Graduate School of Development Studies

INFLATION IN VIETNAM

OVER THE PERIOD 1990-2007

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Abstract

This paper studies the nature of inflation in Vietnam over the period 1900-2007. The analysis finds out that output growth has played an important role on causing inflation rather than relaxing inflationary pressure as it was before. By looking at the impacts of inflation determinants, the study raises a concern about the possibility of an inevitable upward trend of Vietnam's inflation.

Relevance to Development Studies

Development studies are not only concerned with economic development but also to a wide range of issues. This study is relevant to development studies because it is concerned with one of the most important issues of any economy; this is inflation matter. Understanding the nature of inflation in the economy helps for stabilization and sustainable development.

Vietnam had experienced relative low rate over period 1990-2007. However, from late of the year 2007, inflation in Vietnam has been under an upward trend. Although inflation was not serious in the period 1990-2007, it is necessary to studies on determinants of Vietnam's inflation to understand what happen in the economy.

Keywords

Inflation, determinants of inflation, monetary policies.

Chapter 1
INTRODUCTION

The period 1990-2007 is considered as an ideal span of Vietnam's economy. Annual inflation rate was fairly low with an average rate at 13.7% (6.5% for the period 1993-2007); while Gross Domestic Product (GDP) grew at average rate of 7.5% per year. However, inflation has followed an upward trend from the year 2006 and accelerated from half late of year 2007. Inflation shot up to 25.2 % in May of 2008 (when compared with the same month last year) and seemed to keep up. In addition, inflation rate was not stable, but fluctuated during the period 1990-2007. Such thing raises the question about the nature of inflation in Vietnam. What happened behind the ideal low inflation rate of period 1990-2007.

1.1 BACKGROUND AND STATEMENT OF THE PROBLEM

To give a background for the problem stated in this paper, hereafter is an overall outlook of Vietnam's economy and its inflation problem from 1980 until present. It should be noted that Vietnam had centralized and closed economy with rationing system after getting its independence in 1975. Despite the government's strict control of commodity prices and wages, the government failed to ensure the stability of prices. One illegally parallel market- called free market, where people exchanged their goods with a much higher price in comparison to legally planned market-existed together with the official planned market controlled absolutely by the government.

The period 1980-1984

Average inflation of this period was 164.9 %. The economy faced extremely excess demand because of requirement for building dominant industrial sectors, food and other commodities. The government tried to co-integrate the planned market with the parallel markets to stimulate supply. Very initial economic reforms took place in the early 1980s. Agriculture product could be purchased by state agents with negotiated price instead of fixed price as it had been before. Such incomplete reform somewhat raised the total output, but CPI inflation rate was pushed up to 200% in 1982 as a result of partly reform on price.

To suppress inflation, a type of forced savings- unspent money was accumulated and make up the "monetary overhang"- was introduced to households. Money tightening was widespread over the economy, giving very little influence on inflation controlling in Vietnam.

Shortage of goods was still pushing up inflation. In response, the government raised the retail official prices by 10 to 15 times and the wholesale prices raised by 7 to 10 times. Budget spending was increasing and was accommodated by

money creation (Luoc, 1992). In addition, the important of free market entailed a path for household to evade the force savings. It led to the buid-up of household monetary circuit rather than monetary overhang (Hung, 1999).

The government's anti-inflation effort did not achieve its desired result because the immediate causes of inflation were not indentified properly and macroeconomic policies were not used appropriately in controlling inflation (Dam, 1995).

The period 1985-1989

Average CPI inflation rate of this period was 263%. The government introduced the so call "General Adjustment of Price, Wage and Money" with following main points.

- "…Planned prices were pegged to market prices in order to stimulate production, especially agriculture production.

- Monetization of public worker's income to abandon the rationing system, thus raising their standard of living.

- Currency redenomination was introduced in an attempt to destroy the excessive cash holdings of households.

- Increase of loans for state owned enterprises to offset the adverse effect of currency reform" (Hung, 1999).

Despite of hopeful expectation from the government, the immediate aftermath of this adjustment made inflation more serious. Only one year after adjustment, inflation jumped to its peak of 453.5% (in 1986); then maintained hundreds percent some years later. Redenomination created shortage of cash and funds for ordinary operation of state enterprises. Meanwhile the inherently soft budget could not afford to cover for government spending. Budget deficit was at worry with the duty to cover a large number of inefficient state owned enterprises also. The ratio of revenue to total spending was 55% in 1985. To cope with increasing budget deficit, the government borrowed from Central Bank. Then this demand for credit has been met more or less automatically by the banking system: credit expanding and money printing. Budget deficit contributed to strain inflation problem in Vietnam.

Hoarding and speculation behavior took place popularly throughout the economy due to expectations of very high future inflation. In addition, by removing rationing system, monetized income increased the nominal household's income; this lead to demand accelerating for goods. These actions pushed aggregate demand up, intensifying the inherent instability of the economy.

The 1987-1989 macroeconomic and fiscal crisis and hyperinflation provided the impetus for the comprehensive innovation (called Doi moi) that includes various macro policies to secure the economy. The aims were to stabilize the economy, simulate export and investments and enhance economic growth. The most prominent success of this innovation was the success of combined various supply-side policies somewhat helped ease the excess demand strain and eventually the inflation rate suddenly dropped to 37.7% in 1989. This can be considered as the initial success of the innovation program, triggering a new phase of Vietnam's economy. This success in inflation controlling suggests the important role of supply bottleneck and excess demand matter in the planned economy of Vietnam.

The period 1990-2007

After the successful innovation in prior period, inflation problem became less serious with a dramatic fall from hundreds to two-digit inflation rate. However, due to inertia characteristic inflation maintained fairly high over first three years of the 1990s with average inflation rate was around 51%. From 1993 to 2007 (except the year 1995), inflation was well controlled under 10%. Moreover, while some other Asian countries suffered the increasing inflation rate due to the Asian financial crisis in 1997, Vietnam's inflation was not affected significantly (Vinh, 2007).The government control of the economy and a nonconvertible currency have protected Vietnam from what could have been a more severe impact resulting from the East Asian financial crisis in 1997. Inflation was controlled at a fairly low rate while the average GDP growth rate is fairly high (around 8% per year). This seems to be contrary to monetary theory which believes output growth always stimulates inflation.

An interest point in this period is Vietnam's inflation rate was almost always lower than the average rate of the world as well as of developing Asian countries during 10 year before 2002. Then it tended to be higher than inflation rate of the world and developing Asian countries from 2002 onwards.[1]

Budget deficit which equaled to 6% of GDP was no longer a source of inflation from 1993 onwards (Hung, 1999). This period experienced the openness of domestic economy. Trade liberalization and capital inflow helped ease the balance of payment as well as budget deficit problem. In addition, the government increasingly used non-inflationary sources of financing, government bond. The outstanding government bond increases to 1.2% in 1995 from 0.1% in 1988. Such action stopped the threat that money creation strains inflation.

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[1] See Figure 1 in Appendix.

Problem of good shortage was solved by increasing number of efficient enterprises in private sectors. The openness process of Vietnam's economy took place creating good condition for production and trade activities which accelerated productivity improvement.

Accompanying growth of GDP, credit grew rapidly during the period. Nevertheless, there is no discernible relationship between credit growth and the inflation rate (Tu, 2006). It should be noted that Tu's paper captured the figure of credit provided by formal financial sectors only. Meanwhile, the credit from informal financial sectors, which has been fairly popular in Vietnam, is unknown.

By and large, Vietnam's economy structure from 1990 onwards can be considered as much different to the previous. There was more liberty in the financial market. However, capital control was still applied, especially on outflow. Vietnam officially maintained a managed floating exchange rate regime; however, the exchange rate has de facto been pegged to the US dollar in recent year.

1.2 OBJECTIVE AND SCOPE OF THE PAPER

The paper studies the nature of inflation in Vietnam by looking in determinants of Vietnam's inflation. The aim is to identify the main factors explaining Vietnam's inflation in long-run on causal relationships with domestic inflation. The extent to which these factors affect inflation would be analyzed. The paper also looks in the differential behavior of inflation in Vietnam relative to other Asian developing countries and what explains the difference.

Due to the limited number of observation[2], it is difficult to divide the sample into sub-periods. The paper focuses on pass-through of the whole studied period and on long-run behavior of inflation only; thus, the short-run relationships would not be mentioned. The inflation rate studied in this paper is headline inflation rate of CPI. The paper does not deal with core inflation due to data limitation problem. Similarly, the output gap would not be employed in the model to estimate the pass-through of output on inflation. Real GDP instead would take this mission.

The paper examines the period 1990-2007. This choice of studied period aims to obtain sufficient data needed for analysis[3] and avoiding sudden structural breaks that would complicate the empirical analysis.[4] Period 1990-2007 is considered as the beginning of a new page of Vietnam's economic history: good performance and stability.

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[2] See data description in part 1.3 of this chapter.
[3] Data before 1990 is not sufficient in some variables of interest.
[4] Significant structural changes in Vietnam took place on the period 1986-1989.

1.3 APPROACH OF THE PAPER AND DATA

The paper bases on relevant theories about sources of inflation which are applicable for emerging economies, especially for the case of Vietnam. Various schools of though that explain inflation are employed for model construction and analysis. The paper also consults relevant empirical studies to get idea for the most appropriate kind of variables as well as regression model for inflation in Vietnam.

The paper uses both simple regression and the descriptive statistics to analyze inflation in Vietnam. Descriptive statistic draws a picture of Vietnam's inflation together with other macroeconomic indicators. Analysis with regression model gives further findings on inflation determinants.

Theoretical and empirical literature review is employed to build a regression model explaining inflation in Vietnam. Firstly, tests for stationary and cointegrated time series are used to determine for the presence of long-run relationships between inflation and exchange rate, money stock, output, and world commodity price. Secondly, an equation explaining Vietnam's inflation is estimate. Thirdly, an equation estimated across a panel data of 8 Asian developing countries [5] will be created with the same explanation variables. Comparing the coefficients between Vietnam's equation and that of other countries can suggest the differential way Vietnam's inflation response to changes of these factors. Finally, main findings from analysis are presented in conclusion.

The paper used annual macroeconomic data covering the period 1990-2007 of Vietnam and eight Asian developing countries. All data used in the paper is mainly secondary and tertiary. It is taken from reports and papers about relevant issues of IMF, World Bank, Asian Development Bank as well as other authors. More detail data description can be found in chapter 3.

Like in other developing countries, availability of Vietnam's macroeconomic data is a major challenge. Because of small sample size the robustness of regression models are somehow limited; and certainly the return of statistical analysis should be treated with caution.

1.4 STRUCTURE OF THE PAPER

This paper includes 4 chapters. Chapter 1 gives a glimpse of Vietnam's economy before and over period 1990-2007 to give a background for the problem. The aim and approaching method of this paper can be seen in part 1.2 and part 1.3 (respectively) of chapter 1 also. Following the introduction, chapter

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[5] The panel data set covers 8 countries: China, India, Malaysia, Indonesia, Malaysia, Pakistan, Philippine, Sri Lanka, Thailand.

2 presents an overview of related theories about sources of inflation that are suited to the case of Vietnam. In chapter 2, previous empirical studies about Vietnam's inflation after the innovation are also stated to give hint for the model as well as finding in following chapter. Chapter 3 is about data analysis; a simple regression on determinations of inflation in Vietnam is made to study the effect of each determinant. A dynamic panel model is also employed to explain the differential response of Vietnam's inflation to changes in the sources of inflation in comparison to that of other developing Asian countries. Through this, chapter 4 presents the main findings as well as explanation of why inflation in Vietnam has been under control for such long period.

Chapter 2
THE THEORETICAL AND EMPERICAL FRAMEWORK

This chapter attempts firstly to survey the literature on theories of inflation explanation in order to understand and identify the determinants of inflation which are suggested by the theories. The second aim of the chapter is to consult the existing empirical studies on Vietnam's inflation before and in the period 1990-2007. Based on relevant empirical studies, the suitable determinants for the case of Vietnam would pick out to serve for data analysis in chapter 3 of this paper.

2.1 THEORETICAL CONSIDERATION

Inflation can be caused by a variety of different factors, and each factor may be involved in several different theoretical explanations. Such theories are therefore overlapping to some extent. To make a comprehensive and coherent summary about all theories explaining inflation is not a simple task.

In order to avoid overlapped statements this part attempt to arrange the broadly theoretical explanation on inflation based mainly on two aspects of inflation's causes. These aspects are demand-pull and cost-push. There are certainly some different theories that would be grouped into each aspect. The final aim of this part is to look for determinants of inflation suggested by the theories.

2.1.1 Demand-pull inflation

This school of thought argues that inflationary pressures arise because of excess demand for goods and services. When aggregate demand in an economy outpaces aggregate supply, the prices therefore are forced up, causing inflation.

Aggregate demand is made up of all spending in the economy.

$$AD = C + I + G + (X-M)$$

Where:
C stands for consumer expenditure.
I stands for investment.
G stands for the government expenditure.
X and M respectively stand for exports and imports.

The causes of increase in aggregate demand could come from many different sources. A reduction in direct or indirect taxation may be one of the sources. If taxes are reduced, consumers will have more disposable income causing demand to rise. Rapid growth of the money supply as a consequence of

increased credit is another source of increasing aggregate demand. Rising consumer confidence would lead to an increase in total household demand for goods and services. Faster economic growth in other countries could provide a boost to the nation's exports overseas. Remember that export sales provide an extra flow of income and spending into the domestic circular flow. Exports are counted as an injection of aggregate demand. Otherwise, a depreciation of the exchange rate increases the price of imports and reduces the foreign price exports. If consumers buy fewer imports, while foreigners buy more exports, demand in the domestic economy will rise. If the economy is already at full employment, it is hard to increase output and prices are pulled upwards. Whatever it is, it will be inflationary if demand grows faster than supply.

Keynesian argument

According to Keynesian, if there is a certain shock which increase the aggregate demand, firm will increase there production and employ more labor. That means more people get income and the higher aggregate demand will come. This greater demand will make firms employ more labor in order to produce more output to fulfill the increase demand. If there is any bottleneck in production, the output increase will eventually become so small that the price of the good will rise. First, demand-pull triggers inflation, then cost-push maintain inflation.

At first, unemployment will go down, shifting AD1 to AD2, which increases Y by (Y2 - Y1). This increase in demand means more workers are needed, and then AD will be shifted from AD2 to AD3, but this time much less is produced than in the previous shift, but the price level has risen from P2 to P3, a much higher increase in price than in the previous shift. This increase in price is called inflation.
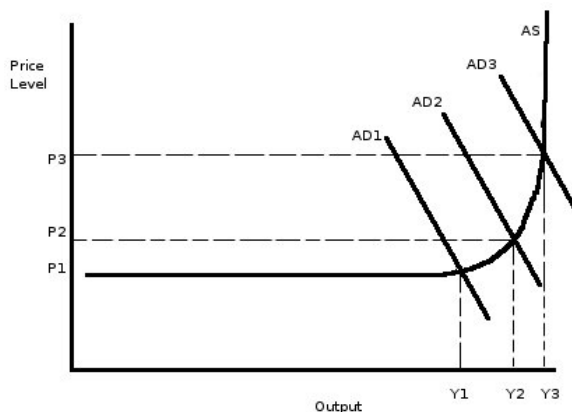
While Keynesian economists look at production capacity; the classical economists look at the change of aggregate money supply which serves for

transaction as a source of inflation. They blame the authorities for the fact that money supply grows faster than the ability of the economy to supply goods and services. The phrase often used is that there is "too much money chasing too few goods".

The quantity theory of money

The quantity theory of money views of inflation as a matter of money, derived from the Fisher Equation of Exchange.

$$M*V = P*T$$

where:
M is the amount of money in circulation
V is the velocity of circulation of that money
P is the average price level, and
T is the number of transactions taking place

It says that the amount of the money stock times the rate at which it is used for transactions will be equal to the number of those transactions times the price of each transaction. Classical economists suggested that the velocity would be relatively stable and the number of transactions would always tend to full employment. Therefore they came to the conclusion that increases in the money supply would lead increase in prices. As a result, control the money supply can help control inflation.

Adaptive and Rational Expectation

Expectations can be an important determinant of inflation, and this has increasingly been recognized by economists and policy-makers in recent years. As a result, a lot of research has been done in this area.

People increase their purchase than usual in order to "self-defense" because of inflationary expectation. This behavior leads to demand-pull inflation rather than cost-push inflation.

Regard to the causes of inflationary expectation, there is considerable disagreement between economists on what determine expectation. So far, there are two categories of expectation; they are adaptive and rational expectation. In simple word, adaptive expectation is the way economic agents form their expectation based on the past relevant information, particularly inflation rate. With rational expectation, economic agents also use current information on their judging.

The Phillips curve

The original Phillips Curve, basing on empirical evidences, states a trade-off between unemployment and inflation. The curve sloped down from left to right and seemed to offer policy makers with a simple choice between inflation or unemployment. So that any attempt by the governments to reduce unemployment was likely to lead to increased inflation. It is impossible to lower both of them. In the 1970s the curve appeared to break down as the economy suffered from unemployment and inflation rising together (stagflation).

Most economists no longer use the Phillips curve in its original form because it was shown to be too simplistic. But still today, modified forms of the Phillips Curve that take inflationary expectations into account remain influential. They distinguished between long-run and short-run.

The "short-run Phillips curve"[6] looked like a normal Phillips Curve, but shifted in the long-run as expectations changed. In the long-run, only a single rate of unemployment (the NAIRU or "natural" rate) was consistent with a stable inflation rate. The "long-run Phillips Curve"[7] was thus vertical, so there was no trade-off between inflation and unemployment.

2.1.2 Cost-push inflation

This argument on causes of inflation claims that prices rise due to increasing cost of the factors of production. Prices of goods and services rise because wages are pushed up by industrialization, or by unions' bargaining power. Balance of payment, exchange rate, global price and so on are also considered as causes of increasing cost.

Structuralists' argument

The structuralists approach to inflation is one of major versions of cost-push inflation. According to structuralists, inflation is an inevitable companion of the process of growth. When industrialization takes place, agriculture sectors would be narrowed down for expansion of production sectors. As a result, demand for imported intermediary and capital increases. That strains the supply constraints of the economy. Moreover, shrink of agriculture sectors reduces food supply for domestic consumption; thus, food price would go up. Then, real wage would come down with higher food price. A demand for real wage resistance would lead to wage-price spirals that propagate through the indexation mechanism. A supply-side shock sparks off a chronic inflation process.

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[6] Also called the "expectations-augmented Phillips curve".
[7] Also called "NAIRU".

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Exchange rate could affect price of imported goods. Inflation may occur when there is a depreciation of the domestic currency. A depreciation of a country's currency results in increases in the price of imported foodstuff, raw materials and capital equipment, especially in a small open economy which is considered as price-taker. Such increases then results in a rise in production costs; and also raise the price of import-competitive goods.

According to above arguments, depreciation could make the real wage fall. Once again, real wage resistance asks for a rise in nominal wage which leads to increase in prices. Then, the foreign exchange-wage spiral appears and results in chronic inflation. Therefore, structuralists counts exchange rate as a determinant of inflation.

Balance of payment problem is also regard as a source of inflation. Under the balance of payments constraint, developing countries tend to depreciate their currencies in order to obtain enough foreign exchange to close their balance of payment deficit. Such action explains for chronic inflation in some developing countries.

Post-Keynesian argument

Post-Keynesian argument on cost-push inflation partially overlaps with arguments of structuralists. However, Post-Keynesian also argues for the role of global price in causing inflation. An increase in the price of energy and many other inputs or intermediate goods used in the production process will manifest itself as higher domestic consumer prices.

Another factor suggested by post-Keynesian that gives effect on inflation is "distributive conflict expression". When workers or capitalists are not satisfied with their shares of the pie, prices could be pushed up. The workers and capitalists try to maximize their share of total income at the expense of each other. And profit share is positively related to the degree of monopoly as represented by the mark-up. Whenever the actual share of profit falls below the target share, firms will increase the price. Such process leads to inflation.

Adaptive and Rational Expectation

One of the main reasons expectations are important is that people take account of them in their wage claims. If inflation is expected then people will include that in their claim to ensure for their real wage persistence. This increases costs of production and therefore accelerates inflation.

In practice, it is not always easy to decompose the observed inflation into its demand-pull or cost-push component. The process is dynamic and the shocks to

price are mixed. Choosing suitable determinants for empirical analysis needs a look on general not on particular theory.

Most of inflation explanations are based on assumption that the markets (e.g. financial markets, labor markets, etc.) are highly developed and functioning very well. However, the markets in developing countries are imperfect to some extent. For instance, the high unemployment rate or the price control has still existed in developing countries. Hence, it is not necessary that all factors mentioned in the theories are the real determinants of inflation in Vietnam. Which inflation determinants are applicable for the case of Vietnam should be chosen with caution. The applicability of theory's assumption to Vietnam's economy and previous empirical studies can suggest for the selection of suitable determinants.

2.2 APPLICABILITY OF THE THEORIES IN THE CASE OF VIETNAM

Labor market rigidities and changes in the cost of labor are believed as a major cause of inflation in developed countries. But it is not considered as a major cause of inflation in most developing countries. Chhibber and Shafik (1990) argued that "wage-push inflation" is rare in developing countries because wages constitute only a small part of national income. In the case of Vietnam, a large pool of underemployment in agriculture sector makes the price of labor extremely cheap, especially for unskilled labor. The wage-price spiral therefore can not hold true. Similarly, the trade-off between unemployment and inflation suggested by Phillips curve is not applicable for Vietnam case.

In Vietnam, bargain power of the labor is extremely weak because of inefficient labor unions as well as the high rate of underemployment. Requests for wage increase from the employee in private sectors are therefore rarely satisfied. Meanwhile, wage in state sectors is controlled by the government and sluggishly response to the raise of price.[8] Thus, wage has little power in term of determination inflation. Hence, the cost-push inflation caused by inflationary expectation is also rare.

In the other hand, inflationary expectation in Vietnam can lead to demand-pull inflation because of hoarding behavior which sees households buying more than their actual need. The wholesaler and retailers also do the same actions.

2.3 EMPERICAL EVIDENCES

Although this paper studies on the period 1990-2007 only; it is useful to look back on the causes of inflation before 1990. The most prominent determinant of

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[8] See figure 6, chapter 3.

inflation in the period 1981-1988 is excessive expansion of money supply, while the growth of real output helps reduce inflation (Cong, 1997).

The causes of monetary expansion are the lack of monetary discipline for the banking system and the problem of budget deficit. Therefore, money creation was employed as a mean to solve the budget problem.

For the inflation in1990s, Goujon (2006) develops a model with two determinants to shed light on the importance of them to inflation in Vietnam, regarding the partially dollarization context of the economy. The study employs Vector Error Correction Model (VECM) to determine for the role of only two factors: monetary aggregate and exchange rate in affecting inflation. Despite of limited number of determinants, it is still useful to consider his findings as a reference; especially in the case that studies on Vietnam's inflation for the 1990s are scarce.

It is the exchange rate management which pursued market stability and disinflation was successful in controlling inflation during the period. However, the expanding monetary aggregate of this period give positive impact on inflation.

A more thorough investigation on inflation determinants is a study of Tho (2001) over the period 1992-1999, which counts real output, exchange rate, balance of payment, broad money supply, and investment as the determinants. Also using VECM for her analysis, the study reflects the remarkable role of exchange rate in the success of disinflation target during this period. The broad money supply raises inflation but at a modest level. These findings again confirm for Goujon's conclusion for the 1990s.

Nevertheless, there is no causal link was found between balance of payment and inflation. Similarly, the impact of investment, which grew at a rapid rate in this period, on inflation does not clear and significant.

Inflation in Vietnam over the period February 1996 to April 2005 is analyzed by Camen (2006). The impact of some determinants of inflation and the role of monetary factors are the main aim of his study. His paper considers indices of world price of petrol and rice, exchange rate, lending rate, credit, and monetary aggregates (including US money supply) as the factors giving effect on inflation. A vector autoregression (VAR) model which bases on monthly data is employed to undertake an exploratory analysis of the role of explanation variables in the determination of Vietnam's inflation. The principal findings prove the fact that Vietnam's inflation in this period is not only a monetary phenomenon but largely the result of supply shock.

The findings claim for the important role of credit to the economy in explaining the CPI inflation after 24 months for the period February 1996 to April 2005 and period February 1996 to April 2004; but the credit explains only a small portion for the period February 1996 to April 2003. Similarly, money supply plays a role in causing inflation too. The lending rate however does not contribute to inflation explanation.

The world prices of petrol and rice together with the exchange rate are also the important determinants of inflation in Vietnam in the studied period. The prices of petrol and rice explain 21% and 11% respectively while the exchange rate movement explains 16% of CPI inflation rate within the first six months.

Different from Camen's findings, the study of IMF emphasizes on the role of output movement and monetary aggregate rather than the role of exchange rate for the period 2001-2006.

The VECM across quarterly data on inflation determinants from 2001Q1-2006Q2 is used to analyze the extent to which each determinant influences inflation. The study focuses on variables of monetary aggregates, the output gap, and the nominal exchange rate in Vietnam.

The outcome of analysis suggests the fairly significant role of monetary factors in explaining inflation in Vietnam; especially the impact of money supply became stronger from 2002. The modest positive effect of national currency depreciation on inflation is also recorded by the model outcome. The little movement of exchange rate in the sample period as well as price control in some crucial goods is blame for diminishing effect of exchange rate change.

The study also finds out that a narrow in output gap[9] relax inflationary pressure remarkably in the economy. In other word, when actual GDP increases relative to the potential GDP, the CPI inflation will fall down.

The study also fails to get strong evidence for an inflation caused by productivity improvement in Vietnam (Balassa-Samuelson effect[10]). There is a

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[9]The output gap is the difference between potential output and actual output. Potential output (also referred to as "natural gross domestic product") refers to the highest level of real output that can be sustained over the long term. The existence of a limit is due to natural and institutional constraints.

[10] The Balassa-Samuelson effect assumes an economy consisting of two sectors, the tradable (typically manufacturing) and the nontradable (typically services). If productivity grows faster in the first sector than the second, if factor markets such as labor are integrated between the two sectors, and if the prices of tradables are given by global trends, it can be shown that domestic inflation is proportional to the productivity gap between the two sectors. Such inflation is regarded as benign because it reflects changes in the real sector rather than macroeconomic policy failure.

significant improvement in productivity; however, the causal linkage between it and inflation is blear.

A comparison between inflation behavior in Vietnam and in other Asian countries is made by estimation across a panel data covering the period 2000Q1-2006Q2. The differential behavior of Vietnam's inflation is captured by the interaction variables (between the county-specific dummy variable for Vietnam and explanatory independent variables). The past inflation is captured as one more explanatory independent variable in this model.

The general point for all Asian countries in the sample (including Vietnam) is that past inflation, the output gap, broad money, and nominal exchange rate play important role in determination inflation. This finding shows a bit difference in the role of exchange rate when the past inflation is captured in the model. Meanwhile, the impacts of output gap on inflation are the same for Vietnam and its neighbors.

The higher inflation rate in Vietnam relative to its neighbors is explained by the higher degree of persistence in inflation in Vietnam than in the others. The response of inflation in Vietnam to national currency depreciation is also greater than in other Asian countries. This contributes to straining inflationary pressure in Vietnam.

Sofat (2008) studies both headline and core inflation[11] in Vietnam from 2001Q1 to 2008Q1, across the quarterly data. His conclusion emphasize that the increasing price of global food stuff rather than of energy causes pressure in headline inflation, beside the causes of core inflation.

Although his major findings are for core inflation rather than headline inflation; the findings also shed light on the role of determinants on headline inflation of which core inflation is a part.

The most important determinant of core inflation is output gap; with 1 percentage point of output gap generates roughly 1 percentage point of core inflation.

Exchange rate movement proves to affect core inflation with a 1:0.4 pass-through. The global food inflation is also one factor accelerating domestic core inflation through its spill over effect. Meanwhile, not any significant energy component in core inflation is found in Vietnam. It is the control in domestic price energy explaining for the interesting surprise.

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[11] Core inflation is a measure of inflation which excludes certain items that face volatile price movements e.g. food products and energy.

Chapter 3 ANALYSING INFLATION IN VIETNAM

An overview of Vietnam's economy from 1990-2007

The period 1990-2000

The famous political and economic innovation (known under the name Doi Moi) in 1986 introduced widespread reforms intending to the transition from a centralized economy to a so-called "socialist-oriented market economy". This form of economy combined government planning with free-market incentives. The innovation consisted of the removal of price controls, the unification of the exchange rate regime, and the introduction of foreign currency deposits. The reform abolished agricultural collectives and enabled farmers to sell their goods in the marketplace. Such combination stimulated production and improve productivity significantly as a result. It encouraged the establishment of private businesses, from small household businesses to large enterprises. Foreign investment, including foreign-owned enterprises also increased in this period.

One evident of successful innovation is the fact that more than 30,000 private businesses had been created, and the economy was growing at an annual rate of 7.5% by the late of 1990s. The success of "hunger and poverty elimination" program is a proof, too. Poverty declined from about 50% of the population in the early of 1990s to 29% of the population in 2000. GDP growth of the whole period is 7.4%; while average CPI inflation rate for period 1990-1992 is 52% and for period 1993-1999 is 8%.

In one hand, thanks to the government control of capital flow and foreign currency as well as its nonconvertible currency, Vietnam's economy was protected from severe influence and aftermath of the Asian financial crisis in 1997. Control in capital flow helped Vietnam avoid the sudden shock made by speculation.

Keeping up the government control, in the other hand makes the economy struggle with structural inefficiencies. The Vietnamese government still continues to hold a tight rein over major sectors of the economy, such as the banking system, state-owned enterprises, and areas of foreign trade. Accompanying with the recession in some Asian countries, the growth rate of Vietnam fell to 4.7 % in 1999 (5.7% in 1998); this rate is even lower than the growth rate in the very early of innovation period.

The period 2000-2007

This period experience some progress in integration of Vietnam's economy. One of them is the Bilateral Trade Agreement (BTA) between the U.S and

Vietnam signed on July of 2000. This has been regarded as an important milestone for Vietnam's economy. More convenience in access to U.S market accelerated the export-oriented economy; and industrialization certainly would accelerate too. This would also attract foreign investment to Vietnam, not only from the U.S, but also from Europe, Asia, and other regions.

In the five-year economic plan with approved in 2001, the private sectors again enhanced their role, meanwhile the relative control of the government was still maintained. The private sectors proved to be efficient with the contribution of one quarter for total output in 2003. Their contribution expanded 18.7% in 2003 and of course more rapidly than the public sectors' with only 12.4%.

The "reforming state-owned sectors" program which would partially privatize thousands of state-owned enterprises, including all five state-owned commercial banks has taken place in Vietnam. Despite of strong commitment from the government, this program was said that it had very slow process and was non-transparent to some extent.

According to World Economic Forum's Global Competitiveness Report, Vietnam's rank in growth competitiveness in the world in 2005 fell to eighty-first from sixtieth in 2003. In business competitiveness, the rank fell from fiftieth in 2003 to eightieth in 2005.

The following progress of Vietnam's integration to global economy is the fact that Vietnam became WTO's 150th member in January of 2007 after 11 years of preparation (including 8 years of negotiation). This fact, in one hand, has been considered to stimulate for the continuation of liberalizing reforms and create opportunities for trade expansion. In the other hand, Vietnam would face plenty of challenges with global competiveness.

In this period, the economy presented to be better than ever, GDP growth has reached the level of above 7% from 2002 until 2007 (above 8% from 2004 to 2007) despite the global recession in late of this period. Vietnam was considered as the country with second largest growth after China in this period. Investment grew three times and domestic savings grew five times. Average CPI inflation rate of this period was only 4.6% (with slight deflation in 2000 and 2001).

By and large, the period 1990-2007 experiences a good performance of Vietnam's economy. It is necessary to note that the economy has just begun at an extremely low level. Despite of fast growth, Vietnam at this time was still far behind with most economies the region. As a developing country with poor

managed banking system[12] and the lack of efficient regulation of markets, Vietnam has not only earned from the fast growth, but also suffered threats. Structural irrationality, lack of transparence, corruption, inefficient government institutions etc. has put the economy in threat and obstructed sustainable economic growth.

VIETNAM'S INFLATION OVER THE PERIOD 1990-2007

3.1 INFLATION IN VIETNAM IN COMPARISON TO THAT OF THE WORLD

Despite the 1989 renovation, inflation in Vietnam still remained its rapid speed for couple of years later because of inflationary inertia. The year 1990 is technologically considered as the beginning of new period of Vietnam's economy. Nevertheless, the new period of Vietnam's inflation begin in 1993, when the inertia of hyperinflation in the past became weak.

Figure 1 shows that Vietnam's inflation is well correlated with that of ASEAN-5[13] and developing Asia rather than that of the world. Since 1994 Vietnam's inflation has followed a fluctuant decline trend until 2000, it has even remained at lower level than the others in some years. After the year 2000, inflation in Vietnam rose up again, remaining an upward tendency. From 2004, inflation in Vietnam has tended to be more serious than those of developing Asian countries (except Indonesia). This raises question on the volatility of Vietnam's inflation.

Figure 1: Vietnam's inflation in comparison to that of the world, developing Asia and ASEAN- 5, 1990-2007

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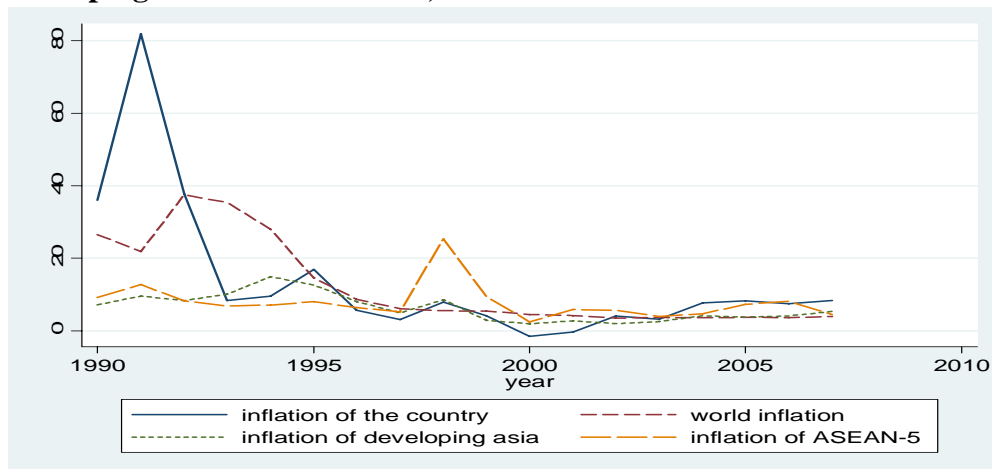
[12] The most present evident is that Standard & Poor's just lowered Vietnam's credit rating due to risks of "widespread economic and financial distress" on May 2008.
[13] ASEAN 5: Indonesia, Korea, Malaysia, the Philippines and Thailand.

Vietnam has imported consumption goods and input as well as exported raw material and agriculture product. It is international trade that created relationship between inflation in Vietnam and global inflation in both cost-push as well as demand-pull ways. Japan, China, Singapore, Korea, Malaysia, Indonesia, US, Germany and Russia were the major trade partners of Vietnam. Therefore, Vietnam's inflation is expected to be influenced by inflation in those countries.

A visible look on the trend of inflation in those countries shows that Vietnam's inflation was well correlated with inflation in those Asian countries (China, Singapore, Korea, Malaysia and Indonesia) (see Figure A.1, A.2, A.3 in appendix A). Japan and the other non-Asia countries like US, Germany and Russia have inflation which was not in trend with Vietnam's inflation. This suggests the possibility that inflation in trade-partner countries does not necessary influence the domestic inflation.

It can be argued that the behavior of emerging and developing economies is different to that of developed economies. Responses to external shocks are different in two types of countries. Then, the way Vietnam's inflation response to external shock (e.g. energy or food price shock) is more similar to that of emerging and developing Asian countries rather than to that of developed countries.

## 3.2 INFLATION AND SOME RELEVANT MACROECONOMIC INDICATORS

3.2.1 Broad money and inflation

According to monetary theory, money stock increase is expected to accelerate inflation. However, the story does not necessary hold true in the case of Vietnam. Previous studies have found little evidence of a robust link between monetary growth and inflation in Vietnam. Only period 1990-1993 experienced the slow down of inflation due to decline in broad money supply (Hung, 1997).

Figure 2 shows that inflation had not in trend with broad money stock from 1994 onwards. Moreover, Vietnam has higher money growth but lower inflation in comparison to other transition economies (Al-Mashat, 2004). This fact weakens the argument for the existence of relationship between money stock and inflation.

However, without further analysis it is too soon to determine for the presence of casual relationship between broad money growth and CPI inflation.

**Figure 2: Money growth and Inflation in Vietnam, 1990-2007**
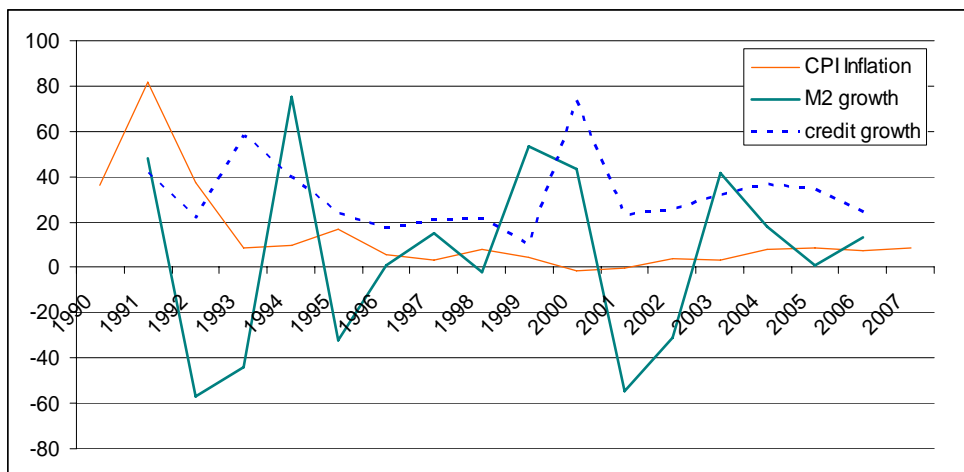
3.2.2 Lending rate and inflation

Lending rate remained significantly higher than inflation over the period 1996-2007. In that period, the economy experienced rapid expansion in private enterprises that required huge amount of credit. The lending rate declined from 1996 to 2002, accompanying with inflation decrease trend. Then, it has grown slightly from 2003, when inflation took off.

Based on theoretical expectation, it is lending rate that gives influence on inflation through cost-push. However, previous empirical studies on Vietnam's inflation negate the causal relationship between lending rate and inflation. In reverse, banks could rise up the lending rate in response to inflationary tax. Indeed, this point was introduced in some previous empirical studies on Vietnam's economy.[14]

**Figure 3: Lending rate and inflation in Vietnam, 1990-2007**

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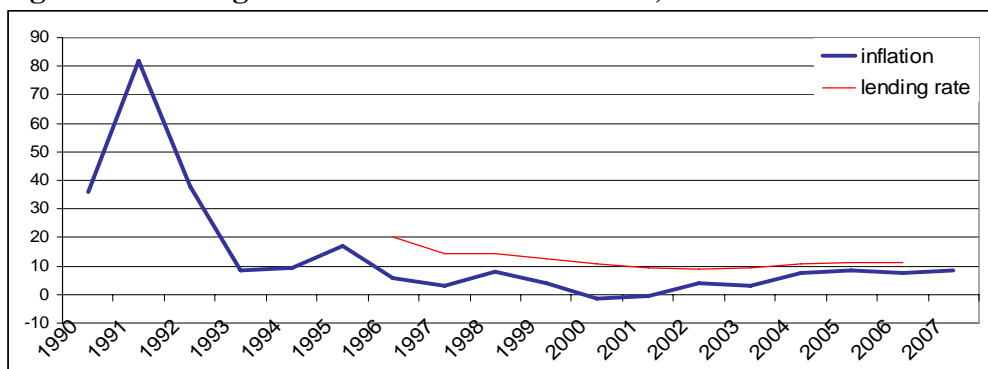
[14] See Frakriti (2008)

3.2.3 Nominal exchange rate and inflation

Before 1999, the objective of fiscal and monetary policies in Vietnam was primarily to archive market stability. Exchange rate was appreciated to serve for anti-inflation strategy. Since 1999, focusing on enhancing economic growth, Vietnam has relaxed the exchange rate regime in order to improve international competitiveness.

Figure 4: Nominal exchange rate and inflation in Vietnam, 1990-2007
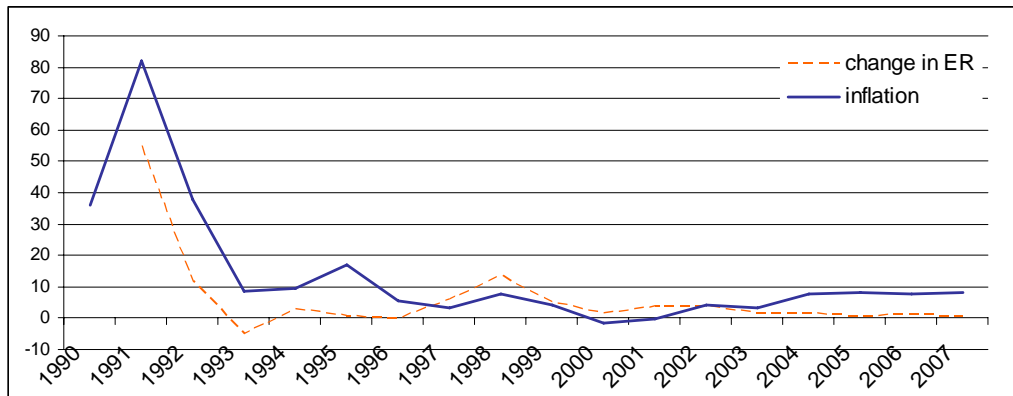
3.2.4 Real GDP growth and inflation

Inflation seems keeping in line with real GDP growth. Over the period, growth rate of real GDP fluctuated slightly before 2002 and became steadier after 2002. The fairly high growth rate of output was the result of industrialization from 1990.

Vietnam's industrialization has reduced the agriculture area and increased demand on labor. However, food shortage due to industrialization has not existed in Vietnam over the period 1990-2007. Nominal wage has increased but not much. The rate of underemployment was high in this period. The common bottlenecks in production did not exist in this period. Therefore, the relationship between real GDP growth and inflation is likely to be explained as demand-pull rather than cost-push.

Figure 5: Real GDP growth and inflation in Vietnam, 1990-2007
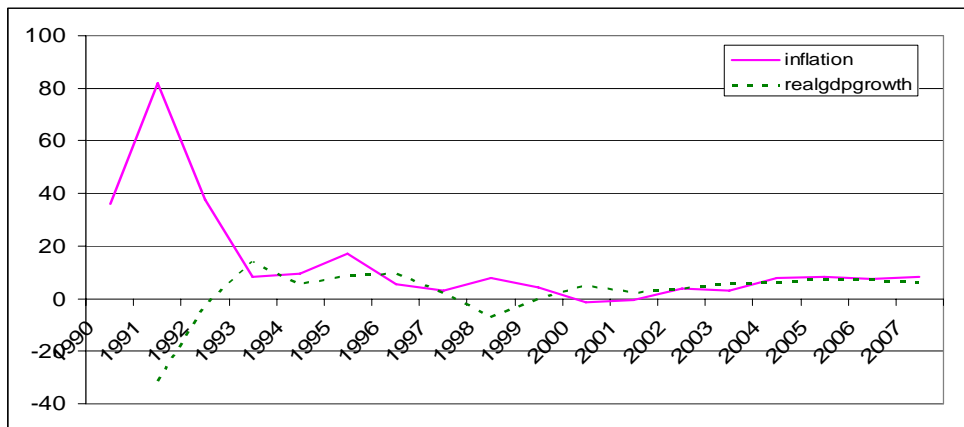
3.2.5 Nominal wage and inflation

The figure suggests one interest point, that growth rate of nominal wage seem to be set based on the previous-year inflation rate from 1999 onwards. If this is the case, magnitude of inflationary inertia would be accelerated.

Nevertheless, it should be kept in mind that the data on wage stands for the nominal wage in state sectors only, which is counted for 10% of total employment. Although wage in other sectors has based on nominal wage in state sector; the growth rate of state-sector wage has not kept pace with that of other sectors, especially in foreign-investment area. Thus, this nominal wage can not well reflect the nominal wage of the whole economy.

Figure 6: Nominal wage in state sectors and inflation in Vietnam, 1990-2007
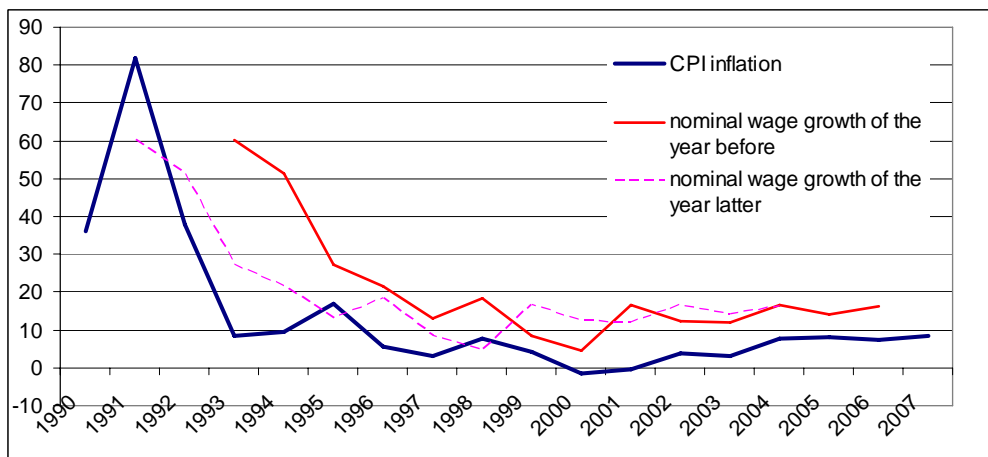
3.3 DATA ANALYZING ON INFLATION IN VIETNAM (1990-2007)

3.3.1 Determinants of inflation in Vietnam

The model

On the basic of relevant theoretical explanation as well as empirical studies presented in previous chapter for the case of Vietnam' inflation, I built the general function:

CPI = f(ER, M2, GDP, COMPRICE)

Where:

CPI denotes annually consumer price index, the percentage change of which is known as "headline inflation" (2000=100).

ER denotes the nominal exchange rate of VND against USD (VND/USD).

M2 denotes broad money stock in the economy.

GDP denotes real value of Gross Domestic Product. [15] (The aim is stripping the unreal value included in the nominal GDP that added by inflation).

COMPRICE denotes the Commodity price index of the world (all primary goods, 2005=100).

Although changes in tax policies, government spending, and investment may be potential explanatory variables; the model does not capture them due to the lack of data on these variables.

To capture the response of inflation to the changes of nominal exchange rate, money stock, and output; these variables come into the model under the form of growth rate. The growth rate is yearly base; in other word, it reflects the percentage in change of this year value in comparison to last-year value.

General equation:

$$Inflation_t = \alpha + \beta_0 Inflation_{t-1} + \beta_1 ERgrowth_t + \beta_2 M2growth_t + \beta_3 GDPgrowth_t + \beta_4 comgrowth_t + u_t$$

(1)

$Inflation_t$ stands for the CPI inflation rate of the year t. $ERgrowth_t$, $M2growth_t$, $GDPgrowth_t$, $Comgrowth_t$ respectively stand for the growth rate of exchange rate, broad money supply, real GDP, and commodity price index of the year t in comparison to year t-1.

Expected sign of coefficients

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[15] Which is calculated by this function: $\left[GDP\ deflator = \dfrac{nominal\ GDP}{real\ GDP} * 100\% \right]$

Previous inflation contributes to present inflation through inertia characteristic; therefore, β_0 should be positive and significant. Exchange rate depreciation could push the input price up as well as increase price in import-competitive goods; this push domestic price up. β_1, which captures effect of exchange rate changes on inflation should be positive and significant. Most theories agree that changes in money supply affect inflation. Therefore, β_2 is certainly expected to be positive and significant. For monetarist interpretation, output increase leads to demand increase; β_3 which measure the response of inflation to change in output, should be positive and significant. However, for Keynesian interpretation, the reserve should hold true because increasing in good supply helps ease inflationary pressure. In other word, β_3 is expected to be negative and significant. World inflation could strain domestic inflation through export and import also. For this reason, β_4 should be positive.

Then, I apply the above general equation form to estimate the specific equation for Vietnam's inflation to examine the extent to which these determinants affect domestic inflation. Before going to estimate specific coefficients, a test for stationary of time series should be applied on all variables to determine for the long-run relationships.

Test for stationary of time series

Dickey Fuller test is employed to test for the number of unit root of all variables. The result proves for stationary, I(0), of all time series. The fact that all of them are stationary suggests for long-run relationships of CPI with growth rate of exchange rate, broad money, and output.

Table 1: Dickey-Fuller test for unit root

Number of order	Inflation	ERgrowth	M2growth	GDPgrowth	Comgrowth
I(0)	-2.100*	-10.927	-2.952*	-10.052	-2.298*
	(-1.753)	(-3.750)	(-1.833)	(-3.750)	(-1.735)
I(1)	…	…	…	…	…
*: a drift was included in the test equation.					
The number in bracket is critical value at 5%.					

To ensure for the possibility of cointegration of these variables, Engle-Granger residual based test is employed.

Engle-Granger residual based test

The test takes two steps. First, I estimate an equation under the form of equation 1 to estimate for long-run relationships.

$$Inflation_t = -12.651 + 0.276 Inflation_{t-1} + 0.531 ERgrowth_t + 0.021 M2growth_t + 0.925 GDPgrowth_t + 0.088 comgrowth_t$$

(2)

Despite of reasonable sign in all coefficients, the equation is not meaning in term of statistically significant and the R^2 is only 64%.

The small sample and possibility of lack of explanatory variables may be the reason. Because of this reason, I follow the autoregressive Distributed Lag (ARDL) method, which works well with small-size sample. One variable capturing the trend will be added to the model.[16] It somewhat can be understood as the instrument to capture sluggish structural change in Vietnam over the period. The result give an equation with statistical significant of all variables and R^2 at 90%.

$$Inflation_t = -31.544 + 0.626 Inflation_{t-1} + 0.863 ERgrowth_t + 0.058 M2growth_t + 2.215 GDPgrowth_t + 0.098 comgrowth_t + 1.506 trend_t$$
$$\quad (8.291) \quad (0.118) \qquad (0.193) \qquad (0.015) \qquad (0.863) \qquad (0.012) \qquad (0.412)$$

(3)

(the numbers in bracket are standard errors | all variables significant at 5% , except GDP at 10% | R^2=90%)

As we can see, the presence of variable trend improves R^2 and statistical significance of regression equation. Indeed, there are some good reasons for the presence of the variable trend. Vietnam's economy is considered as a transition economy. Although most of important reforms took place before 1990, the period 1990-2007 still experienced many sluggish changes in the economy. These sluggish changes were a process and could be measured only after a certain period.

One simple example of the sluggish change is the consumption behavior of Vietnamese. The good performance of Vietnam's economy in the period has given Vietnamese more confidence on their future. People have tended to consume more and the high ratio of saving was no longer necessary. Such action thus has strained the demand side.

Second, the residual took from the equation 3 will be tested for its unit root (null hypothesis: residual is nonstationary) by Dickey Fuller test and Phillips-Perron test. Both results reject the null hypothesis of nonstationary residual.[17] This again suggests for cointergrated equation and existing of long run relationship between inflation and independent variables.

Regression outcome:

[16] Variable Trend takes the value from 1 to 18 for the years 1990 to 2007.
[17] The calculated value is -2.014 in comparison to critical value:-1.860 (at 1% of significant) for Dickey Fuller test. -2.910 agaisnt -2.630 for Phillips-Perron test.

Inflationary inertia

Equation 3 presents the fact that inflation inertia plays an important role on inflation behavior. One percentage point of last-year inflation raises 0.63 percentage point of this-year inflation. This is similar to expectation and other empirical studies for the case of Vietnam. Study of IMF (2006) recorded the presence of inflationary inertia with a lag of 12 months.

The inflationary inertia also reflects the behavior of economy agents in Vietnam. This is the way people predict the future inflation rate based on present inflation. Both households and firms form their expectation of inflation based on recently observed inflation and this may affect the general price level. Prices are rising because people expect them to rise and they expect them to rise because they have seen them rising. Such circle accelerates the inflation process and certainly includes hoarding and speculation behavior which are popular in Vietnam, especially on early of the studied period.

Exchange rate depreciation

In one hand, the pass-through of exchange rate looks strong with its rather high coefficient. However, the magnitude of depreciation year by year is not very great. That means magnitude of the contribution of exchange rate depreciation to inflation in Vietnam is not necessary the most prominent source for the whole period.

This finding is inline with previous empirical studies. Camen (2006), in his study of Vietnam's economy for the period 1996-2005 concluded that exchange rate coordinating with credit play an important role in the determinant of inflation rate. However, study of IMF (2006) on Vietnam's inflation from 2001Q1 to 2006Q2 (on quarterly basis) indicates that the effect of exchange rate depreciation on inflation is just modest and incomplete. Meanwhile study of Vinh (2007) confirms the dual long-run causality relationship between exchange rate movement and inflation from 1990 to 1999. These things, suggest the possibility that impact of exchange rate is different in different sub-period within 1990-2007. However, data limitation does not allow for further study in this paper.

In the other hand, it should be noted that the government administrated a number of crucial goods in Vietnam. The amount of administrated-price goods is counted for 10% of total goods in Vietnam.[18] A great part of administrated-price goods are imported goods such as, fertilize, steel, cement, gasoline. This action has distorted the measure of the pass-through of exchange rate changes. Price administration may diminish the positive impact of exchange rate depreciation on inflation pressure.

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[18] Report of IMF (2006).

Broad money growth

Increase in broad money positively affects inflation rate, but only with a modest level. This suggests that Vietnam's inflation in period 1990-2007 still suffered influence by monetary factors as it had been before 1990, but with a smaller magnitude. Indeed, Camen (2006) proved that excess money is one source of inflation in Vietnam for the 1990s. Meanwhile, studies of Hung (1999) recognized correlation between money growth and CPI inflation, but with weak evidence, for period 1990-1995. Moreover, the study of IMF (2006) indicates some evidences that the link of inflation to money growth become strong from 2002.

During the period 1990-2007, amount of M 2 increased rapidly with an average rate at 29.5% and credit increase rapidly in the economy with the growth rate fluctuated from 20% to 60% each year. This suggests the idea for a link between credit growth and CPI inflation; however, such kind of link is insignificant when applied in the sample with the test for correlation. However, a study of IMF finds out some evidence of correlation between credit growth and inflation from 2002 to 2006.

Real GDP growth

Vietnam's inflation in this period had positive response and seems to be sensitive to the growth of output. Whenever inflation has positive response to output growth, the inflation caused by goods shortage, which is popular in some transition economy, no longer exists. This period experience a stop of inflation caused by goods shortage in Vietnam, which took place in period 1985-1989.

One more interest point should be noted is that the growth of real GDP fluctuated slightly during the period. Meanwhile inflation rate was affected strongly by real GDP growth, one percentage point increase in real GDP is associated with an inflation increase of about 2.22%. This partially explains for the fluctuation of inflation rate over period 1990-2007.

Commodity price index

The positive coefficient of variable commodity price index growth reflects the influent of the global price on domestic inflation. The global price affected domestic inflation through both import and export. However, the pass-through was not very strong.

Vietnam has imported not only consumption goods but also input and intermediate goods. For consumption goods, the rise of foreign price therefore raises the domestic price of imported goods as well as import-competitive goods in domestic market. For input and intermediate goods, rise in foreign

goods certainly raises the production cost and the cost of final goods increase as a result.

Vietnam has also exported various kinds of goods, especially in agriculture product. Whenever, the world price of exported goods increase, the domestic price of these goods raises as a result. This therefore raises the price of relevant goods in local market.

As above mention, the price of some crucial goods, which include both input and consumption goods, especially in energy, has been under control in Vietnam. Such price control has partially diminished influence of the rise of global price on domestic inflation. This also explains for the fact that there is little evidence for the link between Vietnam's inflation and the world price of energy.

Sluggish changes

The variable trend captures all sluggish changes in the economy from 1990 to 2007. Because of improvement in the economy as well as in industrial sectors, the coefficient of the variable is expected to be positive. However, the statistically significant negative coefficient of variable trend gives a reverse outcome. This suggests that sluggish changes in Vietnam economy have accelerated domestic inflation over the period. In average, inflation increase 1.5 percentage point each year due to the sluggish changes in Vietnam.

In comparison with the other relevant empirical studies, findings from equation 3 are reliable and corresponding to previous papers. This eases the doubt about robustness of econometric result across small sample.

Which determinant is the most important?

Equation 3 reflects the impact of each determinant on inflation in Vietnam. However, this equation can not tell us which determinant is the most important one. To study about the relevant importance of determinants on Vietnam's inflation, I use standardized coefficient.

The variables are standardized by subtracting the mean and dividing by the standard deviation. The standardized regression coefficient, then represent the change in response for a change of one standard deviation in a predictor.

Table 2 expresses the standardized coefficients of six determinants on Vietnam's inflation. Such coefficients suggest the most important role of output growth in inflation behavior in Vietnam. Beside that, exchange rate, inflationary inertia, and sluggish change in the economy also play an important role in the movement of inflation rate over period 1990-2007.

It should be kept in mind that the mentioned relative importance of determinants in table 2 is across the whole period 1990-2007. It is not necessary that the relative importance of each determinant stayed consistent in every sub-period within the whole period.

Table 2: Standardized coefficients of determinants on inflation in Vietnam (1990-2007)

variables	standardized coefficients
Inflation$_{t-1}$	0.644*
Exchange rate growth	0.670*
Broad money growth	0.004
Real GDP growth	1.107*
Commodity price growth	0.128*
Trend	0.400*
*: significant at 5%	

3.3.2 What make Vietnam's inflation be different compared to other Asian developing countries?

In order to study the differential behavior of Vietnam's inflation relative to other Asian developing countries, the explanation equation of Vietnam's inflation will be compared with explanation equation of a group of other countries. Difference in coefficients between two equations suggests the differential response of Vietnam's inflation to its determinants.

Firstly, I estimate an equation explaining for inflation in a group of 8 Asian countries, using the panel data.

Data and model

Getting statistical data from IMF and World Bank website, I form a panel data where panel variable including name of 8 Asian developing countries19 and time variable consisting the year 1990 until 2007. All the data are annual data and data set is strongly balance.

To serve for the purpose of comparison, the explanatory variables are the same with that of equation 1. However, a correlation matrix of them should be examined to check for possibility of relationships between variables.

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[19] China, India, Malaysia, Indonesia, Malaysia, Pakistan, Philippine, Sri Lanka, Thailand.

Table 3: Correlation matrix of selected variables across the eight Asian countries, 1990-2007

	Inflation$_t$	inflation$_{t-1}$	Ergrowth$_t$	m2growth$_t$	gdpgrowth$_t$	Comgrowth$_t$
Inflation$_t$	1.0000					
inflation$_{t-1}$	0.4171	1.0000				
ergrowth$_t$	0.7521	-0.0514	1.0000			
m2growth$_t$	0.4838	0.1262	0.3853	1.0000		
gdpgrowth$_t$	-0.2184	-0.1277	-0.2129	-0.2168	1.0000	
Comgrowth$_t$	0.1233	0.1854	0.1937	0.1445	0.3711	1.0000

Table 4: Correlation matrix of selected variables across the eight Asian countries, 2000-2007

	Inflation$_t$	inflation$_{t-1}$	Ergrowth$_t$	m2growth$_t$	gdpgrowth$_t$	Comgrowth$_t$
Inflation$_t$	1.0000					
inflation$_{t-1}$	0.4937	1.0000				
ergrowth$_t$	0.2002	-0.0339	1.0000			
m2growth$_t$	0.1166	0.1145	-0.0678	1.0000		
gdpgrowth$_t$	0.0430	0.0103	-0.1241	-0.1007	1.0000	
Comgrowth$_t$	0.2894	0.1074	-0.3695	0.2564	0.2506	1.0000

For the period 1990-2007, most of them appear fairly good positive correlation with inflation, except the variable of GDP growth and commodity price index. The correlation between real GDP growth and CPI inflation become positive from the year 2000 but it seems not strong. Such change suggests that the whole period should be divided into sub-periods for a better analysis. However, the limited number of observation does not allow this.

The correlation index itself is not the proof of causal relationships. After examining the correlation of variables of interest, I go ahead to Hausman test to make a choice between fixed effects estimator and random effects estimator.

Hausman test

Dealing with panel data, fixed effects estimator is always statistically reasonable because of its consistent result. However, it might not be the most efficient model and random effects estimator could give better P-value. Thus, it is necessary to test for both efficiency and consistent matter. To determine which estimator is suitable for our panel data, I do Hausman test with null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the one estimated by fixed effects estimator. The significant P-value (0.0474) rejects the null hypothesis of no difference in

estimated coefficients. Due to the test result, I chose fixed effects estimator for the sample.

Estimated equation with fixed effects estimator:

$$Inflation_{i,t} = -0.029 + 0.364 Inflation_{i,t-1} + 0.202 ERgrowth_{i,t} + 0.057 M2growth_{i,t} + 0.010 GDPgrowth_{i,t} + 0.076 comprice_{i,t} - 0.344 trend_t$$
$$\quad (0.001) \quad (0.047) \qquad\qquad (0.013) \qquad\qquad (0.006) \qquad\qquad (0.009)* \qquad\qquad (0.021) \qquad (0.134)$$

$$(4)$$

(numbers in bracket are standard errors | all variables significant at 5% , except GDP is insignificant | R^2 =86%)

Variable GDP growth gets statistically insignificant coefficient; while the others get positive and statistically significant coefficients. Thus, the relationship between real GDP growth and inflation should be examined with caution.

Table 5: Coefficients of explanation variables

Explanation variables	Vietnam (equation 3)	Asian developing countries (equation 4)
Inflation$_{t-1}$	0.626	0.364
Exchange rate growth	0.863	0.202
Broad money growth	0.058	0.057
Real GDP growth	2.215	0.010
Commodity price	0.098	0.076
Trend	1.506	-0.344

All coefficients are significant at 5%; except the variable real GDP growth

Inflationary inertia

We can recognize the higher persistence of inflationary inertia in Vietnam relative to in other Asian developing countries. One percentage point of last-year inflation raises present inflation in the countries of sample 0.36 percentage points; meanwhile the number would be 0.63 percentage points for the case of Vietnam.

This again confirms for the so-called "power of belief" in the economy of Vietnam; whenever people expect the high inflation rate, it is difficult to put inflation under control. The Vietnamese, from households to enterprises until

present still keep the routine of hoarding as well as speculation, whenever they realize an acceleration of inflation. Such actions strain inflation pressure.

Experience of chronic hyperinflation for a long period before 1993 may be the cause of this phenomenon. Lack of belief in government commitment on inflation control leads people to self-defense actions.

Change in exchange rate

Compared to what happen in the neighbor countries, the pass-through of exchange rate was quite stronger in Vietnam. One percentage point of exchange rate depreciation increases 0.86 percentage points of domestic inflation, about four times higher than that of inflation of the others.

This reflects the fact that a great part of commodity in Vietnam was imported, especially for input. In one hand, exchange rate depreciation raises the price of imported input; then the domestic output price would increase too. In other hand, increasing price of imported good accelerates price of import-competitive goods. All would converge at CPI inflation strain. Therefore, the larger ratio of imported goods is the more sensitive of inflation response to exchange rate variation.

In addition, exchange rate impacts not only tradable goods but also non-tradable goods in the case of dollarized economy in Vietnam (Goujon, 2006). Depreciation increases price of both kind of goods.

Broad money growth

In both Vietnam and the others, broad money growth seems not to be the matter of worry because of its weak effect on CPI inflation. One percentage point of broad money growth gave only nearly 0.06% increases in inflation for both Vietnam's case and the case of Asian developing countries in sample.

Real output growth

Again, Vietnam's inflation presents its sensitive response to real output growth. A growth of one percentage point in real GDP is associated with an increase in Vietnam's inflation of 2.22 %. This number is so much greater than 0.01% increase in inflation of the others.

Such great difference suggests for the possibility that output increase lead to excess demand, especially in high-elastic goods in Vietnam. However, study of IMF for period 2002-2006 presents that impact of output gap on CPI inflation was equal between Vietnam's economy and other Asian economies. This warns about the reliability of the coefficient of real GDP growth across the panel data. Indeed, this coefficient is not statistically significant, as mentioned above.

Commodity price index

Over the period 1990-2007, although Vietnam had relative heavy price control in comparison to other Asian developing countries; inflation in Vietnam was influenced fairly stronger by the global price than the other countries were.

The fact that Vietnam has pursued an export-based economy may be the reason. Vietnam export mainly food and agriculture product. Meanwhile the global food price has accelerated in recent years. This has allowed Vietnam export their goods at a higher price; and the price of these goods in domestic market therefore increase as a result.

Sluggish changes in the economy

While Vietnam faced with some changes that rose domestic inflation 1.5 percentage point per year; other Asian countries experienced a decrease of 0.34 percentage point annually thank to sluggish change in their countries.

By and large, the response of Vietnam' inflation to the changes in its determinants (except money supply) seems to be stronger than that of other developing countries in Asia. Moreover, in the case of remarkable improvement in output of Vietnam, the domestic inflation was again strained more seriously. These partially explain for the higher inflation rate of Vietnam relative to other Asian countries in the late of studied period.

One more explanation for such higher inflation is the changes in the economy over the period 1990-2007. While the others experienced the sluggish changes that helped reduce domestic inflation; Vietnam, in reverse, had some changes that accelerated its inflation. This again contributes to the explanation on differential inflation behavior in Vietnam over the period.

CHAPTER 4
CONCLUSION

The period 1990-2007 is an interesting span which connects the two period of high inflation in Vietnam. This period experiences a remarkable switch in the nature of inflation together with a significant switch in the inflation rate.

It is the change in determinants of inflation that brought the inflation rate in Vietnam down from the high level of the 1980s. While the crucial causes of high inflation before 1989 are excess money supply and lack of goods due to limited productivity; the major causes of inflation in 1990-2007 are the growth of output, inflationary inertia, exchange rate appreciation, and the changes in the economy during the period.

The government's control in crucial price proves to help reduce inflation because it diminished the influence of exchange rate depreciation and increase in price of global goods. Indeed, the process of reducing subsidies in some crucial goods as well as partially relaxing the administration on energy price from early 2007 together with an increase of the world inflation is blamed for the acceleration in inflationary pressure from late of 2007.

Despite of the fairly low inflation rate during the whole period, it should be noted that Vietnam's inflation has accelerated and been higher than that of other developing Asian countries from 2004 onwards. The crucial cause of this phenomenon is that the sluggish changes in Vietnam's economy have partially accelerated domestic inflation with higher speed relative to its neighbors. Meanwhile the neighbors have a tendency to diminish inflation. This is somehow converse to the general belief that the economy should perform better after a process of reforms; hence, inflation should experience a downward trend.

The overconfidence of economy agents in Vietnam may be one possible explanation. Vietnamese households have tended to increase the ratio of consumption over income because they believe on the possibility of their higher earning in future. The high growth rate of output could give more confidence for people. The more output increase, the more confident people become.

Vietnam's economy seemed still more vulnerable than other Asian countries in term of the pass-through of determinants on domestic inflation. Each positive change in the determinants leads to a higher upward movement in Vietnam's inflation relative to its neighbors. Meanwhile, these determinants have maintained the positive changes over the period; and some domestic determinants such as broad money supply, output growth of the economy were even has higher growth speed in Vietnam. This suggests that there were low inflation rates in Vietnam during the last 17 years because that the economy has

just been in the first stage of the so-call market economy. Hence, the inflationary process has just started with the low level of its first step. The potential coming steps with higher inflation rate will be reached by Vietnam's economy.

APPENDIX

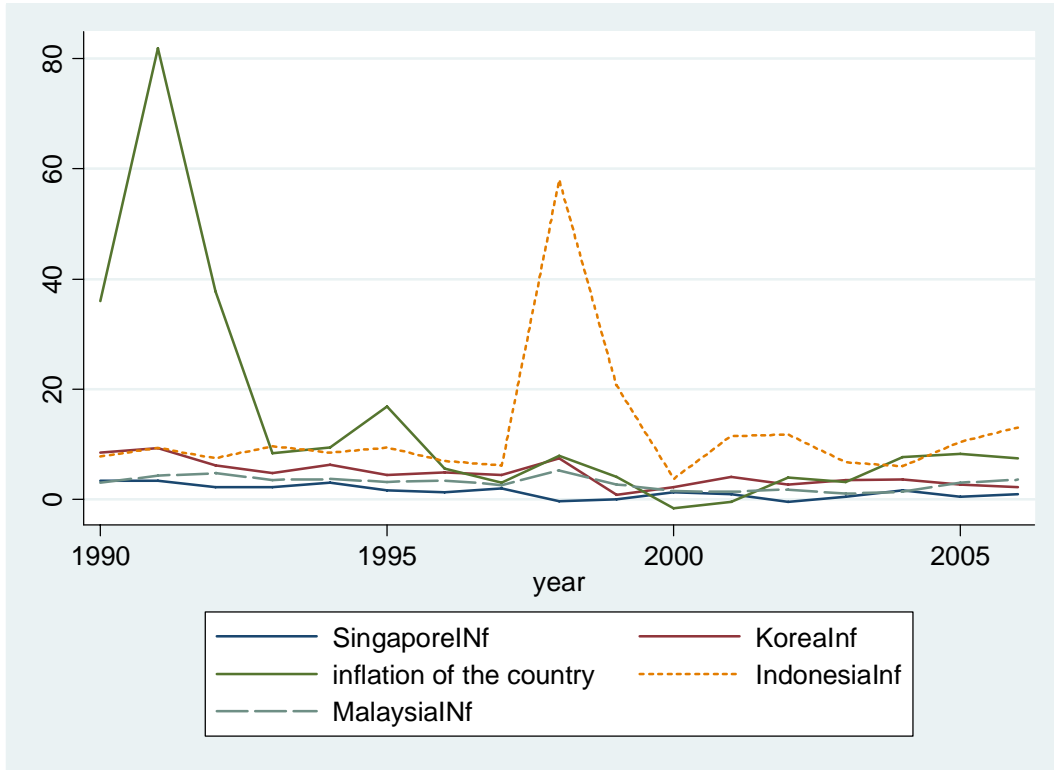**Figure A.1: Inflation in Vietnam, Singapore, Korea, Indonesia and Malaysia, 1990-2007**

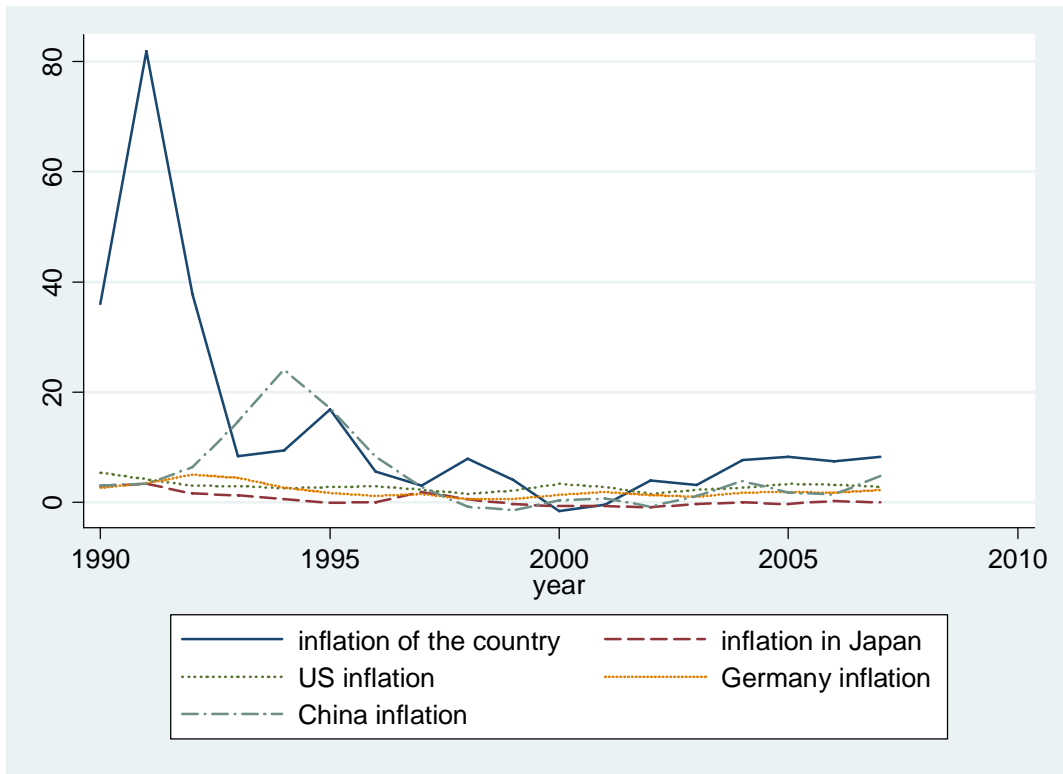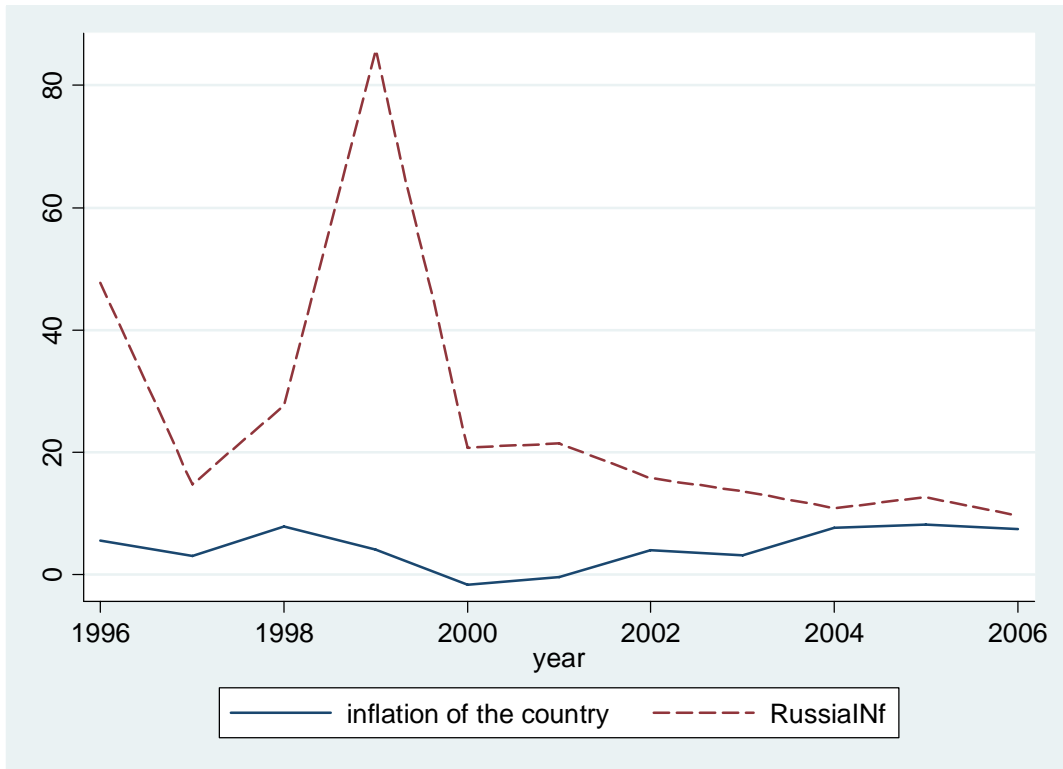**Figure A.2: Inflation in Vietnam, Japan, US, Germany and China, 1990-2007**

Figure A.3: Inflation in Vietnam and Russia, 1990-2007

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