

**THE UNIVERSITY OF DANANG
UNIVERSITY OF ECONOMICS**



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**THE STUDY OF SCALE FLUCTUATION IN GROSS
DOMESTIC PRODUCT(GDP) IN VIETNAM**

Major : Development Economics

Code : 62.31.01.05

SUMMARY OF DOCTORAL THESIS

Danang - 2016

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The University of Danang

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At 8.00 on May 21th, 2016 .

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PREAMBLE

1. THE NECESSITY OF RESEARCH THEME

Gross domestic product (GDP) is one of the important indicators to reflect final results in the production process of the economy. GDP is the basic criteria to assess the growth process and restructuring of the national economy, to evaluate the effectiveness of social production in economy and international comparison. GDP is one of the important bases so that the countries plan on expenditure, investment, accumulation in the economy, building the economic development strategy of the country. Therefore, the study of GDP fluctuation in national GDP is drawn attention by not only many researchers but also politicians, in particular the head of state who concern about the GDP volatility to make the decision for leading the country.

Over 20 years using GDP indicators in Vietnam, in reality there are some research on theory and application of the theory of foreign economists have applied the research on the scale of GDP fluctuations. However, direct study of Vietnam GDP indicators still limited to Content as well as methods.

Hence, the research topic “*The study of scale fluctuation in gross domestic product (GDP) in Vietnam*” is actually necessary in both theoretical and practical aspects.

2. OBJECTIVES OF THE RESEARCH

The objective of this study is to examine the theoretical framework and to apply the theoretical models for analyzing the trend of scale fluctuation in GDP. This study also evaluate the factors influencing GDP fluctuations in Vietnam. Finally, policy

implications are proposed to stimulate GDP growth and restructure its size.

3. OBJECTS AND SCOPE OF RESEARCH

- Research Objects: The Topic is the research-scale fluctuations of GDP and factors affecting the size of GDP fluctuations Vietnam.

- The research content of the thesis is limited to the extent:

+ Scale of GDP in this topic is meant to be GDP excluding price factor, GDP agreed and fixed calculation price in 2010 is aimed to study the variation in terms of the volume of GDP by years.

+ GDP scale volatility within the subject is understood:

* Absolute GDP volatility through the years and it is measured by the amount of increased absolute (amount) which changes over the studied years.

* Relative GDP volatility through the years and it is measured by % change in GDP (growth of GDP - GDP) over the studied years.

+ For Base “*Proposed research model of the factors that impact the size of GDP Vietnam*”, the theme based on the results of the theoretical overview, experimental studies at home and abroad, economic development characteristics and the monitored organization in reports of macro-economic indicators of Vietnam to synthesize the factors affecting GDP. Within the limited research theme with a number of factors: capital, labor, inflation, Synthetic factor productivity (TFP), the openness of the economy, electricity consumption in the economy, oil price, and the latency factor of capital, GDP in the past to fluctuations in the size of GDP in Vietnam.

+ Contribution to GDP growth structure, this research topic is within two criterias of great allocation of Vietnam economy: economic sectors and economic.

Thesis research space within the entire Vietnam economy, due to the limit of the data sources the time study is implemented in 1990-2014 period.

4. RESEARCH QUESTIONS

To meet the objectives of the research, this study should answer these research questions:

1. What model can be used to examine the factors that affect the scale of Vietnam's GDP?

2. What is the trend of Vietnam's GDP scale and how to compare GDP growth rate in Vietnam with other ASEAN countries?

3. How is contribution of the structure according to economic sectors and economic components to GDP growth Vietnam?

4. How is the level of the contribution of these factors: capital, labor, openness of the economy, aggregate productivity (TFP), inflation, and energy to fluctuations in the size of GDP Vietnam?

5. What does Vietnam need to do to ensure the growth of GDP?

5. STRUCTURE OF THE THESIS

Apart from the introduction, conclusion, references, appendix, the thesis is organized into 4 chapters.

- Chapter 1: Theoretical foundations and Literature review of the scale fluctuations in Gross domestic products.

- Chapter 2: Research Design.

- Chapter 3: Study of scale fluctuation in Gross domestic

product in Vietnam and its findings.

- Chapter 4: Policy implications.

CHAPTER 1

THEORETICAL FOUNDATIONS AND LITERATURE REVIEW OF SCALE FLUCTUATIONS IN GROSS DOMESTIC PRODUCT

1.1. INTRODUCTION OF GROSS DOMESTIC PRODUCT

1.1.1. Concept of Gross domestic product

Presently, although there are many different views about the indicators of GDP in the study, the author uses the unified concept: “*Gross domestic product (GDP) is the value of final goods in economy in a certain time period of a year*” of GSO Vietnam as my leading point for scale research GDP in Viet Nam.

1.1.2. The calculation method of Gross domestic product

- Method of production: Reflecting the origins of GDP is generated from productive activities in the economy.

- Method of production: Reflecting the division of economic production result for the owners of the factors involved in the production process creating GDP.

- The last used method: Reflecting how is the GDP used in the economy.

- The method of calculating Gross domestic product in Vietnam: Calculated according to production method.

1.2. SCALE FLUCTATION IN GROSS DOMESTIC PRODUCT

1.2.1. The size of gross domestic product

- GDP Scale means that GDP is calculated at constant prices in order to accurately reflect the amount of goods and services in the economy at different periods but agreed to use a fixed price of a period to calculate GDP. In other words, GDP Scal is meant to be that GDP has been excluded the impact of the price factor in the process of determining the results of economic production.

- Within the scope of this topic, the author uses fixed prices in 2010 according to Circular No. 02/2012 / TT-BKH issued by the Ministry of Planning and Investment of Vietnam : “Regulations 2010 as the base year instead of the base year 1994 to calculate the statistical indicators at constant ” make unified price to calculate GDP and related indicators serving the process of implementing this topic.

1.2.3. Growth theory and economic growth model

1.2.3.1. Overview of economic growth theory

- The theory of economic traditional growth (classical) XVIII in Europe.

+ Economic growth theory of Adam Smith: source of economic growth in every country include: Capital accumulation in the economy, technological advances with social factors and institutional.

+ Economic growth theory of David Ricardo: factors affecting the economic growth the country are accumulating capital for investment.

1.2.3.2. The model of economic growth

- The growth model of Keynesian: one of the first people to use the mathematical model to analyze the impact of the input element of the production process to the output of the economy.

+ The model of Harrod-Domar: Quantifying the relationship between economic growth and investment in the economy.

- The neoclassical growth Model (Solow – Swan): Solow – Swan model explains quantitative terms of economic growth depending on capital, labor and science and technology progress.

- The Neoclassical extended model (William H. Branson): has explained the impact of the factors that may determine ownership as natural resources, land and these factors which can not be determined ownership as pollution of water and air.

- Endogenous growth model:

+ Kenneth Arrow (1962) with “learning Model” thinks that the underlying cause of technological progress is the experience factor in production.

+ Paul Romer (1990) thinks that growth in the developed countries are led by the research and development seeking new ideas, new technology.

+ Villanueva (1994) explains the impact of government policies on growth.

+ Gregory Mankiw, David Romer and David Weil (1992): explains the mechanism of action of human capital to economic growth.

- Fischer (1993): When inflation is low which means the dimensional relationship with economic growth, but, when inflation is high it will negatively related to economic growth”. Barro (1996)

and Romer - Christina (1996) has launched the threshold of economic inflation is 8% / year.

1.2.4. Contribution of economic sectors and economic components to the scale of gross domestic product

Within the topic considering the decay of GDP in two major groups in Vietnam economy: Economic sectors and economic components. Years ago, especially since the VI Party Congress Vietnam has many strategic policies in shaping the development of the economic sectors and economic components. This is associated with many major undertakings in the economy and concretized by resolutions of the Party, economic development strategy of the Government. So, the thesis reviews each economic sector and each economic component what contribution to GDP, commensurating with the investment incentives, accessing to resources for Vietnam's economic sectors, as well as the economic components.

When the decomposing of GDP into economic sectors, GDP is an aggregate indicator and each economic sector is an indicator parts, so, when each economic sector changes (increased or decreased) that will impact directly to the change in GDP. Similarly, when GDP is decomposed into economic sectors, thì khi each component of economic changes that is also a direct impact to the change in GDP.

1.2. EVIDENCE IN EMPIRICAL RESEARCH

1.3.1. Evidence in empirical research in the world

- The basic factors affecting GDP:
- + Capital investment in the economy.
- + Employee.
- + Institutions.
- + Inflation in the economy.
- + The openness of the economy.

- + Monetary policy.
- + The development of the stock market.
- + Energy consumption in the economy.
- + Lag in Investment; inflation and GDP growth.
- The different quantitative research methods: Regression model, Vector autoregressive model (VAR), Random effects model (REM), fixed effects model (FEM), Vector Error Correction Model (VECM), testing the causal Granger, neural network model,...

1.3.2. Evidence in empirical research in the case of Vietnam

- The basic factors affecting GDP:
 - + Capital investment in the economy.
 - + Employee.
 - + Institutions.
 - + Inflation in the economy.
 - + The openness of the economy.
 - + Monetary policy.
 - + Energy consumption in the economy.
 - + Delay in Investment and GDP growth.
- Employed methods: Empirical studies of the Vietnam case employ a variety of different research methods, however only a few works have been applied the neural network model to examine GDP fluctuations as compared to cross-country studies..

1.3.3. Academic gaps in empirical research of scale fluctuations of GDP in Vietnamese economy

Comparing the experimental study in Vietnam and abroad shows that studies at home and abroad still have gaps in terms of content as well as research methods.

- Methodologically, the experimental study abroad was made using neural network model on a number of works to study the impact of these factors on GDP. In VietNam, we have not seen many works using neural network model to study fluctuations in the size of GDP at national level as well as local level.

- In terms of content the domestic works are mainly approached from the total supply the economy to study the factors that affect GDP: Capital, labor and TFP. No many research studies combined factors between the power and the capital, labor, the openness of the economy, inflationary impact on GDP.

It is concluded that methodological studies as well as research content of Vietnam GDP scale there are also issues to be clarified. This is a gap in research that the thesis towards to perform.

CHAPTER 2

RESEARCH DESIGN

2.1. RESEARCH PROCESS

To meet the objectives and deal with the research questions, the overall process of this research is described in the figure 2.01:

- Qualitative methods are used to overview, to systematize the theory of economic growth, economic growth model, and the experimental research on GDP fluctuations scale as the basis for the proposed research model.

- Qualitative methods are used in the subject with purposes to analysis GDP scale fluctuations trend, testing of the existence of the proposed research model and testing of hypotheses.

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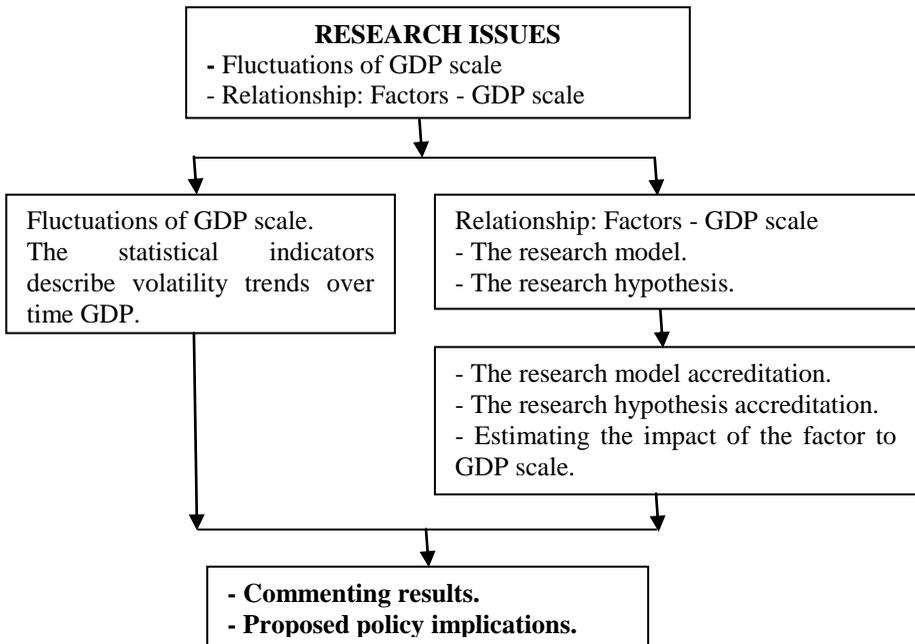


Figure 2.01. Research process

2.2. INDICATOR SYSTEM IS USED TO ANALYZE THE SCALE FLUCTUATIONS IN GROSS DOMESTIC PRODUCT

2.2.1. These indicators reflect the gross domestic product

GDP growth is measured by the change in the percentage of GDP of the period compared to the base studied period.

- Continuous growth.
- Average growth.
- Absolutely continuous increase.
- The average absolute increase.

2.2.2. The analytical indicators of structural contribution to growth domestic product

- Growth value added (VA) of each component in the economy.

- VA structure of each part in the economy.

2.3.3. The analytical indicators of structural contribution to gross domestic product

- The efficiency of investment in the economy.

- Effective use of labor in the economy.

2.3. PROPOSING THE MODELS EXAMINING FACTORS OF AFFECTING THE SCALE OF GROSS DOMESTIC PRODUCT

2.3.1. The neoclassical growth Model

Neoclassical model is developed by Robert Solow and Trevor Swan called Solow model. Solow model measures the impact of these factors on the results of economic production is expressed in the form of the production function formula (2.01).

$$Y = f(A, K, L) \quad (2.01)$$

In which:

Y: GDP representative indicator to measure the results the output of the economy.

A: Total factor productivity – TFP.

K: Total investment in fixed assets in the economy.

L: Total employment in the economy.

The research hypothesis of the neoclassical model.

- Hypothesis $H_{1,1}$: The total investment in the economy changes, GDP will change.

- Hypothesis $H_{1,2}$: The workforce total engaged in production activities in the economy changes, GDP will change.

- Hypothesis $H_{1,3}$: TFP changes, GDP will change.

2.3.2. The Neoclassical extended Model

Based on the proposed model development based on the neoclassical model (2.01), based on the theoretical foundations of The Neoclassical extended Model, Combined with experimental research projects at home and abroad, and based on the real activity situation of the Vietnam economy, monitoring and reporting Vietnam's social and Economic data. Study Model of factors affecting the size of GDP is represented by the formula (2.02):

$$Y = f(K, L, CPI, XNK, LD, GD) \quad (2.02)$$

In which:

Y: GDP representative indicator to measure the results the output of the economy.

K: Total investment in fixed assets in the economy.

L: Total employment in the economy.

CPI: Consumer price index– indicators reflecting inflation in the economy.

XNK: The proportion of exports and imports/GDP reflects the openness or degree of economic integration.

LD: Energy consumption in the economy.

GD: Oil traded prices on the market.

The research hypothesis reflects the impact of the 6 factors affecting GDP.

- Hypothesis $H_{2,1}(H_{1,1})$: The total investment in fixed assets in the economy changes, GDP will change.

- Hypothesis $H_{2,2}(H_{1,2})$: The total workforce engaged in production activities in the economy changes, GDP will change.

- Hypothesis $H_{2,3}$: The economic inflation changes, GDP will change.

- Hypothesis H_{2,4}: The opening of the economy changes, GDP will change.

- Hypothesis H_{2,5}: The amount of power consumption in the economy changes, GDP will change.

- Hypothesis H_{2,6}: The oil prices changes, GDP will change.

2.4. METHODS OF ANALYSIS THE IMPACT OF THE FACTORS TO GROSS DOMESTIC PRODUCT'S VOLATILITY

2.4.1. The analyzing method about the impact of capital, labor and TFP to gross domestic product

- Accounting method
- Econometric models
- + The model does not change the scale
- + Models have time lag factor
- + Combining superlative difference model and testing the causal (Granger).
- + Lag distribution model (ARDL)
- + Error correction vector Model (VECM).

2.4.2. The Neural Network Model

According to Ngo Van Sy (2008)'s Translation: "*Artificial neural networks (Artificial Neural Network - ANN) regenerates the function of the human nervous system with a multitude of associated neurons communicating with each other over a network. Like humans, neural network is learned by experience neural network is learned by experience and used in appropriate situations*".

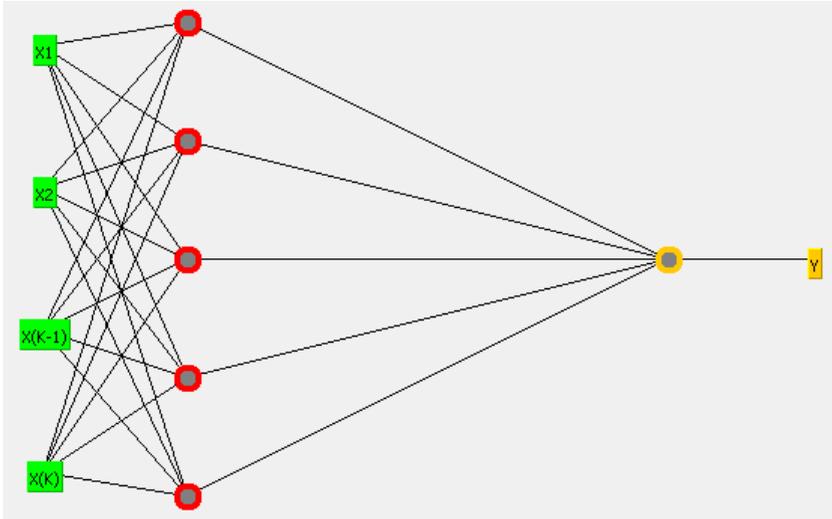


Figure 2.02. Neural network model structure MLP

Within the scope of the use of neural network model 3-layer structure in the figures (2.02):

- The first layer is called the input layer(Input layer) including input factors of neural networks. In this study, the input variables mainly reflect the factors affecting the size of GDP.

- The second layer is called the hidden layer(Hidden layer) including nodes (Nude) or hidden neurons. Each hidden layer of neural network may have one or more neurons depending on the research variables which are included in the neural network model to analyze.

- The third layer is called the output layer (Output layer) reflecting the final outcome of the combination of input factors to the hidden layer neurons to produce the output value. The output value of the neural networks in the study is variable GDP.

Neural network research process

- + Identifying the input and output variables of neural network model: Correlation Inspection.
- + Defining neural network model:
 - * Root square error Average root square – Original average error (Root mean squared error–RMSE).
 - * The determination coefficient (R Squared – R^2).
- + Commenting level of individual impact on GDP based on estimated results of neural network mode.

2.5. DATA SOURCES AND METHODS OF DEFLATION

2.5.1. Data source

Collecting from Vietnam General Statistics Office:

- + Collecting directly from the website of the General Statistics Office Vietnam, however this source is limited from 2005 to 2013. Private data 2014 is estimated (provisional).
- + Data 1990 - 2004 were collected from the Statistical Yearbook of Vietnam in 1993-2005.
 - The data used to compare GDP growth Vietnam and some countries in the ASEAN region are obtained from the International Monetary Fund(IMF) database.
 - Inflation Data (%) are collected from the Statistical Yearbook of Vietnam and the IMF database.
 - Crude prices data (USD/crate) are determined by the simple average trading price of annual with each barrel of crude oil traded on the stock market of New York.
 - Data on power consumption in the economy (million Kwh) collected from the electricity consumption reports of Vietnam national electricity company in 1990-2014.

2.5.2. Methods of deflation

All data are converted into the base prices- 2010 year.

2.5.3. Estimated total fixed assets in the economy

The total value of fixed assets in the economy is estimated indirectly through an indicator of investment in the economy.

CHAPTER 3

STUDY OF SCALE FLUCTUATION IN GROSS DOMESTIC PRODUCT IN VIETNAM AND ITS FINDINGS

3.1. ANALYZING SCALE FLUCTUATION TREND OF GDP

3.1.1. Vietnam's Gross Domestic Product Growth

Vietnam GDP period 1990-2014 with an annual average growth rate is 6.85% corresponding to an average annual increase 86858.74 (billions dong).

- Period 1990-1997: The resources are mobilized to serve the manufacturing process of the economy which making an annual average GDP growth rate up to 9.11% , especially GDP in 1995 increased 9.54%; increased 9.34% in 1996.

- Period 1998-2001: You may recall that this is the period of first economic recession in Vietnam which made the average GDP growth in the period 1998-2001 only 6.05%.

- Period 2002-2007: This was a period of economic recovery after the first Vietnam's economic recession, with an annually average GDP growth rate of 7.31%.

- Period 2008-2009: Vietnam fell into a second economic recession affected by the world economic crisis starting from US

financial markets spreading globally. Average GDP growth for 2008-2009 was 5.53%.

- Period 2010-2014: This is the stage when Vietnam economy without clear trend with an annual average GDP growth of 5.86%

3.1.2. Comparing Vietnam's Gross Domestic Product Growth and other countries in ASEAN-5

The average GDP growth of Vietnam during 1990-2014 at 6.85% was the highest among ASEAN countries. The average growth rate of the ASEAN was 5,85% and ASEAN 5 (Indonesia; Malaysia; Philippines; Singapore; Thailand) was 5,16%.

- GDP per capita of Vietnam period 1990-2014 was 726,27 USD. In comparison relation Vietnam with other countries in the region, GDP per capita of Vietnam is too low compared with the general level ASEAN 3.601,27 USD-14.017,25 USD.

3.2. CONTRIBUTION OF GDP SECTOR COMPOSITION TO ITS GROWTH

3.2.1. Contribution of GDP sector composition to its growth

Period 1990-2014, VA contribution percentage to GDP of the service sector was the highest with 41.23% followed by industry group 34,41% and the lowest ones in agriculture, forestry and fisheries 24,36%.

Although, industry and service sectors are much larger invested in the economy compared with agriculture, forestry and fisheries, the efficiency of investment between sectors reflected unlike investment ratio between economic sectors. Agriculture, Forestry and Fisheries Sectors act as an insurance role in the economy. Investing little but most jobs.

3.2.2. Contribution of GDP ownership-sector composition to its growth

State economic sector in contribution to GDP growth Vietnam in period 1996-2000 was 34,36% and 2001-2005 was 36,07%, higher than the sector with foreign investment respectively 31.01% and 16.46%.

Presently, there are paradoxes in Vietnam's economy in the order of investment incentives reserves of economic sectors: The first is the state economy; foreign investment Economy; finally the private economic sector, however in terms of contribution to GDP growth and investment efficiency in the economy then the private sector is the highest than other economic sectors. Private economic sector is the sector generated the most jobs in the economy.

3.3. THE IMPACT OF FACTORS SUCH AS CAPITAL, LABOR AND TFP ON VIETNAM'S GROSS DOMESTIC PRODUCT GROWTH

3.3.1. The testing result and estimation of the model does not change due to scale

Based on the assumption: “*The model does not change according to the scale*” estimation results indicate $\alpha = 0,696$.

$$\alpha + \beta = 1 \Leftrightarrow \beta = 1 - \alpha \Leftrightarrow \beta = 1 - 0,696 = 0,304$$

Vietnam GDP Growth period 1991-2014 mainly relied on investment factors in the economy, with an average increase of investment in fixed assets in the economy with 7,86%.

The level of employee contribution to GDP growth period 1991-2014 the second factor after capital, with annual increase was

2,48% impact on GDP growth 0,76% getting proportion 10,87% in total GDP growth period 1991-2014.

TFP as a factor reflecting the combination of input factors of production process, management mechanism, scientific and technological level,...contribution to Vietnam 's GDP growth was the lowest, period 1991-2014 was 0,72% getting 10,39% the proportion of the average GDP growth of Vietnam.

3.3.2. The testing result and estimation of latency model.

- Estimation results according to the first difference model reflect that in short term "*The model does not change according to the scale*".

- Estimation results according to the first difference model with late distribution reflect that in short term Vietnam GDP growth exist only 2 factors: labor factor and GDP growth with a lag of one year.

Estimation results VECM, Vietnam GDP growth after having been adjusted wrong number between short-term and long-term depends on GDP growth with a lag of 1 year and 2 years.

3.4. ESTIMATION THE IMPACT OF FACTORS TO GROSS DOMESTIC PRODUCT SCALE BY THE NEURAL NETWORK MODEL

With correlate testing results, more precisely $\ln(\text{GDP})$ correlated with the factors: Total investment in fixed assets in the economy; Total employees engaged in the manufacturing process in the economy; Inflation in the economy; Import-export turnover of economy; Oil prices; Energy consumption in the economy; GDP in the past with 1 and 2-year delay; Total investment in fixed assets in the economy with a lag of 1 year and 2 years; economic crisis once I.

3.4.1 Neural network model

Estimation results of factors affecting GDP Vietnam according to neural network model show that model with 12 hidden layer neurons is the best. The model with 12 hidden layer gives the best explanation of factors impacting Vietnam GDP with 97,5% which is higher than the remaining models. Besides 12 hidden layer neurons also is the smallest wrong number model.

3.4.2. Discussion on the estimated results

Based on the value of the connection coefficient shows that the level of impact of these factors in turn from high to low: Investment in fixed assets factor was ranked highest; Total electricity consumption in economy is respective 2nd place; 3rd Total labor; 4th oil price; 5th inflation; the openness of the economy 6th; 7th economic crisis. Next GDP in the past 1 year latency 8th; 1 year latency fixed assets 9th and the last two variables 2 year lag of GDP and total fixed assets, respectively 10 and 11.

CHAPTER 4

POLICY IMPLICATIONS

4.1. THE DEVELOPMENT OF AGRICULTURE AND FORESTRY - FISHERIES SECTOR

+ The government should have programs with investment objectives for services and industrial development, supporting agriculture and forestry fisheries development. This is the essentially right direction of Vietnam, because Vietnam has got experience, has a comparative advantage compared to the world in the agriculture and forestry sectors - fisheries. The modern industries like auto; new technologies theoretically create higher value-added than agriculture and forestry sectors - fisheries. Besides Vietnam does not have the advantage of developing the industry if Vietnam concentrate resources on investment which will lead that industry groups Vietnam have advantages to be left behind and occupations which Vietnam invest, could not compete with the products of the advanced countries.

4.2. THE DEVELOPMENT OF OWNERSHIP SECTOR BASED ON INVESTMENT EFFICIENCY

+ Government should reconsider the policy of economic state development and building which is a key economic sector, as the leader in the Vietnam economy.

+ Without discrimination, economic sectors are equal in opportunities to access resources, especially the resources invested in the economy.

- State Economy focus on public products, production for community, for ensuring security and defense. Separating the

business function of state economy from the function implementing the obligations of public security and defense of the state economy.

4.3. IMPROVING THE EFFECTIVE CONTRIBUTION OF THE FACTORS TO THE GROWTH OF GROSS DOMESTIC PRODUCT

- Capital factor: Government should orient the investment flows into the economic sectors based on the efficient use of capital principles.

- Labor factor: Changing strategy of human resource training Vietnam, orienting training institutions at all levels is the training of human.

- Power factor:

- + Power consumption factor in the economy: Diversification different power source as wind power, Solar, Thermal. Limiting development of power sources from hydropower and reducing dependence on power supply which is bought from China and some countries in the region.

- + Petroleum energy sources: The advisory department, the State management agencies should study to implement price insurance measures gasoline through the financial instruments on the international market.

- Inflation factor: Performing synchronous measures, including the promotion of investment efficiency, control oil prices, power prices in the economy will help control inflation in Vietnam.

- Economic openness factor: Improvement scale and commodity structure of export of Vietnam towards export the refined products of high added value. In short term, studying enterprise system guide of Viet Nam to understand and use privileges which were committed between Vietnam to other countries, các commercial

organizations worldwide so that Vietnam may penetrate the world market.

TFP factor: Continuing stronger reforms of administrative procedures, improving the legal system to create healthy legal framework, to create favorable conditions for all objects in economy are eligible to participate in the production process of the economy.

CONCLUSIONS

1. Achievements of the thesis

Basically, the thesis has met the objectives and answers the study questions. Systemizing theoretical basis and proposing research mode, analyzing the impact of these factors on the size of GDP and from that given the policy implications of quantitative basis.

2. Limitation of the thesis

Besides these achievements, there are still a certain number of limitations in the thesis:

- Restrictions on research data as well as factors affecting GDP in Vietnam cause testing and estimated results according to methods in the thesis to ensure the highest reliability.

- Method of neural network models only stopped at the application level.

3. Further resesarch development of the thesis

This topic will be further improvement and subsequent studies in the future will extend time series to verify the results of the current study. If the conditions for organizing data for socio-economic indicators of Vietnam is fuller, the topic will add such factors: The development of the stock market, fiscal policy, monetary policy,... to clarify more details the role of each factor affecting GDP growth in Vietnam. From that, the policy implications to improve efficiency factors to GDP growth Vietnam.