.1.2.2 Neoclassical theory of economic growth and some typical models

2.1.2.3 Theory and models of modern growth

2.2 THE EFFECT OF PUBLIC DEBT ON ECONOMIC GROWTH

2.2.1 Concepts and methods of measuring public debt

2.2.1.1 Concepts of public debt

When it comes to the concept of public debt, each country can have different measurement criteria, but they all have in common with the definition of large financial institutions such as the World Bank and the International Monetary Fund. In this thesis, the author uses the concept of public debt as defined by the International Monetary Fund.

2.2.1.2 Methods of measuring public debt

The estimated result depends not only on the model built, the method chosen, but also on the measurement of the variable. Therefore, the calculation of the value of public debt is an important technique in research. Theoretically, there are two methods of determining the value of public debt: the value of public debt at the end of the period, usually taking at the end of the fiscal year, and the average value of public debt.

2.2.2 The effect of public debt on economic growth

2.2.2.1 Public debt has a positive impact on economic growth

The view of public debt has a positive impact on economic growth that the Government can affect the aggregate demand of the economy through its impact on its spending is of Keynesian scholars.

2.2.2.2 Public debt has a negative impact on economic growth

Elmendorf and Mankiw (1999) made some arguments about the impact of public debt on economic growth of countries. Accordingly, public debt has a positive impact on economic growth in the short term through increasing aggregate demand of the economy. However, in the long term, public debt reduces savings and capital accumulation due to increased deposit interest rates, thereby reducing economic growth. This argument was later developed by Diamond (1965) and (Barro, 1990).

2.2.2.3 Ricardian equivalence

The Ricardo equivalence is a neutral theory that deals with the effect of public debt on economic growth. The idea of this theory is that if the Government changes only a certain type of policy, the change does not have any significant effect.

2.2.2.4 Public debt has a nonlinear relationship with economic growth

When considering the impact of public debt on economic growth, it is important to recognize that this relationship also reflects differently in different countries. Some of the reasons to explain this difference can be mentioned as the difference in the level of development of science and technology, the ability to tolerate debt levels or the vulnerability of the financial market with the structure of public debt. However, the explanation of the nonlinear relationship of public debt to economic growth has so far not been explained by theory, but only by published empirical studies..

2.3 THE EFFECT OF CORRUPTION ON ECONOMIC GROWTH

2.3.1 Concepts and methods of measuring

2.3.1.1 Concepts of corruption

Depending on the different goals, the concept of corruption also

has differences, but in general, there are some similar connotations.

In this thesis, the author establishes the concept of corruption as the behavior of a person or group of people with positions and powers in the public sector who has taken advantage of that position and power for personal gain or group benefits.

2.3.1.2 Methods of measuring corruption

To date, some commonly used measures of corruption include measuring through Transparency International's Corruption Perceptions Index, the Corruption Control Index - one of the six components global governance index developed by the World Bank.

2.3.2 The effect of corruption on economic growth

Dzhumashev (2014) develops the endogenous growth model of Barro (1990) by assuming that the economy has two-types of agents, one engaged in the production of public goods and the other engaged in the production of private goods. The analysis is based on the theory of utility maximization for households, government officials, and firms and the theory of budgetary constraints. As a result, the influence of corruption on the economic concentration is positive or negative depending on whether the government size is higher or lower than the optimal size.

2.4 THE EFFECT OF PUBLIC DEBT, CORRUPTION ON ECONOMIC GROWTH

Based on the growth model of overlapping generations of Diamond and Samuelson, the endogenous growth model of Barro (1990), Ivanyna et al (2015a, 2015b) construct equations reflecting the maximization. usefulness of households, government officials, and businesses, and then demonstrate the relationship between public debt, corruption and economic growth. In turn, corruption increases tax evasion (through corruption effects), reduces tax revenue, and increases government borrowing. However, as past liabilities and interest become due, discretionary budgets

to finance public investment will decrease, resulting in a reduction in the marginal benefits of corruption. In addition, over time, an increase in spending obligations also increases the cost of maintaining discretionary budgets of a certain size, thus also requiring debt to finance expenditures. However, issuing new debt when the obligation for old debt is high will incur a very expensive cost. Therefore, high public debt from past debt accumulation reduces corruption, tax evasion and public debt. The very interaction between public debt and corruption can be strong enough to create a debt-corruption cycle. This means that public debt and corruption will be relatively high in one period and only drop to lower levels in the next stage.

2.5 RELATED RESEARCHS TO THE THESIS

2.5.1 Studies on the effect of public debt on economic growth

2.5.1.1 For foreign studies

Public debt has a positive impact on economic growth

Studies that only give results on the positive impact of public debt on economic growth are quite limited, including some authors such as Abbas, S. M., & Christensen, J. (2010), Dreger, C., & Reimers, H. E. (2013), Fincke and Greiner (2015b).

Public debt has a negative impact on economic growth

Studies that only give results on the negaive impact of public debt on economic growth are quite limited, including some authors such as Presbitero (2005), Abbas et al. (2010), Kumar and Woo (2010,, 2015), Calderón and Fuentes (2013), Eberhardt and Presbitero (2015), Fincke and Greiner (2015a).

Public debt has a nonlinear relationship with economic growth

Unlike the two groups of results above, most of the research results show that the relationship between public debt and economic growth is non-linear and there is a threshold of public debt at which the impact

direction of public debt be changed. These studies are by the authors such as Reinhart, C. M., & Rogoff, K. S. (2010), Checherita-Westphal, C., & Rother, P. (2010), Kumar and Woo (2010, 2015), Canner et al. (2010), Pattillo, C., Poirson, H., & Ricci, L. A. (2011), (Cecchetti et al., 2011), Minea and Parent (2012), Elmeskov, J., & Sutherland, D. (2012), Padoan et al. (2012), Baum et al. (2013), Égert, B. (2015), Markus and Schweickert (2018).

2.5.1.2 For domestic research

The authors with research supporting the view that public debt has a positive impact on economic growth include Le Thi Minh Ngoc (2011), Vo Huu Phuoc and Nguyen Quyet (2016); Public debt negatively affects economic growth including Nguyen Van Phuc (2013), Nguyen Van Bon (2016), Vo Thanh Hoa (2017); Public debt has a nonlinear relationship with economic growth including Le Phan Thi Dieu Thao and Thai Han Vinh (2015), Mai Dinh Lam and Nguyen Thanh Sang (2016).

2.5.2 Studies on the effect of corruption on economic growth

2.5.2.1 For foreign studies

The relationship between corruption and economic growth has also been done by many researchers with different methods and samples. The results of these studies can be divided into two groups. The first group, corruption negatively affects economic growth, includes authors such as Mauro (1997), Tanzi, V., and Davoodi, H. (1998), Poirson (1998), Venard (2013), Takuma and Akihisa (2014)), D'Agostino, G.; Dunne, J.P.; Pieroni (2016a, 2016b), Andrzej Cieślik and Łukasz Goczek (2018). In contrast, the second group believes that corruption has a positive impact on economic growth including Brunetti et al. (1997), Wedeman (1997), Heckelman and Powell (2010), Chiung-JuHuang (2016).

2.5.2.2 For domestic research

According to the author's research, there are some empirical studies in recent times, including Dang Van Cuong (2016), which argues that corruption roles as a lubricant for promoting economic growth in the context of institutional quality is low and Bui Thi Thuy Duong (2019) agrees that controlling corruption will stimulate economic growth.

2.5.3 Studies on the effect of public debt, corruption on economic growth

2.5.3.1 For foreign studies

Studies examining the combined effects of different macro variables on economic growth at the same time are quite limited, especially studying the impact of public debt under the influence of corruption in groups of countries including Mauro (1995), Jalles, TJ (2011), Kourtellos, A., Stengos, T., & Tan, CM (2013), Kim, E., Ha, Y., & Kim, S. (2017).

2.5.3.2 For domestic research

Studies on the combination of macro factors including public debt, corruption and economic growth in Vietnam, according to the author's research, are almost non-existent. Currently, there are only studies on the combination of public debt, inflation and economic growth in Vietnam (Nguyen Van Bon, 2016) and research on the combination of public debt, government size and economic growth by Hoang Khac Lich, Duong Cam Tu (2018).

2.6 RESEACH GAP

Today, loan borrowing is becoming more and more common for all entities in the economy from individuals, organizations to a country. However, all things have two sides, and the use of debt is no exception. In addition to the benefits that debt creates, it also creates certain risks. In addition, some studies show that some of the causes leading to the public debt crisis are relatively easy access to loans, low interest rates plus the

decision to spend excessively compared to the economy and economic growth rate. According to Tanzi and Davoodi (2002), Increase in public spending is a consequence of corruption. The effects of corruption on public spending can be viewed as channels for the transmission of the effects of corruption on public debt.

On the other hand, a combination of research results on public debt, corruption and economic growth can show that most of the results show that public debt and economic growth have a nonlinear relationship. There is a certain threshold of public debt for groups of countries at different study time periods and there are also few studies conducted on the association between public debt, corruption and economic growth in the world and in Viet Nam.

In addition, the topic of public debt, corruption, and economic growth is always a highly topical topic and is of great interest to scholars and policy makers because of these indicators. reflect the development of a country. Countries borrow to promote economic growth, but to use debt effectively, corruption must be well controlled. These three macro factors have a close relationship with each other and have been proven both in theory and empirical studies in Vietnam and around the world. Therefore, the author determines that the study of the relationship between public debt, corruption and economic growth in a special context to once again test the theories as well as the expectation to find a reasonable public debt threshold, the corruption threshold to be controlled for groups of countries, thereby suggesting some implications for groups of countries in general and Vietnam in particular as a research gap for this thesis.

Summary of Chapter 2

CHAPTER 3: MODEL, VARIABLE DESCRIPTION AND RESEARCH METHODS

3.1 RESEARCH DATA

Secondary data sources were collected for this study and downloaded from the websites of organizations including the World Bank, the International Monetary Fund and Transparency International.

3.2 HYPOTHESIS AND RESEARCH MODEL

3.2.1 Research Model

Based on the theory of endogenous growth of Barro (1990) and the production function of the economy in the form of a Cobb-Douglas function, inheriting variables including Economic Growth, initial GDP Per Capital, Public Debt, Trade Openness, Deficit, Inflation, Government Size in Woo and Kumar's study (2010, 2015), Corruption, interaction variable between public debt and corruption in Kim et al's study (2017), Human Capital variable in the research model of Nguyen Van Bon (2016), the author builds empirical models to solve the objectives of the proposed thesis, including:

Firstly, the model analyzes the nonlinear relationship between public debt and economic growth, and at the same time determines the optimal public debt threshold value

$$\Delta Y_{i,t} = \beta_0 + \beta_1 \log(Y_{i,t-4}) + \beta_2 DEBT_{i,t-4} + \beta_3 DEBT_{i,t-4}^2 + \sum_{j=4} \beta_j X_{i,t-4} + \rho_i + \tau_t + \varepsilon_{it} \quad (3.2)$$

Where:

- ΔY_{it} = ($\log Y_{i,t}$ - $\log(Y_{i,t-4})$)/4, represents Economic Growth variable, the average growth rate of the real per capital GDP of country i over the period of four years..
- $Y_{i,t-4}$ is the GDP per capital at the beginning of the period
- $DEBT_{i,t-4}$ is the public debt at the beginning of the period

- $X_{i,t-4}$ is a vector of other control variables at the beginning of the period, including Human Capital (HUMAN), Inflation (INFLAT), Government Size (GSIZE), Trade Openness (TO), Deficit (DEFICIT) and Debt Crisis (CRISIS).

- β_j are coefficients for all variables

- ρ_i and τ_t are country-specific fixed effect and period-specific fixed effect, respectively and ε_{it} is the idiosyncratic error term.

Second, Model to analyze the impact of corruption on economic growth

$$\Delta Y_{i,t} = \beta_0 + \beta_1 \log(Y_{i,t-4}) + \beta_2 CPI_{i,t-4} + \sum_{j=3}^{8} \beta_j X_{i,t-4} + \rho_i + \tau_t + \varepsilon_{it} \quad (3.3)$$

Where: CPI l is the public debt at the beginning of the period

Finally, the model analyzes the impact of public debt as a function of corruption on economic growth

$$\Delta Y_{i,t} = \beta_0 + \beta_1 \log(Y_{i,t-4}) + \beta_2 DEBT_{i,t-4} + \beta_3 CPI_{i,t-4} + \beta_4 DEBT_{i,t-4} * CPI_{i,t-4} + \sum_{j=5}^{10} \beta_j X_{i,t-4} + \rho_i + \tau_t + \varepsilon_{it} \quad (3.4)$$

3.2.2 Research Hypothesis and Variables

3.2.2.1 Dependent variable

Independent variables include Public Debt, Squared Public Debt, Corruption and the interaction variable between Public Debt and Corruption. Based on the theories and objectives of the thesis, the author setups the following hypotheses..

H1*: Public debt has a nonlinear relationship with economic growth in countries belonging to the three groups, and the reasonable public debt threshold is different between the three groups of countries. Specifically, the group of countries with higher incomes has a higher public debt threshold will be higher.*

H2*: Corruption has a negative relationship with economic growth in countries belonging to the three groups of low middle income, high middle income and high income. Specifically, the higher the corruption perception index increases (the lower the transparency), the lower the economic concentration decreases and vice versa.*

H3*: The coefficient of the public debt variable has a positive relationship and the coefficient of the interaction variable between public debt and corruption has a negative relationship with economic concentration in the model containing the interaction variable for countries of three income groups: low middle income, high middle income and high income..*

3.2.2.2 Independent variable and Control Variables

Control variables in the model include real GDP per capita at the beginning of the period, Human Capital, Inflation, Government Size, Trade Openness, Deficit, Public Debt Crisis.

3.2.3 Measuring research variables

Table 3.1: ***Variables and sign expectation***

Variable Name	Measuring	Reference	Sign expectation
Real GDP per capital (Y)	$(Log(Y_{i,t}) - Log(Y_{i,t-4}))/4$	Presbitero (2005), Caner et al., (2010), Cecchetti et al., (2011), Woo and Kumar (2010, 2015), Nguyen Van Bon (2016), Kim et al., (2017),..	-
Public Debt (DEBT)	The ratio of Public Debt to GDP	Kumar and Woo (2010, 2015), Minea & Parent (2012), Égert (2015), Markus & Rainer (2018)	+
Corruption (CPI)	Corruption Perception Index from 0 (the lowest corrouption) to 10 (the highest corrouption).	Méon and Sekkat (2005), Heckelman and Powell (2010), Takuma v et al., (2014), Chiung-Ju Huang (2106), Dang Van Cuong (2016), Kim et al., (2017)	-
Human capital (HUMAN)	Total population between the ages 15 to 64 as a percentage of the total population	Woo and Kumar (2015); Nguyen Van Bon (2015); Kim et al., (2017).	+
Inflation (INFLAT)	Inflation rate	Gillman et al., (2004), Gillman & Harris (2008); Presbitero (2012), Samimi & Kenari (2015); Woo and Kumar (2015); Égert, B. (2015); Kim et al., (2017); Yifei Cai (2017); Andrzej Cieślik and Łukasz Goczek (2018); Saeed, S.; Islam, T. (2018)	-
Government Size (GSIZE)	Government consumption ratio to GDP	Woo and Kumar (2015); Kim et al., (2017); Andrzej Cieślik và Łukasz Goczek (2018)	+
Trade Openness (TO)	Sum of export and import as a percentage of GDP	Égert, B. (2015); Woo and Kumar (2015); Kim et al., (2017); Yifei Cai (2017); Markus Ahlborn & Rainer Schweickert (2018); Saeed, S.; Islam, T. (2018)	+
Deficit (DEFICIT)	The ratio of fiscal deficit to GDP, measured by the difference between fovernment revenue and expenditure	Afonso, A., and Jalles, J. T. (2013); Woo and Kumar (2015); Kim et al., (2017)	-
Public debt crisis 2010 (CRISIS)	Dummy variable takes the value 1 (2011-2019) and 0 (2000-2010)	Afonso, A., and Jalles, J. T. (2013)	

Source: Author's summary

3.3 RESEACH METHODS

3.3.1. Methods for estimating panel data

3.3.1.1. Pooled – OLS method

3.3.1.2. Fixed effect model (FEM)

3.3.1..3 Random effect model (REM)

3.3.2 Testing the choice of estimation method

3.3.2.1 Hausman test

3.3.2.2 F test

3.3.3 Testing the suitable of model

3.3.3.1 Multi-collinearity test

3.3.3.2 Heteroskedasticity test (Wald test)

3.3.3.3 Wooldridge test

3.3.3.4 Check for endogenous

3.3.4 Generalized Method Moments's method (GMM)

Specifically, we will use the Difference Generalized Method Moments (DGMM) method according to Arellano and Bond (1991) because this research model also suits the assumptions Arellano and Bond (1991) set. For the DGMM method, specific assumptions include: *First,* the process may be dynamic, with current realizations of the dependent variable influenced by past ones; *Second,* there may be arbitrarily distributed fixed individual effects. This argues against cross-section regressions, which must essentially assume fixed effects away, and in favor of a panel setup, where variation over time can be used to identify parameters; *Third,* some regressors may be endogenous; *Fourth,* the idiosyncratic disturbances (those apart from the fixed effects) may have individual-specific patterns of heteroskedasticity and serial correlation.

To determine the validity of the instrumental variable for two-step DGMM, the author performs Hansen's test with the hypothesis H0 that the instrumental variable is exogenous and hypothesis H1 implies that there is

least one instrumental variable is endogenous. The test value P-value > 0.05 gives the conclusion that accepting the hypothesis H0 or in other words the instrumental variable used is appropriate. In addition, the author run the Arellano-Bond test to determine the autocorrelation phenomenon in the difference of residuals. If the residual difference has only first order autocorrelation and no second order autocorrelation, it means that the model has overcome the endogeneity. If the residual difference is still quadratic, the model still suffers from endogeneity and GMM estimation in this case is not efficient. To perform this test, it is hypothesized that H0 is the model without second order autocorrelation and H1 is the model with order 2 autocorrelation. In case the test value P-value (AR1) < 0.05 and P-value (AR2) > 0.05, the model has first order autocorrelation but no second order autocorrelation.

3.3.5 Research sequence

Summary of Chapter 3

CHAPTER 4: RESEARCH RESULTS AND DISCUSSIONS

4.1DESCRIPTIVE STATISTICS

4.1.1 General descriptive statistical analysis

4.1.2 General characteristics of the groups of countries studied

4.1.3 Descriptive statistics of variables

The results of descriptive statistical analysis show that the average real GDP of three groups of countries: HICs, UMICs, and LMICs respectively, are 10,3364; 9.2406 and 8.3456 with standard deviations are both below 0.5; The data on the ratio of public debt to GDP of three groups of countries HICs, UMICs, and LMICs respectively are 58.4%; 40.3% and 48.64%. Data on corruption perception index of three groups of countries HICs, UMICs, and LMICs respectively are 2.85; 6.36 and 7.08 show that the division of groups by income ensures centralized data and reflects the

individual characteristics for each group and is expected to yield more exactly results.

4.2 ANALYSIS OF CORRELION BETWEEN VARIABLES

Table 4.10: Correlation matrix of variables for HICs

VARIABLES	ΔY	Y	DEBT	CPI	HUMAN	INFLAT	TO	GSIZE	DEFICIT
ΔY	1,000								
Y	-0,450***	1,000							
DEBT	-0,244***	0,187***	1,000						
CPI	-0,223***	0,634***	-0,130***	1,000					
HUMAN	0,101**	0,156***	-0,226***	0,013	1,000				
INFLAT	-0,038	-0,344***	-0,211***	-0,175***	0,015	1,000			
TO	0,121***	0,396***	-0,190***	-0,171***	0,676***	-0,043	1,000		
GSIZE	-0,143***	-0,004	0,187***	0,023	-0,526***	-0,093**	-0,422***	1,000	
DEFICIT	-0,089**	0,306***	-0,283***	-0,473***	0,010	0,018	0,230***	-0,166***	1,000

Source: Research results are extracted from Appendix 4.2

Table 4.12: Correlation matrix of variables for LMICs

VARIABLES	ΔY	Y	DEBT	CPI	HUMAN	INFLAT	TO	GSIZE	DEFICIT
ΔY	1,000								
Y	-0,211***	1,000							
DEBT	0,111**	-0,156***	1,000						
CPI	-0,168***	-0,346***	-0,095*	1,000					
HUMAN	0,205***	0,712***	-0,133**	-0,172***	1,000				
INFLAT	0,146***	-0,131**	0,123**	0,228*	-0,023	1,000			
TO	0,222***	0,128**	-0,116**	-0,123**	0,461***	0,085	1,000		
GSIZE	-0,080	0,253***	-0,068	-0,240***	0,309***	-0,073	0,235***	1,000	
DEFICIT	-0,102*	-0,099*	0,036	-0,077***	0,029	0,044	0,107*	0,043	1,000

Source: Research results are extracted from Appendix 4.2

Table 4.11: Correlation matrix of variables for UMICs

VARIABLES	ΔY	Y	DEBT	CPI	HUMAN	INFLAT	TO	GSIZE	DEFICIT
ΔY	1,000								
Y	-0,468***	1,000							
DEBT	-0,093*	-0,139***	1,000						
CPI	-0,244***	0,253***	-0,112***	1,000					
HUMAN	0,189***	0,381***	-0,101**	0,125**	1,000				
INFLAT	0,071	0,058	-0,085*	-0,076*	0,000	1,000			
TO	0,002	0,121**	0,018	-0,319***	0,067	0,037	1,000		
GSIZE	-0,077*	0,085*	0,058	-0,521***	0,005	0,046	0,118**	1,000	
DEFICIT	0,093***	-0,026	-0,152***	0,032	0,042	0,469***	0,114**	0,039	1,000

Source: Research results are extracted from Appendix 4.2

4.3 ANALYSIS OF RESEARCH RESULTS

4.3.1 Research results on the impact of public debt on economic growth

Table 4.13 show that the relationship between public debt and economic growth is linear and the public debt thresholds of the three groups of HICs, UMICs and LMICs are 120%/GDP, 93%/GDP and 67%/GDP, respectively (Columns 1, 3, 5). In other words, in the post-debt crisis period, the increase in public debt has a better supportive effect for the recovery of the economy for the UMICs and LMICs but reduced the positive impact on the HICs (Columns 2, 4, 6).

Table 4.13: ***The effects of public debt on economic growth***

Variable	High-Income Economies		Upper-Midle-Income Economies		Lower-Midle-Income Economies	
	(1)	(2)	(3)	(4)	(5)	(6)
Y	-0,1020***	-0,0624***	-0,0296	-0,1117***	-0,1057***	-0,1544***
DEBT	0,00372***	0,0007***	0,00235***	0,0011***	0,00334***	0,0006***
$DEBT^2$	-0,00001***		-0,00001**		-0,00002***	
DEBT THRESHOLD	120%		93%		67%	
HUMAN	-0,0098 ***	-0,0122***	0,0190***	0,0057***	0,0090***	0,0171***
INFLAT	-0,0015***	-0,0012***	0,0008	-0,00043**	0,0001	0,0000
TO	-0,0003***	-0,0003***	0,0015***	0,0004**	4,17e	-0,0005***
GSIZE	-0.0017	0,0033***	0,0050***	-0,0022	-0,0008***	-0,0000
DEFICIT	0,0015***	0,0001	-0,0008	0,0001	0,0001	-0,0012*
DEBT CRISIS	-0,0033***		0,0062***		0,0133***	
DEBT * CRISIS		-0,00004***		0,00007**		0,0001***
ABOND (AR2) TEST	0,147	0,584	0,081	0,606	0,486	0,850
HANSEN TEST	0,173	0,175	0,157	0,096	0,142	0,227

Nguồn: Kết quả nghiên cứu trích xuất từ phụ lục 4.3

4.3.2 Research results on the impact of corruption on economic growth

Table 4.14: ***The effects of corruption on economic growth***

Variable	High-Income Economies		Upper-Midle-Income Economies		Lower-Midle-Income Economies	
	(1)	(2)	(3)	(4)	(5)	(6)
Y	-0,0356***	-0,0266***	-0,0453***	-0,1301***	-0,1039***	-0,1091***
CPI	0,0351***	0,0394***	-0,0113***	-0,0126***	-0,0239***	-0,0063**
HUMAN	-0,0104***	-0,0107 ***	0,0183***	0,0068***	0,0075**	0,0109***
INFLAT	-0,0013***	-0,0012***	0,0001	-0,0008***	0,0002	-0,0002
GSIZE	0,0069***	0,0071***	0,0007	0,0095***	0,0009	-0,0031***
TO	-0,0003***	-0,0003***	0,0012***	0,0010***	-0,0008***	-0,0003***
DEFICIT	0,0011***	0,0008 ***	0,0040*	0,0029***	0,0004	-0,0016**
DEBT CRISIS	-0,0021***		0,0024		0,0005	
CPI*CRISIS		-0,0023***		0,0015***		-0,0009***
ABOND (AR2) TEST	0,552	0,325	0,924	0,386	0,628	0,136
HANSEN TEST	0,173	0,147	0,353	0,241	0,457	0,186

Source: Research results are extracted from Appendix 4.4

4.3.3 Research results on the impact of public debt, corruption on economic growth

Table 4.15: ***The effect of public debt, corruption on economic growth***

Variables	HICs	UMICs	LMICs
Y	-0,0925***	-0,1226***	-0,2680***
DEBT	0,0020***	0,0061***	0,0079**
CPI	0,0535***	-0,0283**	0,0267
DEBT*CPI	-0,0004***	-0,0007***	-0,0010*
Corruption Threshold	4,5	8,2	7,8
HUMAN	-0,0099***	0,0009	0,0333***
INFLAT	-0,0016***	-0,0012*	0,0007*
GSIZE	0,0055***	0,0043*	-0,0023
TO	-0,0001***	0,0006*	-0,0002
DEFICIT	0,0011***	-0,0008	-0,0019
DEBT CRISIS	-0,0015*	0,0129***	0,0049
Abond (AR2) Test	0,066	0,712	0,078
Hansen Test	0,113	0,057	0,186

Source: Research results are extracted from Appendix 4.5

Summary of Chapter 4

CHAPTER 5: CONCLUSION AND POLICY IMPLICATIONS

5.1 CONCLUSION

Firstly, the thesis has confirmed that the relationship between public debt and economic growth is nonlinear, meaning that the increase in public debt at first has a positive effect on economic growth, but up to a certain threshold, this effect will reverse. The thesis also shows that the public debt threshold for the research samples is also different, the country with higher income has a higher threshold of public debt and vice versa. Specifically, the public debt threshold for the HICs is 120%, the UMICs is 93%/GDP, and the LMICs is 67%/GDP. The results of this study also confirmed the second research hypothesis that the author had previously identified and also solved the second objective of the thesis. In addition, when separating the research period into before and after the public debt crisis, the author finds that after the public debt crisis, the level of positive impact of public debt is greater or in other words, The use of public debt is more efficient than in the pre-crisis period for middle-income countries but lower for the HICs.

Secondly, the thesis also analyzes the direct impact of corruption on economic growth for the research samples for both the period from 2000 to 2019 as well as for the period before and after the 2010 public debt crisis. Research results show that in the research period, the level of impact of corruption on economic growth also has different direction and level of impact. Specifically, during the study period, corruption had a negative impact on economic growth in the UMICs and LMICs while the opposite in the HICs. In the period after the public debt crisis, the negative impact of corruption on economic growth decreased in the UMICs and became more severe in the LMICs, while for the HICs, the positive influence of corruption on growth was observed economy also fell.

Thirdly, the thesis continues to analyze the overall impact of public debt and corruption on economic growth to solve the fourth goal of the thesis set out earlier. The research results show that the regression coefficient of the positive public debt variable and the interaction variable between public debt and corruption are negative and statistically significant, showing that the impact of public debt on economic growth is a function of public debt. The number depends on the degree of corruption, the higher the corruption index, the lower the positive effect of public debt on economic growth and when reaching a certain threshold value, the positive effect will turn into a negative one. Specifically, the corruption threshold determined for the HICs, UMICs and LMICs is 4.5, respectively; 8.2 and 7.8. This result also implies that debt borrowing is a good tool to support economic growth, however, if the inefficient use of debt arises due to corruption, it is the real problem that needs attention. handle. Therefore, good control of corruption will limit the negatives arising from public debt and make good use of opportunities from public debt to develop the country, especially for middle-income countries.

Finally, the thesis also considers the impact of a number of control variables such as real GDP per capita at the beginning of the period, human capital, inflation, government size, trade openness and budget deficit on growth. economic growth for all three groups of countries. Most of the research results obtained are quite similar to previous studies..

5.2 POLICY IMPLICATIONS

5.2.1 High-income economies

Policies on cutting spending, cutting debt, strengthening anti-corruption measures to enhance institutional quality to gradually bring the debt ratio to fair or lower than the target public debt threshold: Italy and Greece

Seting-up a warning public debt threshold compared to the optimal debt threshold to create a buffer zone and to enhance the effectiveness of the implementation of anti-corruption measures: Portugal, USA, Spain, Singapore, France, Belgium.

Increase appropriate public debt ratio: Chile, Estonia, Hong Kong, Lithuania,

5.2.2 Lower-midle-income economies

Brazil and Jordan need to implement a policy of tightening spending, restructuring expenditures and public investment projects in a way that is less dependent on resources, and orients the private manufacturing sector towards development. economy goes hand in hand with research & development investment.

Azerbaijan, Botswana, Guatemala, Kazakhstan, Paraguay, Peru and Russia should consider increasing the public debt ratio at a reasonable level.

Jamaica, Argentina implement the same policies as Brazil and Jordan to create a safe buffer zone.

Countries with a public debt ratio of over 60%/GDP, should continue to maintain a public debt ratio below the optimal debt threshold reasonably, especially South Africa and China. These countries continue to increase the effectiveness of anti-corruption solutions, improve the quality of public governance to improve the quality of institutions to achieve the greatest benefits from public debt.

5.2.3 Lower-midle-income economies

Egypt, El Salvador, India, Pakistan, Tunisia and Zambia were forced to implement a policy of radically reducing public spending, gradually bringing the public debt ratio to a safe threshold. Some other countries such as Bolivia, Ghana, Kenya, Morocco, Senegal also need to implement similar policies as the above group. In addition, these countries need to

make anti-corruption a top important goal in economic and social development.

Policy implications for Vietnam

Public Debt

The first is to further strengthen the public debt administration aspect in addition to the guidelines on public debt management according to the issued documents to enhance the efficiency of public debt use based on the cost of debt use and acceptance reasonable risk; Second, improve transparency in public debt information disclosure; Finally, it is necessary to develop a guiding standard on the preparation of public debt reporting in the direction of information diversity.

Corruption

First, strengthen economic freedom and democracy; The second is to continue to improve the salary policy; Third, strengthen the monitoring regime for making public anti-corruption reports to the public; Fourth, it is necessary to develop a system of reporting forms and specific targets for corruption reporting that should be publicly and uniformly applied at all levels; Finally, it is necessary to carry out propaganda, dissemination and education on anti-corruption at lower school levels.

5.3 LIMITS OF THESIS

Firstly, this study has not considered the impact of each component of debt. Second, the debt threshold is determined by Laffer curve theory, so only one threshold value can be found. However, there may exist different thresholds of public debt at which public debt can negatively affect economic growth. Third, the policy implications based on the collected data accurately reflect the actual situation of the countries and the personal knowledge of the author.

5.4 RESEARCH TENDENCY IN FUTURE

Analyze components of debt to consider the impact of each type of debt on the economic growth in order to have more specific policy recommendations.

Use other threshold measures to determine the threshold of public debt, threshold of corruption.

Summary of Chapter 5

PUBLISHED SCIENTIFIC WORKS

1. Tác động của nợ công, tham nhũng đến tăng trưởng kinh tế của các quốc gia thu nhập trung bình thấp. Tạp chí Tài chính Kỳ 2 – Tháng 3/2021 (735), ISSN – 2615-8973. (Đồng tác giả với Nguyễn Văn Tình)
2. Tác động của nợ công đến tăng trưởng kinh tế tại các quốc gia trên thế giới, Tạp chí Tài chính Kỳ 2 – Tháng 8/2020 (735), ISSN – 2615-8973.
3. The Impact of public debt on economic growth for low middle countries, Kỷ yếu hội thảo Quốc tế trường ĐH Tài chính Marketing, ISBN: 978-604-79-2601-5.
4. Tác động của nợ công đến tăng trưởng kinh tế tại một số quốc gia Đông Nam Á, Kỷ yếu hội thảo khoa học trường ĐH Tài chính Marketing, ISBN 978-604-79-2625-1