

Macroeconomic Policy Analysis of Vietnam: A Macro-Econometric Model Approach

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Abstract

Since 1986, Vietnam has been implementing its transition from centrally planned economy to a market economy and has maintained an opening-up policy. Economic reforms on both demand side and supply side have largely contributed to successes of the economy. Since 1990, the economic development has been impressive, even if Vietnam was strongly affected by the Asian financial crisis in 1997–1998. The high economic growth was achieved in a stable macroeconomic situation. Inflation was kept within a controllable range. Undoubtedly, the macroeconomic policies have played an important role in stabilizing the economy in this period. As a consequence of its integration into the world economy and its economic reforms, Vietnam has benefited from inflows of foreign direct investment (FDI) and foreign trade expansion. Beside benefits from open door economic policy and economic integration, Vietnamese economy would face to more external shocks from its integration process. Joining WTO in 2007 creates both opportunities and challenges to the country and it raised the need for suitable and flexible economic policies to sustain the economic development. The objective of this paper is to analyze the impacts of external shocks and short-term macroeconomic policies in Vietnam. These impacts are investigated by employed a macro-econometric model with the assumption of demand determined economy in the short term. Vietnamese economy's model is constructed based on the data from 1986 to 2003. Some simulations of external shocks from world economy; and fiscal policy, monetary policy and exchange rate policy are analyzed in the model. Increase in world demand as a result of further accession of Vietnamese goods to the world market brings a lot of benefit to Vietnamese economy. As a heavy import dependent economy, increase in import prices worsens the economy. Inflation rate increases fast while GDP decreases. Monetary policy has slightly impact on the economy while relaxation fiscal policy could help to promote the economic growth with small impact on inflation rate. Devaluation could help to promote growth however it leads to strong increase in inflation rate and worsens the trade balance.

1. Introduction

As demand management policies, macroeconomic policies have short-run effects through the changes in aggregate demand and prices. Cook and Kirkpatrick (1990) report that the objective of macroeconomic policies is to control the short-run behavior of an economy. The behavior is monitored by the movements in the three main aggregate level variables — the output level, the inflation rate and the balance of payment. In general, for internal balance, the policies raising aggregate demand in

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the short term will lead to increase in the output and price level. For an open economy, external balance is affected by changes in domestic interest rate and exchange rate.

It has been evident that macroeconomic policies in Vietnam have contributed much to the success of the country after Renovation policy. As a result, the Vietnamese economy has made many significant achievements after 20 years of Renovation. In the 1990s, the country enjoyed very promising economic performance. High economic growth was achieved in a stable economy and GDP doubled after 10 years.¹ Inflation has been curbed. Open door economic policy resulted in huge external financial inflows in the forms of Foreign Direct Investment (FDI) and Official Development Assistance (ODA), and strong external trade growth. Vietnam began applying for WTO membership in 1995 and became the WTO's 150th member on 11 January 2007.

Further economic integration will bring both opportunities and challenges to Vietnamese economy. Beside benefits from open door economic policy and economic integration, Vietnamese economy would face to more external shocks from its integration process. To keep a stable high economic growth rate, it raises the need for more flexible macroeconomic policies.

The Vietnamese economy in transition period and its economic integration have been an attractive topic involving numerous studies. However quantified analysis of policies' impact on the economy has been limited. The main reason is that the transformation period from centrally planned economy to market economy has taken place for only a short period, and thus the necessary data for such study is limited. It is difficult but interesting to carry out quantitative analysis of the Vietnamese economy.

The main objective of this paper is to analyze impacts of some external shocks of world economy on Vietnamese economy in its international integration process and impacts of macroeconomic policies on the economy by applying both qualitative and quantitative analyses. For the purpose of quantitative analysis, macro-econometric models can take into account macro behavioral relationships and are suitable for analyzing medium term and short term impacts of macroeconomic policies. With the given objective of study, macro-econometric modeling will be used as a method of quantitative analysis and simulations.

Data collecting for model is always difficult when applying quantitative study method for Vietnamese economy. In order to build a macro econometric model, macroeconomic time series data is collected from national account in the period 1986 to 2003. Other necessary data is collected from other sources of Vietnamese government, ADB, WB and IMF.

The structure of this article is as follow: In the section 1, an introduction about the background, also the objective and methodology of the study in this paper is given. Section 2 overviews the Vietnamese economy performance and macroeconomic policies' implementation after Renovation program. Section 3 is employed to build a macro econometric model based on characteristics of the economy. Section 4 evaluates the impacts of external shocks and macroeconomic policy. Scenarios of

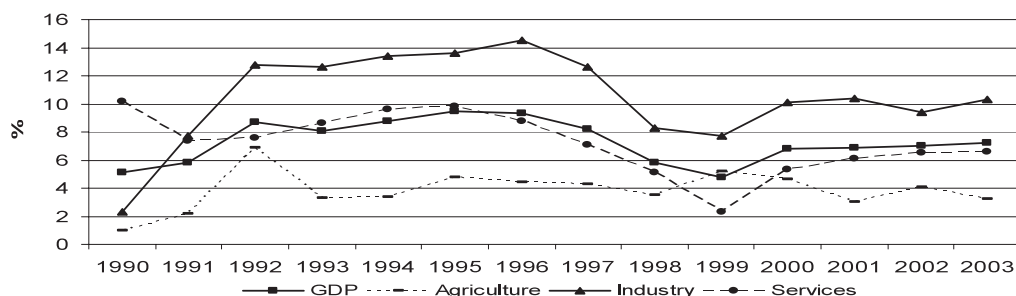
change in world demand, world prices of export and import, fiscal policy relaxation, monetary expansion and exchange rate devaluation implementation are considered. In the section 5, conclusions are drawn based on the results and suggestions for policy implications.

2. Vietnamese Economic Performance and Macroeconomic Policy after Renovation Policy

2.1 Macroeconomic Performance after Renovation Policy

Vietnamese economy has been in a transition period since 1986, transforming from a centrally planned economy to market economy under the “Doimoi” or “Renovation” program. Although the “Doimoi” program was initiated in 1986, only in the spring 1989 did Vietnam embark on comprehensive reform towards a market economy. The reform aimed to stabilize the economy, remove administrative controls that stifled economic performance, and induce market development. The stabilization program was adopted in 1989 as a combination of reforms. The key components of the program were tight monetary and fiscal policies and an appropriate exchange rate policy. The reform included devaluating and unifying the market exchange rates, raising nominal interest rates and thereby pushing real rates to positive levels, reducing subsidies to SOEs, curbing public sector expenditures, restraining increases in wages and state-run sector and state budget expenditures as well as halting the financing of state budget deficits by printing money. A new banking system was established to replace the old mono banking system with a two level banking system that separated the functions of management carried out by state bank from business activities of commercial banks. A new taxation system was also established in this period. A series of tax laws was promulgated including turnover tax, profit tax, export and import taxes. The new tax system contributed to the increase in fiscal revenue and macroeconomic stabilization. Price liberalization was carried out in the period 1989–1991. In the meantime, supply side related policies such as encouraging the development of a multi-ownership economy, restructuring of SOEs, decollectivizing and granting individuals and

Figure 2.1 Vietnam' Economic Growth

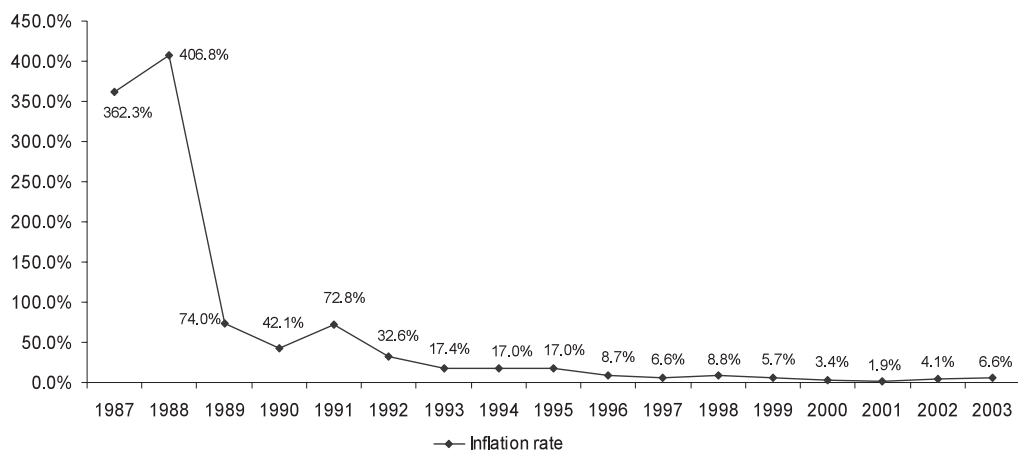


Source: Data from GSO and calculated by author.

families long-term user rights to productive land in the agricultural sector were essential factors included in the reform package.

In the 1990s, particularly the first half, the economy showed very good performance. High economic growth was attained under stable macroeconomic conditions. As a result of a stabilization program, hyper inflation was curbed.

Figure 2.2 Vietnam's Inflation Rate in the Period of 1987–2003



Source: Data from GSO and calculated by author.

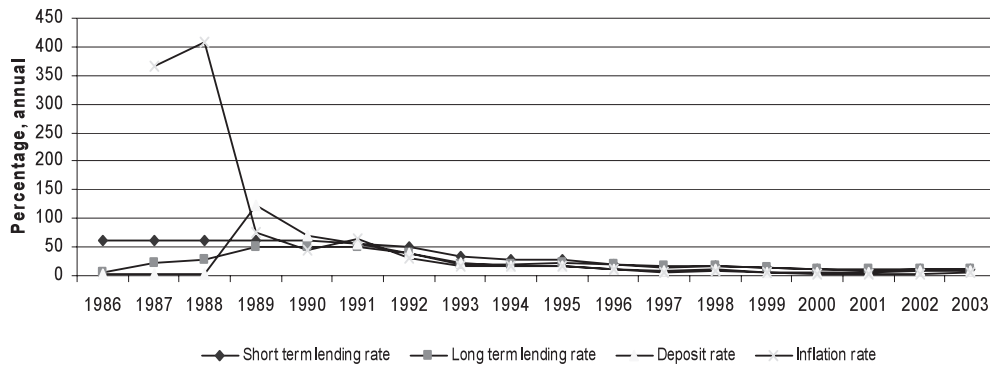
2.2 Macroeconomic Policy after Renovation Program

As one important part of stabilization program, tight fiscal policy was adopted to constrain the budget deficit. The current expenditure of the government was curtailed to comply with the scope of fiscal revenue. Fiscal deficits dropped sharply and were tightly controlled. The financing of state budget deficits by printing money was halted and has been stopped since 1992 (Nghieu 2000: 40). Borrowing to finance budget deficits has only been used for development investments emphasizing infrastructure investment. However, with the changes in economic conditions in the late 1990s when economic growth slowed down and inflation was curbed at a safe level, tight fiscal policy seemed less suitable. A more flexible policy should be considered.

Other key policy was implemented in Vietnam is tight monetary policy. Under tight monetary policy, money supply was strictly controlled. Money growth was kept in accordance with GDP growth and has been demand determined. In theory, the State Bank of Vietnam (SBV) could use some monetary policy tools such as interest rates, credit ceilings, reserve requirements, recapitalization, and Treasury Bill auction to control money supply. However, in reality, the money supply in Vietnam has been controlled mainly by the credit ceiling imposed for every commercial bank from 1994 (Thanh 2003: 4). In fact, indirect tools did not work well under the less-developed financial system existing in

Vietnam thus the SBV controlled the money supply under a direct mechanism rather than using indirect monetary policy tools like many other market economies. The increase in nominal interest rate and then a positive real rate aiming to stopping credit subsidies contributed greatly in curbing inflation.

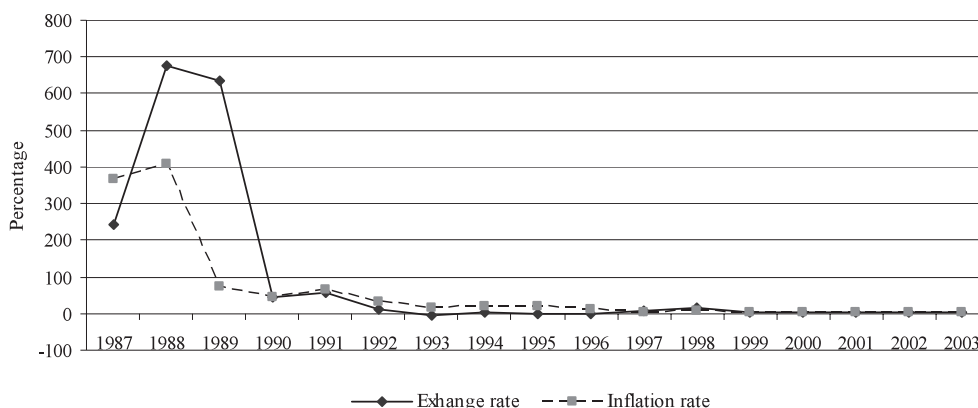
Figure 2.3 Interest Rates and Inflation Rate in the Period 1986–2003



For a long time, interest rates had been controlled by SBV. The ceiling lending rates and then the basic lending rates with upper bounds were set by SBV. The lending rate ceiling on foreign currency loans was abolished in November 2001. Since then domestic borrowers in foreign currencies have been allowed to negotiate interest rates with domestic and foreign banks. Only after June 2002, were interest rates fully liberalized. Banks are now allowed to set lending rates on the basis of their own appraisal and negotiation with their customers.

Exchange rate policy was also considered as a main part of stabilization policy in Vietnam. In 1989 when Vietnam embarked on radical reform toward a market economy, the exchange rate was unified by a sharp devaluation of the official exchange rate. During the 1990s, the VND was kept stable with several discrete realignments.

The attempts of SBV to keep exchange rate stable in this period had the primary purpose of stabilizing domestic prices while the economy was substantially dependence on imports. However, in this period, VND was considered overvalued and was under devaluation pressure. During the period 1997–1999, pressures to devalue the VND increased as financing current account deficits became more difficult due to a slowdown in foreign direct investment (FDI), thin foreign currency reserves with a concurrent decline in growth of exports. Worries about overvaluation of VND became more acute following the East Asian economic crisis that led to sharp devaluation of crisis countries' currencies, and thus reduced the competitiveness of Vietnamese commodities. Under pressure to devaluation with an accompanying fear of bad outcomes of a sharp devaluation under the introduction of a flexible regime, the SBV has adopted a cautious exchange rate policy, which has allowed the VND

Figure 2.4 Nominal Exchange Rate Changes and Inflation

to devalue modestly and gradually, while keeping strict control over foreign exchange. Vietnam has also imposed stronger controls over imports and current account transactions. Between 1997 to 2000, the VND depreciated by at least 20% with respect to the USD, but appreciated by at least 19% or more relative to currencies of crisis-affected ASEAN countries (CIEM 2001: 35). A further devaluation is necessary in consideration of future export prospects.

Since 1998, Vietnamese economy growth was slowing down after a period of high economic growth rate. The regional situation after the Asian crisis and the country economic conditions has changed. Vietnamese currency became overvalued in comparison with crisis-affected ASEAN countries and it requires appropriate adjustments in macroeconomic policy. A flexible fiscal policy such as fiscal relaxation and currency devaluation should be considered to push the economic growth in the short term and to improve the trade stance. The impact of policy adjustments will be examined in the next part by applying a macro-econometric model as a quantitative method.

3. Macro-Econometric Model for Vietnam

The main objective of this study is to analyze impacts of some external shocks from world economy and macroeconomic policy adjustment on the economy by applying an econometric model as a quantitative method. Six simulations of increase in world demand; increase in world prices of Import Goods; increase in world prices of export; fiscal relaxation policy, monetary policy expansion and currency devaluation will be examined in the model and then policy implication will be given for the economy in this period.

The model will describe the behavior of aggregated agents. In practice such a model generally considers five agents: the households, the firms, the financial institutions, the State and its agencies, and the rest of the world. The model is supposed to describe the behavior of agents, but this behavior

is not decided by theory alone. Formulas will be based on historical data, and validated through statistical tests. The estimated formulations have been defined in advance, according to some theory. The role of econometrics will be only to validate pre-set structural equations, and to lead the choice between alternate versions. The parameters of the equations are empirically estimated based on time series data. The model is a dynamic one. It means that in some cases, the past values of variables will affect present ones. This is a general characteristic of macro-econometric models.

This section introduces the data sources for the model and methodology used in modeling.

3.1 Data System and Software Used in Model

Before 1988, Material Product System (MPS) was used as a System of General Socio-economic Information in Vietnam. From 1989 to 1992, under the support of International Statistical Agency, Vietnam's General Statistical Office started studying to apply System of National Accounts (SNA). The government Decree No 183/TTg on the official application of SNA to periodically compile the country's national accounts was promulgated in December 25, 1992 by the Prime Minister. After several years applying SNA in Vietnam, GSO has calculated some aggregate indicators and compiled some main accounts for the demand of macroeconomic management. However, the application of SNA in Vietnam has been inefficient. The reasons are that the initial basic data is not adequate and the accounting and statistical system are not improved enough to correspond with the contents of SNA. Thus, to a certain extent, Vietnamese data is inaccurate and inadequate (General Statistics Office 1998).

The model uses annual data, and the equations are generally estimated for a period ranging between 1986 and 2003, that is, the period of the dramatic transformation and the opening up of the Vietnamese economy. Almost all data comes from the Statistical Yearbook of Vietnam and reports of International organization (such as ADB, IMF, WB); some other data come from the Ministry of Planning and Investment (MPI), Vietnam, and Development Strategy Institute (DSI), Vietnam.

The software used to construct and run the model is EVIEWS 4.0.

3.2 Method of Estimation

A model is a set of one or more equations that jointly describe the relationship between a set of variables. The model equations can come from many sources: they can be simple identities, they can be the result of estimation of single equations, or they can be the result of estimation using any one of multiple equation estimators. There are two approaches to estimate the model equations. One approach is to estimate each equation in the system separately. A second approach is to estimate, simultaneously, the complete set of parameters of the equations in the system. In reality, single equation estimation method is easier and more flexible for adjusting and selecting the form of equation.² There are some advanced technique to estimate system of equations such as Two Stage

Least Squares (TSLS) or Three Stage Least Squares (3SLS),³ however with Vietnamese data condition, the observations are limited⁴ and it is ineffective for using some techniques such kind of techniques.⁵ An alternative technique is used for this model estimation is the Seemingly Unrelated Model (SUR). The SUR model is a recursive model consisting of a series of endogenous variable as a group. This kind of model can improve on the efficiency of ordinary least squares. By writing the equation system as one combined equation, estimating that equation using least squares estimation. This increase the efficiency because there are more degree of freedom with which to estimate the parameters for variables than single one.⁶

Thus the Vietnamese model, ordinary least squares (OLS) method is applied to estimate the single equations to identify the form of each equation. And then SUR model is applied for estimating system of equations. The results when applying OLS and SUR to estimate equation in Vietnamese model is almost the same.

A common finding in time series regressions is that the residuals are correlated with their own lagged values. This serial correlation violates the standard assumption of regression theory that disturbances are not correlated with other disturbances. In this case we could apply auto regressive model to correct the serial correlation error. The simplest and most widely used model of serial correlation is the first-order autoregressive, or AR(1), model. For the simple case, if the AR(1) model is specified a

$$Y_t = \beta X_t + U_t \quad (1)$$

$$U_t = \rho U_{t-1} + \varepsilon_t \quad (2)$$

The parameter ρ is the first-order serial correlation coefficient. In effect, the AR(1) model incorporates the residual from the past observation into the regression model for the current observation. For example, if EVIEWS software is used to estimate, the linear model is transformed into nonlinear model as

$$Y_t = \rho Y_{t-1} + \beta(X_t - \rho X_{t-1}) + \varepsilon_t$$

by substituting the second equation into the first, and rearranging terms. The coefficients ρ and β are estimated simultaneously.

EVIEWS software provides the DW test, the Q-statistic and the Breusch-Godfrey LM test to test the serial correlation.⁷ Also the causality test is applied to check the consistence of each equation.

3.3 Model Specification

The model includes 7 behavioural equations and 10 identities as follows:

(1). Private consumption equation

$$\log(\text{CPR}) = 3.35 + 0.7\log(\text{GDPR}) + [\text{AR}(1) = 1.29, \text{AR}(2) = -0.64]$$

(2). Domestic Firm Investment Equation

$$\log(\text{IFRD}) = -7.07 - 0.004\text{RRATE} + 1.2\log(\text{GDPR}) + 0.3\log(\text{IGR})$$

(3). Real Exports Equation

$$\log(\text{XR}) = -8.27 + 2.46\log(\text{WD}) + 0.87\log(\text{ER} \cdot \text{PX\$} / \text{PGDP})$$

(4). Real Imports Equation

$$\log(\text{MR}) = -3.85 + 0.96\log(\text{DR}) + 0.43\log(\text{XR}) - 0.14\log(\text{ER} \cdot \text{PM\$} / \text{PGDP})$$

(5). Real money demand equation

$$\log(\text{M2R}) = -3.54 + 0.45\log(\text{GDPR}) + 0.83\log(\text{M2R}(-1))$$

(6). GDP deflator equation

$$\log(\text{PGDP}) = -3.35 + 0.89\log(\text{PM}) + 0.27\log(\text{DR})$$

(7). Employment equation

$$\log(\text{EMP}) = 6.66 + 0.3\log(\text{GDPR}) + [\text{AR}(1) = 0.45]$$

(8). Real GDP includes domestic demand and trade balance and corrected by statistical discrepancy

$$\text{GDPR} = \text{DR} + \text{TB} - \text{SDR}$$

(9). Real domestic demand includes total investment and consumption

$$\text{DR} = \text{IR} + \text{CPR} + \text{CGR}$$

(10). Real total investment includes foreign direct investment, government investment and domestic investment from firms

$$\text{IR} = \text{FDIR} + \text{IGR} + \text{IFRD}$$

(11). Foreign direct investment in constant price

$$\text{FDIR} = (\text{FDI\$} \cdot \text{ER} / \text{PGDP}) / 1000$$

(12). Government revenue from tax

$$\text{REVGR} = \text{RATIO} \cdot \text{GDPR}$$

(13). Real trade balance

$$TB = XR - MR$$

(14). Inflation rate

$$P = (PGDP/PGDP(-1) - 1) * 100$$

(15). Real interest rate

$$RRATE = RATE - P$$

(16). Import deflator

$$PM = ED * PM\$$$

(17). Exchange rate index

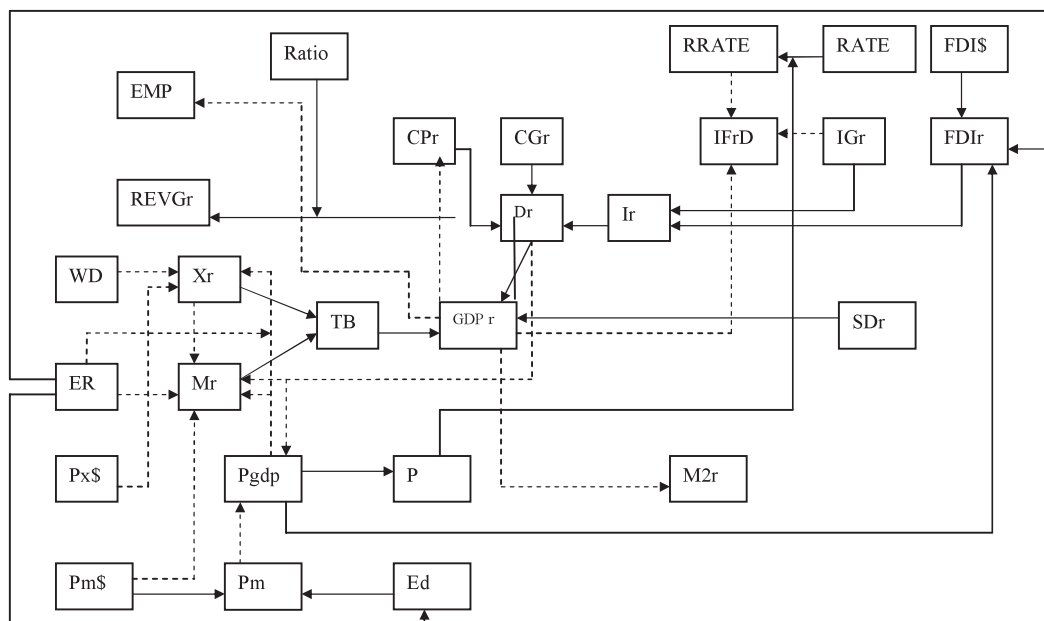
$$ED = ER / 10965.7^8$$

The model is a simple macro-econometric one with the assumption of demand determined economy in the short term, implying that increase in aggregate demand leads to increase in output and prices.⁹ Output (GDPR) of the economy is determined by domestic demand (DR) and corrected by trade balance (TB). Domestic demand (DR) is determined as sum of total investment (IR), private (CPR) and government consumption (CGR). Private consumption is determined by income (GDPR). Total investment (IR) includes foreign direct investment (FDIR), domestic investment from firms (IFRD) and government investment (IGR). Domestic investment from firm (IFRD) is explained by income (GDPR), real interest rate (RRATE), and government investment (IGR). Real interest rate is determined by nominal interest rate (RATE) after adjustment for inflation rate (P). Inflation rate is determined by changes in domestic price, here GDP deflator (PGDP) is used as domestic price. Domestic price (PGDP) is affected by change in aggregate demand in short term (DR)¹⁰ and import deflator as domestic price of import (PM).¹¹ Import deflator is determined by nominal exchange rate (ER) and trading price of import (PM\$). Trade balance is determined by net export (XR-MR). Export (XR) is explained by world demand (WD)¹² and price-competitiveness determined by nominal exchange rate, domestic price (PGDP) and trading price of exports (PX\$). Import is explained by domestic demand (DR), export,¹³ and price-competitiveness. Real money demand (M2R) is determined by real income. Money growth is assumed to be demand determined. Employment (EMP) of the economy is determined by real output (GDPR). By assuming government revenue form tax to GDP ratio (RATIO) is given exogenously, government revenue (REVGR) form tax will be calculated in the model by using this ratio.

Table 3.1 List of Variables

	Variable	Unit	Explanation
Endogenous			
1	GDPR	Bil. dongs	GDP at constant prices
2	DR	Bil. dongs	Final demand at constant prices
3	IFRD	Bil. dongs	Domestic investment firms at constant prices
4	FDIR	Bil. dongs	Foreign direct investment at VND
5	CPR	Bil. dongs	Private consumption at constant prices
6	XR	Bil. dongs	Export at constant prices
7	MR	Bil. dongs	Import at constant prices
8	TB	Bil. dongs	Trade balance
9	P	%	Inflation rate
10	EMP	Thous. pers	Labor demand
11	PGDP	Index	GDP deflator
12	M2R	Bil. dongs	Real money demand
13	PM	Index	Import deflator
14	RRATE	%	Real interest rate
15	IR	Bil. dongs	Real total investment
16	ED	Index	Exchange rate index
17	REVGR	Bil. Dongs	Government revenue from tax at 1994 prices
Exogenous			
18	CGR	Bil. dongs	Government consumption at constant prices
19	ER	dongs/US\$	Exchange rate
20	FDI\$	Mil US	Real FDI
21	IGR	Bil. dongs	Government investment at constant prices
22	PX\$	Index	Export trading price
23	PM\$	Index	Import trading price
24	SDR	Bil. dongs	Statistical discrepancy at constant prices
25	WD	Index	World demand
26	RATE	%	Nominal interest rate
27	RATIO	%	Government revenue from tax to GDP ratio

Figure 3.1 Vietnam Macroeconomic Model Structure



Behavioral Equations

• Private Consumption Equation

Real consumption (CPR) is simply defined as the function of real income (GDPR). Autoregressive (AR) model is applied to correct serial correlation.

$$\text{Log(CPR)} = 3.01 + 0.74\text{log(GDPR)} + [\text{AR}(1) = 0.90, \text{AR}(2) = -0.41]$$

t-Statistic 7.46*** 19.06*** 5.07*** -2.36**

R² 0.99

DW stat 1.64

Note: one asterisk () indicates parameter significant at the 10% level; two asterisks (**) indicate parameter significant at the 5% level; three asterisks (***) indicate parameter significant at the 1% level.*

The result of estimation shows that the coefficients conform well to theory. Income elasticity is positive and statistically significant at the 1% level, verifying a positive relationship between consumption and disposable income. The elasticity is 0.7 means there will be 0.7% increase in consumption if there is 1% increase in income.

• Domestic Investment From Firms Equation

Real domestic investment from firms (IFRD) is specified as the function of domestic real interest rate (RRATE), real income (GDPR) and government investment (IGR).

$$\log(\text{IFRD}) = -7.07 - 0.004\text{RRATE} + 1.2\log(\text{GDPR}) + 0.3\log(\text{IGR})$$

t-Statistic	-1.51	-3.08***	2.21**	1.13
R ²	0.97			
DW stat	2.14			

The specification of the domestic investment from firms function is relatively simple. However, it seems to provide a reasonably good explanation of investment behavior in Vietnam. Real interest rate negatively relates to domestic investment from firms as expected and is significant at 1% level. However, Vietnamese investment is quite interest-inelastic, with the interest elasticity estimated to be about -0.004 . This is due to the fact that for a long time, the interest rate in Vietnam was tightly controlled by the State Bank.¹⁴ Real income elasticity to investment is 1.2 and significant, implies that 1 percent increase in real income leads to 1.2 percent increase in real domestic investment from firms. One interesting result is that government investment could influence the private investment from firms as crowding in effect. Increased government investment, for example in infrastructure acts as to some extent a catalyst to private investment. The government investment elasticity is estimated to be 0.3%, meaning that 1% increase in government investment leads to 0.3% increase in private investment.

• Real Exports Equation

Exports are assumed to be a function of the price-competitiveness ($\text{ER*PX\$}/\text{PGDP}$) and the world demand (WD), with positive coefficients for both variables. The exports equation may therefore be expressed as:

$$\log(\text{XR}) = -8.27 + 2.46\log(\text{WD}) + 0.87\log(\text{ER*PX\$}/\text{PGDP})$$

t-Statistic	-2.59**	16.44***	2.4**
R ²	0.96		
DW stat	1.72		

All coefficients in the estimation export function bear the expected signs and are significant. As a small country, world demand has a big impact on Vietnam's export, reflected by the elasticity of world demand much larger than unity, 2.46. Elasticity of price-competitiveness is 0.87, implies significant export response to relative price changes.

• Real Imports Equation

Real imports are conventionally related negatively to price-competitiveness ($\text{ER*PM\$}/\text{PGDP}$) and positively to real domestic demand. In reality, imports in Vietnam is not only for domestic demand but are also used for re-export as intermediate goods. Thus export is included in the import function as a explanation variable. The form of imports equation as

$$\log(\text{MR}) = -3.85 + 0.96\log(\text{DR}) + 0.43\log(\text{XR}) - 0.14\log(\text{ER*PM\$/PGDP})$$

t-Statistic - 2.69** 9.88*** 10.93*** -1.61

R² 0.99

DW stat 1.63

In the export equation the estimated coefficients also bear the right sign and are all significant at conventional levels. Domestic demand elasticity is rather high, 0.96, implies that Vietnamese economy depends heavily on imports. 1% increase in domestic demand will lead to 0.96% increase in imports. Exports elasticity is 0.43, implying that 1% increase in exports is responded by 0.43% imports. Demand for imports response to relative price change is not so significant. 1% change in relative price leads to 0.14% change in imports.

• Real money Demand Equation

Keynes visualized the demand for money (real cash balances) as rising from transactions, speculative and precautionary motives. For the transaction and precautionary purposes, the higher income, the higher demand for money. For speculative purposes, the higher interest rate, the less demand for money (Jha 2003: 30). In fact, the strongest motive influencing the demand for money in Vietnam is transactions, which depend on income. The speculative demand for money is not very pronounced in Vietnam since the money market is not well developed and few alternative financial assets exist. Government bonds and Treasury bills are largely purchased by the financial institutions as investment for their idle funds. Thus the money demand in Vietnam is assumed as a function of income. Lagged dependent variable is included in the equation to analyze adjustment between short term and long term. The equation is defined as

$$\log(\text{M2R}) = -3.54 + 0.45\log(\text{GDPR}) + 0.83\log(\text{M2R}(-1))$$

t-Statistic -1.56 1.43 5.26***

R² 0.97

DW stat 1.51

The real income elasticity to money demand is 0.45 in short term, implying 1 percent change in income lead to 0.45 percent change in demand for money. Long run elasticity is much higher, about 2.7 percent.

• GDP Deflator Equation

GDP deflator can be understood as the general price level. For Vietnamese economy in the transition period, the two main factors assumed to have the impact on change in price level are import price, considered as cost push inflation, and aggregate demand change (DR) in the short term considered as demand pull inflation. It is useful to examine the effect of demand expansion policy on price level. The equation is defined as:

$$\log(\text{PGDP}) = -3.35 + 0.89\log(\text{PM}) + 0.27\log(\text{DR})$$

t-Statistic	- 3.3***	53.34***	3.3***
R ²	0.99		
DW stat	1.91		

The result of the equation are significant and of the expected sign. Prices of import has strong impact on domestic prices. 1 percent change in prices of imports leads to 0.89 percent change in prices level. The elasticity of total demand is 0.27, implies that 1 percent change in income leads to 0.27 percent change in prices level.

• Employment Equation

For the employment function, demand for employment will be determined by aggregate demand. Increase in aggregate demand in short run could create more jobs. This idea combine with the idea of demand pull inflation discussed in equation (6) show the determination of output, labor and price level in the short term. Output expansion leads to the increase not only in employment but also in price level, implies the trade off between unemployment rate and inflation rate¹⁶. Autoregressive (AR) model is applied to correct serial correlation.

$$\log(\text{EMP}) = 6.66 + 0.3\log(\text{GDPR}) + [\text{AR}(1) = 0.45]$$

t-Statistic	57.38***	32.42***	1.87***
R ²	0.99		
DW stat	1.73		

Result of estimation implies that for 1% increase in output there is for 0.3 percent increase in employment.

In sum, the period 1986–2003, of which data were applied for estimating the model was considered as the first stage of reform. The model specification was based on the characteristics of Vietnamese economy in this period. The financial system is still weak. Government has mainly used the direct tools to regulate the monetary system. The impact of indirect tools has been limited. Interest rate was tightly controlled for a long time, and thus it did not contribute so much in promoting investment. Increase of investment in this period mainly resulted from the growth of income. Government investment also contributed to encourage the private investment. As a small country, export was strong affected by the world demand. Vietnamese economy depends heavily on imports. The increase in import price strongly affected the domestic price. Almost parameters in equations were significant estimated at the expected signs and could be explained by the reality in this period.

Results of simulation for the past, in the period 1998–2003, are acceptable. The percentage errors of some indicators is from -2.29% to 2.44% . The model could be used to do simulations for the period of 1998–2003. Next section is use for policy simulation.

Table 3.2 Model Evaluation

	CPR	EMP	GDPR	IFRD	M2R	MR	PGDP	PM	XR
Percentage error									
1998	2.44	-0.17	0.90	1.12	0.41	1.59	0.49	0.00	-0.43
1999	-0.14	-0.65	-0.05	-0.06	0.32	-0.09	-0.03	0.00	0.02
2000	-0.10	-0.48	-0.03	-0.04	0.25	-0.06	-0.02	0.00	0.02
2001	-1.67	-0.34	-0.51	-0.63	-0.02	-1.08	-0.33	0.00	0.29
2002	-3.38	-0.46	-0.86	-1.07	-0.40	-2.12	-0.64	0.00	0.56
2003	-2.29	-0.11	-0.55	-0.69	-0.59	-1.42	-0.43	0.00	0.37

4. Assessment of Policy Adjustment

After the East Asian economic crisis, the Vietnamese economy slowed down. The VND was considered overvalued and appreciated relative to currencies of crisis-affected ASEAN countries, thus reducing the competitiveness of Vietnam commodities. Tight fiscal policy was no longer appropriate to promote growth. Some adjustments in macro policy were now needed. Vietnam further integrates into the world economy and it would be affected more by external shocks. In this part, six simulations have been implemented to assess the impact of external shocks and policy adjustments on Vietnamese economy in the year 2003. The first one assumes an increase in world demand as a result of further international integration. The second one assumes an increase in import prices. The third one assumes an increase in export prices. The fourth one assumes an increase in government investment. The fifth one studies the effect of nominal interest rate decrease. The last one assumes an exchange rate devaluation.

4.1 The Impact of Increase in World Demand.

The first simulation implemented corresponds to a 5% increase in world demand as a result of further economic integration and trade liberalization into the world economy.

Table 4.1 The Effect of 5% Increase in World Demand

(percentage change from base)

WD	GDPR	IFRD	CPR	PGDP	P	EMP	XR	MR	TB	REVRG	M2R	RRATE
5	5.1	6.8	3.5	1.3	25.9	1.5	11.5	8.9	11.3	5.1	2.2	-28.2

As a small economy, 5% increase of world demand directly leads to 11.5% increase in export. The country receives more incomes, GDP increases by 5.1%. Increase in GDP leads to domestic private investment increases by 6.8%; consumption increases by 3.5%; and government revenues increases by 5.1%. As a result of increase in demand, prices increase by 1.3%, results in an increase in inflation

rate from 5.1% to 6.5%. Import increases by 8.9% as a result of increase in domestic demand and export, however export increases larger and it leads to an increase in trade balance by 11.3%. Real interest rate reduces from 4.7% to 3.3% as a result of increase in inflation rate.

4.2 The Impact of Increase in World Price of Import Goods

The second simulation implemented corresponds to a permanent 5% increase in world prices of import goods. As a heavy import dependent economy, the price of import has strong impact on domestic prices level. 5% increase in prices of import leads to 4.1% increase in domestic prices level and thus the inflation rate increases from 5.1% to 9.5%. As a result of increase in inflation rate, real interest rate reduces from 4.7% to 0.5%. Domestic investment increases slightly by 0.1%. Increase in domestic prices leads to decrease in price-competitiveness of export and thus export decreases by 3.4%. Because import prices increases (by 5%) larger than domestic price (by 4.1%), price-competitiveness of import increases and it leads to decrease in import by 2.2%. Trade balance reduces by 7.6% because export decreases larger than import. GDP decreases by -1.2%.

Table 4.2 The Effect of 5% Increase in World Price of Import Goods

(percentage change from base)

PM\$	GDPR	IFRD	CPR	PGDP	P	EMP	XR	MR	TB	REVRG	M2R	RRATE
5	-1.2	0.1	-0.9	4.1	83.8	-0.4	-3.4	-2.2	-7.6	-1.2	-0.6	-88.6

4.3 The Impact of Increase in World Price of Export Goods

Table 4.3 The Effect of 5% Increase in World Price of Export

(percentage change from base)

PM\$	GDPR	IFRD	CPR	PGDP	P	EMP	XR	MR	TB	REVRG	M2R	RRATE
5	1.7	2.3	1.2	0.4	9.0	0.5	3.9	3.0	3.9	1.7	0.8	-9.9

The third simulation implemented corresponds to a permanent 5% increase in world prices of export goods. 5% increase in world prices of export goods leads to increase in price-competitiveness of export, thus export increases by 3.9%. As result of increase in export, import also increases by 3.0%. However, export increases larger than import, thus trade balance increases by 3.9%. GDP increases by 1.7%. Increase in GDP results in 2.3% increase in domestic investment and 1.2% increase in domestic consumption. Domestic demand increases leads to domestic prices increases by 0.4% thus inflation rate increases from 5.1% to 5.6%. Real interest rate decreases from 4.7% to 4.2%.

4.4 The Impact of Fiscal Relaxation, Government Investment Increase by 5%

Table 4.4 presents the results of the simulations for the main variables relative to their baseline values. An increase in government investment has two implications. First, it directly raises the total demand. Second, it influences private investment. 5% increase in government investment leads to about 0.3% increase in output and about 1.9% increase in domestic investment from firms. More jobs are created; employment increases by 0.1%. Domestic prices rise by 0.1% thus inflation rate increases from 5.1% to 5.2%. As a result of increase in inflation rate, real interest rate decreases from 4.7% to 4.6%. Increase in government investment worsens the trade balance. Domestic price increases makes the Vietnamese commodities less competitive, thus exports reduces by 0.1%. Increase in domestic demand and domestic prices lead to 0.7% increase in imports. Trade balance decreases by 6.9%. Government revenue from tax increases by 0.3% as the direct impact of increase in total output.

Table 4.4 The Effect of 5% Increase in Government Investment

(percentage change from base)

IGR	GDPR	IFRD	CPR	PGDP	P	EMP	XR	MR	TB	REVRG	M2R	RRATE
5	0.3	1.9	0.2	0.1	1.5	0.1	− 0.1	0.7	− 6.9	0.3	0.1	−1.7

The first conclusion for this simulation is that an increase in government investment could promote growth by increasing demand of the economy; however, it worsens the trade balance and leads to an increase in domestic prices. The government investment could be financed by the increase of government revenue from tax as a result of increase in total output.

4.5 The Impact of Monetary Policy Expansion, Nominal Interest Rate Decreases by 5%

Table 4.5 The Effect of 5% Decrease in Nominal Interest Rate

(percentage change from base)

RATE	GDPR	IFRD	CPR	PGDP	P	EMP	XR	MR	TB	REVRG	M2R	RRATE
5	0.03	0.23	0.02	0.01	0.14	0.01	−0.01	0.07	−0.64	0.03	0.01	−10.41

Table 4.5 presents the results of the simulations for the main variables relative to their baseline values. Interest rate policy has slightly impact on the economy. 5% decrease in nominal interest rate leads to 0.23% increase in domestic private investment. GDP increases by 0.03%. Domestic prices increase by 0.01%.

4.6 The Effect of Devaluation

The second simulation concerns the nominal exchange rate. Competitiveness for domestic

commodities could be gain by devaluing the domestic currency. Table 4.6 investigates the effects of 5 percent devaluation of the VND.

Five percent devaluation would increase real GDP by a 0.5 percent. However, as import prices and domestic demand enter to determine domestic prices, the increase in nominal exchange rate implied by devaluation leads to an increase in domestic prices. This would lead to a 4.6% increase in the domestic price level. Thus inflation rate increases from 5.1% to 9.9%. Real interest rate decreases from 4.7% to 0.1%

Table 4.6 The Effect of 5 % Devaluation of the VND

(percentage change from base)

ER	GDPR	IFRD	CPR	PGDP	P	EMP	XR	MR	TB	REVRG	M2R	RRATE
5	0.5	2.5	0.4	4.6	93.4	0.2	0.4	1.0	-5.6	0.5	0.2	-98.3

The effect on trade balance is negative. Export increases by 0.4%. Import also increases by 1% as a result of increase in domestic demand. Trade balance decreases by 5.6%. Government revenue from tax also increases as direct impact of increase in output by 0.5%.

4.7 Model Limitations

The model presented in this paper emphasises the role of macro policies in the Vietnamese transitional economy. The model describes the behavior of aggregated agents mostly on the demand side of the economy. It gives a central role to macro policy as a way to promote growth in the short run. However there are still several limitations. Lack of accurate and adequate data is always the most difficult issues for quantitative studies of Vietnamese economy, and thus the model constructed in this study specified as the simple one. The model only focuses on the demand side of the economy and is not able to analyze the impact on supply side. Lack of data in banking and financial sector limits the ability of the model in analyzing impacts monetary policy in this study.

5. CONCLUSION

Since 1986, Vietnam has been in the transition from the centrally planned economy to a market economy. “Renovation” policy, or the Vietnamese “Doimoi” battle-cry moved the economic system towards major policy changes and economic reforms. In the late 1980s, Vietnam embarked on comprehensive reform towards a market economy. The reform aimed to stabilize the economy, remove administrative controls that stifled economic performance, and develop the markets. As the combination, the stabilization program adopted by the Vietnamese government in 1989 included three key macroeconomic policies which played an important role in stabilizing the economy. Tight fiscal

policy and fiscal reform were implemented for the purpose of improving fiscal stance. Tight monetary policy and banking system reform were adopted as a measure to control money growth and establish the prerequisite fundamentals for market economy. Trade reform and an appropriate exchange rate adjustment were undertaken, on the one hand to promote trade relationships, on the other hand to stabilize domestic prices. Macroeconomic policies in Vietnam have contributed much to the success of the country after Renovation policy, especially over the last decade.

Joining WTO in 2007 creates both opportunities and challenges to the country and it raised the need for suitable and flexible economic policies to sustain the economic development. Beside benefits from open door economic policy and economic integration, Vietnamese economy would face to more external shocks from its integration process.

Further integration into the world market would benefit the economy a lot. Larger market strongly generates export growth and domestic income. However, the integration process brings not only opportunities to the economy but also challenges. The more trade liberalization with less protection will make the economy more sensitive affected by external shocks. As a heavily import dependent economy, increase in import prices worsen the economy much. Inflation increases sharply while domestic income decreases. To react with more external shocks, it raises the need for more flexible and suitable of macroeconomic policies to be implemented while Vietnam integrates further into the world economy.

Relaxing fiscal policy, relaxing monetary policy and devaluation of VND are suggested as two promoting growth policies. The simulation results show that relaxing fiscal policy implying a modesty increase in government investment could promote growth by increasing demand of the economy; however, it worsens the trade balance and leads to an increase in domestic prices and inflation rate. After the Asian financial crisis, the economy was affected and slowing down. In case of low inflation rate, government could increase its investment as a push for the economy. Reducing the nominal interest rate slightly affected the economy. It reflects that the role of monetary policy in Vietnam is still weak. Vietnam is a strong import dependent country thus devaluation of VND could both promote growth however it worsens trade balance; and the domestic prices and inflation rate increase much. In both simulations, government revenue from tax is expected to increase as the direct result of increase in total output.

In some recent years, Vietnamese government was implementing more flexible policies on both fiscal policy and exchange rate policy. In the transition period of Vietnam, investment in infrastructure plays an important role in economic development and government investment is the main actor. Increase in fiscal spending for investment is planning to keep accordance with fiscal revenue. The fiscal deficit at 6% to 7% is considered as an acceptable in fiscal planning (Nghieu 2000: 172). Tax system was continued reforming to improve the fiscal revenue. Borrowing to finance investment is from both domestic and abroad. In 1998, domestic borrowing through government bonds and Treasure

bills accounts for 52.6% of total borrowing and borrowing from abroad through loans, ODA account for 47.4% of total borrowing (Nghieu 2000: 272). In the industrialization period, governments should carefully plan the financing sources and debt repayments to both sustain the investment and relax the debt burden. As other policy, a cautious exchange rate policy was adopted by the SBV, which has allowed the VND to devalue has contributed much in the expansion of trade. However, as a strong import dependent economy, modestly and gradually devaluation is necessary to ensure the stable of domestic prices and the trade balance.

In the long term, to sustain the development, government should also pay more attention to the quality of the economy. Investment in education, training, technology and infrastructure should be preferred to push up the capacity of the economy. Further reforms to establish a good environment will encourage not only domestic investment but also foreign investment.

Notes

- 1 In terms of 1994 constant price, GDP in 1990 was VND 131,968 billion and in the year 2000 was VND 273,666 billion VND.
 - 2 If one of the equations in the system is misspecified and estimate the parameters using single equation methods, only the misspecified equation will be poorly estimated. If system estimation techniques are employed, the poor estimates for the misspecification equation may “contaminate” estimates for other equations.
 - 3 For further discussion see Griffiths, Hill and Judge 1993.
 - 4 Series data is form 1986 to 2003
 - 5 Requirement for the effectiveness when using TSLS or some other methods is that the observations are rather big
 - 6 For further discussion see Pindyck and Rubinfeld 1991: 308–311.
 - 7 For details see EViews user’s guide book or EVIEW help.
 - 8 Benchmark year exchange rate in 1994
 - 9 Change in demand in short run will move the economy along the short run aggregate supply curve, which slopes upward in short run, thus changing the output level, employment and price level.
 - 10 In short term, the expansion of aggregate demand will lead to change in price and output. The increase in price leads to inflation. This effect is considered as demand pull inflation. For further discussion, see Mankiw 2000: 363–364.
 - 11 For a strongly import-dependent economy like Vietnam, change in import price leads to change in domestic price. This effect is considered as cost push inflation.
 - 12 Definition of World demand corresponds to the share normally allocated to Vietnamese exporters, considering the evolution of demand on the world market by normal clients of Vietnam (including major trading partners of Vietnam such as US, Japan, China, Australia, Singapore, Germany, UK, Taiwan, France, Korea, Philippines, Holland, Malaysia, Belgium, Hong Kong, Thailand, Indonesia) for the goods which Vietnam exports.
- $$WD = \sum_{i=1}^n GGDP_i \times W_i$$
- GGDP(i): Income growth of trading partner i
 X(i): trade weight of trading partner i
- 13 Part of imports are intermediate goods or materials used for exports.
 - 14 Until 2002, the interest rate was controlled by SBV. The SBV set the ceiling lending rates and then the base

lending rates with upper bound for commercial banks.

15 The idea reflects Phillip's curve.

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