

INFLATION IN THE SEACEN COUNTRIES: Its Causes and Management

Lim Choon Seng



**The South East Asian Central Banks (SEACEN)
Research and Training Centre**

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by
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The South East Asian Central Banks(SEACEN)
Research and Training Centre
Kuala Lumpur, Malaysia

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FOREWORD

Despite being one of the most studied economic variables, the cause of inflation remains debatable. While its effects may vary across borders, inflation remains an universal issue of concern. Unless all of us revert back to barter trade, inflation will feature prominently in our lives. After all, inflation is about the purchasing power of the people, the honesty of the government, the prosperity of the people and the wealth of the nation. Back in 1926, Irving Fisher published his paper, *A Statistical Relation Between Unemployment and Price Changes* in the *International Labor Review*. It was the first systematic analysis ever performed by an economist on the relationship between inflation and unemployment. Since then, the body of economic literature on inflation has grown by leaps and bounds.

While the more traditional issues of demand-pull, supply shocks and cost-push are not entirely neglected, the focus on inflation has somewhat shifted to that of credibility and sustainability. There is the question of the credibility and independence of central banks. Also, is inflation rate sustainable in an environment of rapid economic growth? In a broader analytical framework, this study aims to analyze both the monetary and non-monetary causes of inflation in the SEACEN countries by assessing their experiences with inflation and to recommend appropriate techniques for dealing with inflation.

This collaborative project was undertaken by Mr. Lim Choon Seng, Economist of The SEACEN Centre. He authored Part I of this Volume. Mr. Lim was assisted by Mr. Lee Ee Soon, Research Associate who contributed positively at the initial stage of the project. At the later stage, Mr. Koay Keng Teik, Research Associate, provided the necessary research support. The secretarial assistance of Miss Karen How and Mrs. Haslinda Muda is also gratefully acknowledged. Mr. Lim would also like to thank all the staff of the Research Division of The SEACEN Centre for their useful comments and suggestions and the Publications Unit of the Centre for its assistance.

The Centre is also very grateful to the country researchers from member central banks of Bank Indonesia, The Bank of Korea, Bank Negara Malaysia, the Central Bank of Myanmar, Nepal Rastra Bank, Bangko Sentral ng Pilipinas, the Monetary Authority of Singapore and the Bank of Thailand for preparing their respective country studies which form the contents of Part II of this Volume. The views ex-

pressed in this Volume, however, are those of the authors and do not necessarily reflect the views of the member banks and monetary authorities or that of The SEACEN Centre.

Dr. Vicente B. Valdepeñas, Jr.
Director
The SEACEN Centre

Kuala Lumpur
June 1996

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EXECUTIVE SUMMARY

INFLATION IN THE SEACEN COUNTRIES : ITS CAUSES AND MANAGEMENT

The inflationary experiences of the SEACEN countries can roughly be divided into several time periods. These would encompass the first and second oil-shocks between 1970 and 1980, the Gulf War period in early 1990's, and in between, the recessionary and economic boom periods. In the early 1970's, the three-fold rise in oil prices brought about by the first oil-shock, caused many of the SEACEN countries to experience their first episode of inflation. The second oil shock, following the Iranian Revolution launched another bout of pressure on inflation. However, by mid-1980's, inflation rates moderated due to global recession and a more accommodative monetary policy was swiftly put in place by the SEACEN countries. In the 1990's, apart from the Gulf War, severe external shocks were virtually non-existent. However, during this period, the liberalization efforts of the 1980's led to massive capital flows into several SEACEN countries fueling inflationary pressures.

The time-series analysis of inflation rates in the SEACEN countries (except for Myanmar) reveals that inflation is stationary. Although commodity prices and external shocks triggered off inflation, inflation rates did moderate in most of the SEACEN countries. This study also finds that money supply is the common denominator as the cause of inflation in the SEACEN countries. However, the elasticity estimates suggest that prices are highly non-homogeneous. Moreover, the short-run analysis for the case of Indonesia, Korea and Malaysia suggests that monetary policies are non-accommodating. Fiscal policy also plays an important role in the management of inflation in the SEACEN countries. It is also noted that fiscal deficit is found to Granger-cause money supply. Perhaps the best governments can and should do is to pursue balanced/surplus budgets so as to enhance credibility on their anti-inflationary programs. With proper management of economic growth, inflation can be contained.

In the 1990's, the common theme relating to anti-inflationary programs appears to be some form of a policy dilemma. With the opening of the capital account, there is increased interaction between interest

rate, exchange rate and monetary policies. Domestic economic policies have also become increasingly interrelated with external sector policies. In such circumstances, determined anti-inflationary policies can be thrown off guard by surges in capital inflows. The best solution in such a situation is perhaps to introduce additional measures while maintaining the anti-inflationary policy stance so as to instill credibility and at the same time eliminate uncertainty regarding future inflation.

With financial liberalization, the use of interest rates to control inflation becomes increasingly popular. However, this study cautions the use of interest rate per se as there is evidence to suggest that in the long run, inflation rates tend to go up with interest rates. This is possibly due to the fact that the response of the monetary authorities is one of incompleteness, i.e., the authorities systematically raise interest rates in response to expectation of future prices but somehow the increase appears to be insufficient to prevent further price escalation.

As for the debate on the issue of the independence of central banks, this study argues that for the SEACEN countries, perhaps a rather more relevant issue is to ask whether policymakers have ever deviated significantly from the rules that they themselves set.

In conclusion, perhaps the key to successful implementation of inflation programs in some of the low-inflation SEACEN countries lies in the boldness, swiftness, seriousness and consistency in which the authorities act to control inflation.

PART I

AN OVERVIEW ON INFLATION IN THE SEACEN COUNTRIES: ITS CAUSES AND MANAGEMENT

Chapter 1

INFLATION IN THE SEACEN COUNTRIES: ITS CAUSES AND MANAGEMENT

by
Lim Choon Seng

INFLATION. Inflation occurs where there is an increase in currency without a corresponding increase in commodities, or where there is an increase in paper currency without a corresponding increase in metallic backing ... rising prices and shortages of the necessities and comforts of life, and results from the creation of additional purchasing power, following a huge excess of public expenditure over revenue from taxes, coupled with a rapidly mounting national debt. The "inflationary gap" is that part of the Treasury borrowings not derived from public savings, but the banks

Thomson's Dictionary of Banking
Pitman Publishing Ltd., U.K.
Twelfth Edition, 1974
Reprinted, 1977

1. Significance

Inflation became a major concern for most countries, particularly after the first and second oil shocks. High inflation does not only undermine the stability of money but can create financial chaos, thus affecting the growth of the economy. It follows that price stability is a priority issue of central bankers. The hard-earned lessons from and the varying degrees of success in managing inflation are as varied as the causes of inflation themselves. Success in managing inflation during period of economic expansion promotes higher sustainable living standards and preserves confidence in the financial system through price stability. While the impact of inflation varies across borders, price uncertainty remains a common issue of concern.

Some have argued that the current economic problems besetting the United States can be traced to the failure of the authorities to stem inflation in the 1970's. The A-B-C countries of South America, namely Argentina, Brazil and Chile, while having respectable growth during the first 20 years of the post-war era, failed to reach 'developed' status due in large part to hyperinflation. Between 1970-1972, Brazil's inflation of 20 percent was considerably lower than earlier years. On the other hand, the Republic of China (ROC), Taipei, Singapore and Korea, through careful management of price levels and with other growth promoting policies, became Newly Industrialized Economies (NIEs). Likewise, Malaysia, Indonesia and Thailand, even with brisk economic activities in recent years, managed to keep their inflation rates at generally acceptable levels. By comparison, the People's Republic of China, while having considerably higher growth, experienced relatively higher rates of inflation.

There are various theories on the causes of inflation. There are traditional explanations like cost-push, demand-pull and supply shocks. In recent years, both the long-run and the short-run Phillips Curve explanations failed to either capture or describe the traditional relationship between unemployment and inflation rates. Some countries have undergone periods of stagflation, i.e., a stagnant economy with inflationary pressures.

Price stability and economic growth have often been associated with sound monetary, fiscal and exchange rate policies. Recent developments in the analysis of inflation reasserted the importance of these policies. With rational expectations, future prices are influenced by the expectations of the official policies and the corresponding reaction thereto. It is possible that most inflationary pressures of recent years are in fact caused by these expectations and not by the price adjustment mechanism itself.

2. Objectives

This study is focused on the following objectives:

- (i) to assess the experiences of the SEACEN countries with inflation;
- (ii) to identify the causes of inflation in the SEACEN countries;
- (iii) to study the different policy measures adopted by individual SEACEN countries in dealing with inflation;

- (iv) to validate (ii) and (iii) through empirical analysis; and,
- (v) to examine and identify appropriate techniques for dealing with inflation.

This SEACEN research collaborative project consists of two parts. The first part covers the comparative analysis prepared by the SEACEN researcher. The second part comprises country chapters drafted by the respective researchers from the participating member banks and monetary authorities.

This study aims to provide a broader analytical framework in analyzing both the monetary and non-monetary causes of inflation in the SEACEN countries. By examining the facts and figures, and by looking at the experiences of the member banks and monetary authorities in dealing with inflation, one hopes to obtain a clearer picture. By analyzing the causes and effects, one hopes to be able to suggest ways towards its better management.

Chapter 2

Without the notion of prices there would be no economic science. The concept is of absolutely central significance. It is not as easy and trivial a concept as it appears to be at first sight. A satisfactory measurement of price is, as a consequence, a difficult undertaking, and it is not surprising that price statistics, abundant as they are, have to be approached with utmost caution.

Oskar Morgenstern
on the Accuracy of Economic Observations
Princeton, N.J.: Princeton University Press, 1963

1. Introduction

Since the existence of money, inflation has become one of the most controversial economic variables, not only in the sense of what causes inflation and its possible implications on the economy but also how one proceeds to measure it. Three decades ago, with the Phillips Curve, economists thought they had finally come to understand inflation and its process thereof. The Phillips Curve states that inflation and unemployment rates are inversely related. For sometime, debate on inflation was centered on this Phillips Curve Hypothesis. Various distinct interpretations complementary to the Phillips Curve emerged. As with any economic theory, there are also explanations on short-run Phillips and long-run Phillips Curve. However, the Phillips Curve, though not theoretically incorrect, fails dismally to address the problem of stagflation, where the tradeoff between inflation rate and unemployment rate is absent. As to how one measures inflation, the most common index used is the Consumer Price Index (CPI) and the Gross Domestic Product (GDP) deflator. There have also been proposals to measure 'core' and 'underlying' inflation. These measures are of course not without their problems and controversies.

2. Inflation Defined

Inflation is defined as a process where there is continuous increase in the average level of price for goods and services. With the definition above, price increases in individual goods, temporary price increases and a one-off increase in prices do not necessarily qualify as inflation. Although one recognizes that the average price of goods and services

is a function of individual prices, the price increase in some individual goods may not be taken as a measure of inflation as the price of other individual goods may be declining. A one-off increase could push the price level up and if the adjustment is not instantaneous, the rate of change in prices could increase, but this rate of change would by itself subsequently adjust to the same level prior to the one-off increase in prices.

2.1 Cost of Living Index (CLI)

The rate of increase of the CPI is one of the most common measurements of inflation. The one advantage it has over other measurements is that the statistics of CPI are often up-to-date. In many countries, indexation of income to the rate of CPI is not uncommon. In the United States (U.S.), social security recipients receive increases in their nominal pensions which are equal to the rate of inflation. In other countries, wage indexation is a common feature in wage bargaining rounds. Theoretically, the CPI could be considered as a measure of the cost of living.

Assuming that the utility function of the society is given by:¹

$$U = f(q^1_1, q^1_2, \dots, q^1_m, q^2_1, q^2_2, \dots, q^2_m, q^3_1, \dots)$$

where q^t_i = quantity of the i th goods/services consumed at time t . In a broader sense, goods consumed included consumption of leisure, air, etc.

The cost function which minimizes cost in order to attain a specific level of utility u could be specified as:

$$c(p^t, u) = \min \sum_{i=1}^n p^t_i q^t_i : u \leq U(q^t)$$

Since it is impossible to measure prices of all goods and services consumed, $n < m$, where n is all consumable goods and services with corresponding measurable prices, p^t_i .

1. Based on Wynne M.A., and Sigalia F.D., *The Consumer Price Index*, **Economic Review**, Federal Reserve Bank of Dallas, Second Quarter, 1994.

The true cost of index (CL) is thus,

$$[c(p^t, u)]/[c(p^b, u)]$$

where, p^b refers to prices in some base period b . If the above index is greater than one, it means that prices of goods and services in period t have increased as compared to the base period. That is, the cost of living has increased.

2.2 Consumer Price Index (CPI)

The consumer price index measures the rate of change in the prices of goods and services purchased by private households. Obviously, one cannot measure all the prices of goods and services in the country. Often, a basket of goods and services and their respective weighting based on a household survey expenditure is used to reflect the spending patterns of an average individual household. The underpinning weights are based on the share of the expenditure of the items. Conceptually,

$$CPI^t = \sum p_i^t x_i^b / \sum p_i^r x_i^b$$

where, p_i^t = Price of goods i at period t
 x_i^b = of goods consumed at base period b
 p_i^r = of goods i at period r

3. Data Collection

Each country has its own method of data collection which has evolved overtime, becoming more sophisticated and comprehensive. For example, in Indonesia, prior to 1979, price development was formally measured by the Jakarta Cost of Living index (CLI). The CLI was based on the Cost of Living Survey on industrial labor in Jakarta in 1957/1958 and it covered 62 items of goods and services. Subsequently, there are two more main surveys, namely the 1977/1978 Survey and the 1988/1989 Survey. The latest consumer price index, based on the Cost of Living Survey conducted in the period of April 1988-1989 was introduced in April 1990. This new index measures the consumer prices in a sample of 27 cities compared to 17 cities in the 1977/1978 survey. Under the present survey, the number of consumer

goods also increased from 115-150 to 200-225 items. The CPI for Indonesia is a weighted average of CPIs of provincial capital cities using the total number of households in each city as the weights. The CPI for each city is calculated according to the city's monthly household consumer pattern.²

For Nepal, prices are being monitored through 13 urban collection centres. For the Kathmandu Region, the price of each item is taken from five different shops from the pre-determined market. The weights are based on the Multi-Purpose Household Budget Survey carried out in 1983/84. The criteria in selecting the household families are households having two to ten family members, households having income ranging from Rs. 450 to Rs. 3500 per month and households which spend more than 50 percent of their income in purchasing goods and services from the market.³

Currently, in the Philippines, the CPI has 1988 as the base year and it is computed using the Laspeyres' formulae. The weights utilized were based on the Family Income and Expenditure Survey conducted by the National Statistics Office in 1988. Prices used in the computation of the CPI are collected from retail outlets in Metro Manila (11 Markets), in all provincial capitals and in more or less 600 municipalities throughout the country. Each of the 14 regions has its own 'market basket' of goods and services purchased for consumption by households in the region based on the 1985 Commodity and Outlet Survey. The commodities items are selected to present the composite price behavior of all goods and services based on their representation and importance in household purchases.⁴

In Singapore, prices of selected goods are collected regularly from markets, supermarkets and provision shops, econ-mini markets and other retail outlets located throughout the country. The frequency of pricing depends on the price stability of the items. Prices are collected thrice weekly for perishables such as fish, vegetables, meat and poultry and weekly for sundries and provisions. Clothing materials, including items of services are priced monthly. Items with infrequent price fluc-

2. Bank Indonesia, *Annual Report*, various issues.

3. Mathema S.R., Country Chapter.

4. The Central Bank of the Philippines, *Annual Report*, Volume II, 1992.

tuations (e.g., house rents, school fees, public utilities charges, bus fares) are priced quarterly, yearly or as and when their prices are revised. Over the years, new items such as the certificate-of-entitlement (COE) premiums for car purchases, laser discs, laser disc players, handphones, pagers and nursing care services are included. Currently, the weights assigned are based on the expenditure pattern of households with monthly incomes ranging from \$820 to \$8300 during the period from October 1992 to September 1993. The Department of Statistics also releases data on CPI for three separate income groups. These income groups are the top 20 percent, middle 60 percent and lowest 20 percent income earners with average monthly household incomes of about \$9,200, under \$3,000 and \$1,100 respectively.⁵

In Sri Lanka, the official indicator for inflation is the Colombo Consumers' Price Index (CCPI). The CCPI has 1952 as the base year. In 1989, the Department of Census and Statistics introduced the Greater Colombo Consumer Price Index (GCPI). The GCPI is considered to be a more realistic indicator of the general level of retail prices by virtue of its weights being more up-to-date and its wider items and geographic coverage. The weights of the GCPI are based on the expenditure patterns of the bottom 40 percent of households when ranked by expenditure in the greater Colombo areas as revealed in the Labor Force and Socio-economic Survey conducted by the Department of Census and Statistics in 1985-1986.⁶

In Thailand, there are three main indicators. For the general price index, the weights and selected items are derived from a socio-economic survey conducted only in urban areas in 1990 among families of two or more persons but not over ten with monthly incomes ranging from ฿ 4000 to ฿ 11000. For the lower income group price index, weights and selected items are derived from a socio-economic survey conducted in urban areas in 1986 among families of two or more persons but not over seven, with monthly incomes ranging from ฿ 2500 to ฿ 4000. For the rural price index, the weights and selected items are derived from a socio-economic survey conducted in sanitary districts in 1986 among families of two or more persons but not over ten, with monthly incomes ranging from ฿ 1500 to ฿ 3500.⁷

5. Country Chapter and the Department of Statistics, Singapore, *Yearbook of Statistics*, 1992.

6. The Central Bank of Sri Lanka, *Annual Report*, 1993.

7. The Bank of Thailand, *Quarterly Bulletin*, February 1995.

4. Biasedness in Consumer Price Index

4.1 Substitution Bias

The Laspeyres formulae are most commonly used in the construction of price indices. The formulae are also used extensively by the G-7 countries.⁸ However, cost of living as measured by CPI using the Laspeyres⁹ formula which is based on a fixed basket of goods and services has been known to be susceptible to an upward substitution bias. Compared to the Cost of Living Index, the CPI does not allow for adjustment in consumption levels in response to a change in relative prices. If there are relative price changes, economic agents are likely to substitute less expensive comparable goods for more expensive ones. As such the CPI tends to over-estimate welfare loss. However, the Laspeyres price index provides an upper bound to the true cost of living index based on the reference period utility level.¹⁰ The size of the biasedness depends on the magnitude of relative price changes and the size of consumption substitution elasticities. If there are no relative price changes, regardless of the size of substitution elasticities, then there will be a zero bias and if the consumption substitution elasticities equal zero, regardless of the size of relative price changes, then the bias will also be zero.

The way to circumvent this type of bias is to periodically update the weights of the basket of goods and services used in the calculation of the CPI. However, it may be costly and impractical to conduct household expenditure surveys periodically.

4.2 Quality Bias

Overtime, the quality of a particular product is likely to improve. This will be reflected as the price increases for that particular product.

8. Chriszt M.J., *Are International Comparisons of Inflation and Employment Valid?*, **Economic Review**, Federal Reserve Bank of Atlanta, November/December 1993, pp. 23-36.

9. Other methods of construction of the CPI include the Paasche Index, the 'Superlative' Index Number and the Tornqvist Index. See Diewert W.E., *Exact and Superlative Index Numbers*, **Journal of Econometrics**, May 1976, pp. 115-145.

10. Braithwait S.D., *The Substitution Bias Of The Laspeyres Price Index: An Analysis Using Estimated Cost-of-living Indexes*, **American Economic Review**, March 1980, pp. 64-77.

The CPI does not take into account this type of quality bias. Often, the improvement could be seen as a creation of a 'new' product and such price increase caused by improved quality must in theory be factored out.¹¹ Quality bias is most evident for durable goods. However, it is difficult to quantify as it involves accurate measurement of quality improvement. Often, a subjective adjustment is made to the CPI. According to Garfinkel (1989),¹² the general price index used to measure inflation does not take into account quality bias; hence, the resulting measure of inflation would tend to overstate actual inflation rate.

4.3 New Goods Bias

New goods are constantly being introduced. In some way, the new goods bias could be classified as quality bias but the problem is that the distinction between an entirely new product and a variant of an existing product is not always obvious.¹³ Fixler (1993)¹⁴ defines a new product as a rebundling of a product's characteristics or the inclusion of new characteristics while a quality change could be seen as a change in a product's characteristics.

4.4 Overall Bias

The size of the overall bias in the CPI is anybody's guess. Empirically, it is extremely difficult to isolate the contribution of the various types of bias. Wynne and Sigalia (1994)¹⁵ suggest that an overall bias of less than one percent is a plausible estimate. However, their caveat is that '[t]he true figure may be a lot larger or a lot smaller; at present we simply do not know.'

11. Hildebrandt P., and Thomas E.A., *The Cost of Medical Care and its Effect on Inflation*, **Economic Review**, Federal Reserve Bank of Kansas City, September/October 1991, pp. 56.

12. Garfinkel M.R., *What is an 'Acceptable' Rate of Inflation? A Review of the Issues*, **The Review**, Federal Reserve Bank of St. Louis, July/August 1989, pp. 3-15.

13. Wynne M.A., and Sigalia F.D., *The Consumer Price Index*, **Economic Review**, Federal Reserve Bank of Dallas, Second Quarter, 1994, p. 12.

14. Fixler, D., *The Consumer Price Index Underlying Concepts and Caveats*, **Monthly Labour Review**, December 1993, pp. 3-12.

15. Wynne M.A., and Sigalia F.D., *The Consumer Price Index Economic Review*, **Federal Reserve Bank of Dallas**, Second Quarter, 1994, pp. 18.

5 Inflationary Experience in Selected SEACEN Countries¹⁶

The inflationary experiences of the SEACEN countries can roughly be divided into several time periods. These would encompass the first and second oil-shocks between 1970 and 1980, the Gulf War period in early 1990's, and in between, the recessionary and economic boom periods.

5.1 First Oil Shock

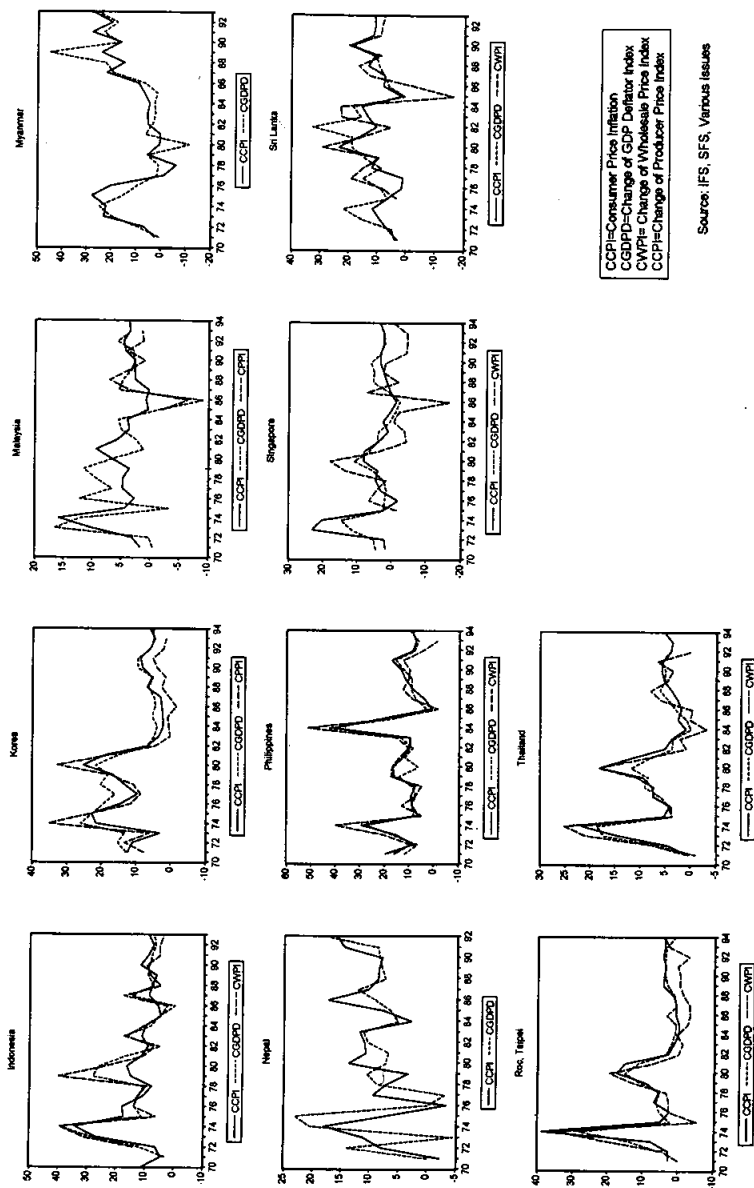
In the early 1970's, the three-fold rise in oil prices brought about by the first oil-shock, caused many of the SEACEN countries to experience their first episode of inflation (Chart 2.1). In the case of *Indonesia*, an oil-exporting country, the increase in oil revenue was used especially to increase public investment and expenditure at the expense of stoking inflationary pressures. However, the Central Bank imposed credit squeeze by setting credit ceilings for banks. National buffer stocks were also introduced. In other SEACEN countries, the oil price shock increased production costs. With a sizable energy bill, the terms of trade deteriorated drastically. In *Korea*,¹⁷ the government price control system which was implemented in 1972 resulted in the accumulation of inflationary pressures which was partly responsible for the subsequent increase in inflationary pressures during the period 1974-1975. To control inflation, the Price Stabilization and Fair Trade Act was enacted in 1975. *Malaysia*¹⁸ experienced its first inflationary episode during the period of 1973-1974 where inflation peaked at around 17.4 percent. The situation was very similar to Indonesia. Excess demand for commodities rose sharply and as a result, there were substantial inflows of foreign exchange. This led to excess liquidity in the economy. The surge in oil prices by 234 percent also added fuel to inflation. In the wake of accelerating inflation, Malaysia took several measures. These measures included increasing interest rates, higher statutory reserves and selective credit schemes. In addition, surcharges and duties on the

16. Based on the **Country Chapters**; unless otherwise stated, inflation rate is based on the change in CPI.

17. The case of Korea is based on Kim M.W., *Measurement of the Underlying Rate of Inflation in Korea*, **Quarterly Economic Review**, The Bank of Korea, December 1990, pp. 19-41.

18. Based on Bank Negara Malaysia, *Inflation and Management of Inflation*, **Annual Report, 1991**, pp. 120-127.

Chart 2.1
Inflation Rates



exports of major commodities were increased to absorb the excess liquidity. Restrictions were also imposed on the export of goods mainly for the construction sector.

In the case of the *Philippines*, inflation was contained in the wake of the Martial Law. In addition, the Presidential Decree No. 20 served to limit housing rental growth. However, inflation accelerated to over 30 percent in 1974, due to the shortage in rice and oil as well as an adjustment in the exchange rate. However, by 1975, inflation began to slow down. This was credited to the liberalization of import restrictions, the adjustment in export and import duties, the building up of fiscal cash balances and the flotation of Central Bank Certificates of Indebtedness. Food subsidies and controls also helped to regulate prices. In *Singapore*, the higher oil prices during this period were responsible for inflation reaching its peak during the period 1972-1974, averaging over 20 percent. In *Thailand*, the increase in import costs of crude oil and the rapid expansion of private credit pushed inflation rate to a double-digit figure in 1974. Policy-makers of Thailand adopted expansionary policies which led to the emergence of fiscal deficits as at that time they were more concerned with economic growth.

5.2 Second Oil Shock

The second oil shock, following the Iranian Revolution launched another bout of pressure on inflation. The *Indonesian* rupiah, which was devalued in 1978 in order to boost exports, caused the inflation rate to accelerate to around 20 percent in 1979. However, the excellent harvest in 1980 helped to contain prices. In March 1983, the rupiah was further devalued by 27.5 percent. But monetary policy remained tight and inflation rate dropped to around 4.3 percent in 1985. In 1979, *Korea* adopted tight monetary and fiscal policies and this led to a sharp increase in interest rates. However, inflation hit its peak in 1981. By mid-1980's, the gradual lowering of interest rates was carried out to ease the financial burden on firms. In 1981, the same year as in Korea, inflation rate in *Malaysia* reached its peak at 9.7 percent. Escalating oil prices and soaring prices for raw materials and investment goods further aggravated the cost of production. Supply constraints and excessive demand were also major contributing factors. Various measures were introduced to moderate the growth of money supply while ensuring that there were enough credit for investments and other productive activities. On the other hand, fiscal policy was aimed at

reducing supply bottlenecks by stimulating the expansion of the country's productive capacity.

For *Nepal*, the inflation rates between 1980-1983 were relatively higher, due to higher inflation rates in India, higher price of petroleum and higher cost of production following the rise in fertilizer prices. The devaluation of the Nepalese rupee possibly also contributed to the increase in the inflation rates. Nepal introduced a series of anti-inflationary measures between 1980 to 1985. Amongst the measures, commercial banks were to maintain 25 percent of total deposit liabilities in liquid assets and 5 percent of total deposits with the Nepal Rastra Bank. A number of changes was also made to the interest rate structure to enable better mobilization of funds. In the *Philippines*, two oil price adjustments in 1979 and higher utility prices and wage increases stimulated consumer demand. Price control was also lifted in the same year. However, by 1981, inflation had slowed down considerably. This was credited to sustained policy measures on demand management and supply stabilization. For example, selective pricing schemes for fuel products, water and fuels were introduced and financial incentives were given to promote production. *Singapore*, on the other hand, shifted from monetary policy to exchange rate targeting in 1981, aiming to reduce the degree of import-price-pass through as during the first oil-shock. It was apparent that exchange rate policy was a better option as between 1982 to 1983, the annual inflation rate was capped under 3 percent. Inflation-wise, Singapore was the only SEACEN country not severely affected by the second oil-shock. In *Thailand*, the domestic wage adjustments and the increase in utility prices as a result of the oil-shock further boosted inflation pressures in 1979. However, by 1981, inflation had decelerated due to fiscal and monetary restraints, slower increase in oil prices and a surplus supply in agricultural production.

On the global front, the world economy slowed down drastically and by 1981, private investment in the SEACEN countries had slowed down as well. By 1982, even though the overall economic performance of the SEACEN countries was relatively strong as compared to other regions, economic growth declined significantly. Due to declining international demand, the manufacturing sector was the worst hit. Furthermore, the emergence of high unemployment rates in the developed countries saw protectionist policies on the rise. However, the world economy recovered slightly in 1983-1984. But the U.S. which led

the recovery began to slow down in 1985. By then, major primary commodity markets had slackened and the oil markets softened. By mid-1980's, mitigating recessionary impact became the main concern of the SEACEN countries. Inflation rates moderated and a more accommodative monetary policy was swiftly put in place by the SEACEN countries. In *Indonesia*, the Indonesian rupiah was devalued again in September 1986 by 31 percent vis-a-vis the US dollar to improve international competitiveness. Non-oil exports were actively promoted. The Central Bank asserted control on money supply and interest rates through open market operations. During 1986-1989, inflation was contained to a single digit.

In *Korea*, the restrictive fiscal and monetary policies together with the decline in oil and raw materials helped to moderate inflation during 1982-1986. During the period 1982-1987, the inflation rate in *Malaysia* decelerated to a low of 0.4 percent in 1985 and remained below 1 percent until 1987. For *Nepal*, the negative growth of agricultural production by 7.3 percent in 1986/1987 and the relative increase in the growth of the Wholesale Price Index in India for cereals further fueled inflationary pressures. Earlier, in November 1985, following the devaluation of the Nepalese rupee, the electricity tariff was raised by 22 percent and fertilizer prices by 20-34 percent. Between 1985/1986 and 1989/1990, the country embarked on two stabilization programs with the International Monetary Fund (IMF). For the *Philippines*, inflation trended downwards in 1982 until the third quarter of 1983. However, from the third quarter of 1983 to 1984, inflation accelerated due to successive depreciation of the peso as a result of a liquidity crisis that compelled the country to declare a debt moratorium on its external obligations. The situation was aggravated by typhoons in 1984. However, in 1986, inflation decelerated to a low of 0.8 percent. This was credited to sustained stability in the exchange rate, the rollback in oil prices as well as the opening of the importation of grains to the private sector.

For *Singapore*, the 1985-1986 recession, coupled with a series of cost and tax-cut measures effectively reduced inflationary pressures. Inflation was at negative 1.4 percent in 1986 and held below 2 percent in 1988-1989. In *Thailand*, between 1984-1987, domestic prices stabilized, with inflation registering a rate between 0.9 and 2.5 percent. However, inflation accelerated to 5.4 percent in 1989 compared to 3.8 percent, as a result of increased demand from the wealth effects of

higher securities and real estate prices. This was also due to the increase in the costs of production, particularly those of labor, raw materials and imported oil.

5.3 Current Trends (1990-1994)

By 1990, the SEACEN economies had emerged as the pride of Asia's success story. The SEACEN economies had benefited tremendously from a framework of sound macroeconomic policy-mix. Investments were heavily promoted in the 1980's and continued to be encouraged in the present decade. Apart from the Gulf War, there were no virtually severe external shocks during this period. However, by early 1990's the liberalization efforts of the 1980's led to massive capital flows into several SEACEN countries and in many instances, fueling their inflationary pressures.

In *Indonesia*, a strong domestic demand caused inflation to accelerate to 9.5 percent in 1990 and 1991. The increase in domestic prices of fuels and oil, transportation fares and cement was also contributory factor. By 1994, inflation stood at 9.2 percent, due to supply side constraints, floods, prolonged droughts and adjustments of the electricity tariff. In *Korea*¹⁹, during this period, the cause of inflationary pressures included rises in real estate prices, wage increases, higher prices of petroleum products, a weak Korean won and the continued expansion of private consumption and construction. Poor harvest due to unfavorable weather and price hikes in public services were also major contributors. The inflation rate in Korea stood at 9.4 percent in 1990 and decelerated to 4.5 percent in 1992 before picking up to 5.8 percent and 5.6 percent in 1993 and 1994 respectively. In *Malaysia*,²⁰ inflation registered an increase of 4.4 percent and 4.7 percent in 1991 and 1992 respectively. The build-up of inflationary pressures was mainly caused by excess demand, monetary expansion and pressures on the wage front as the supply of labor did not keep pace with surges in private investment activity. However, inflation moderated to 3.6 percent in 1993, due to persistent tight monetary policy. At the same time, the government continued to observe fiscal restraint. Also, import duties of several hundred items were either reduced or abolished. Between

19. Based on The Bank of Korea, *Annual Report*, Various Issues.

20. Based on Bank Negara Malaysia, *Annual Report*, Various Issues.

late 1993 and 1994, high interest rates, expectations of exchange rate appreciation and opportunities in the stock market induced massive inflows of short-term funds. The Central Bank introduced several administrative measures to deal directly with the inflows. It also raised the reserve requirement and intensified money market operation activities to absorb the excess liquidity. In 1994, the inflation rate increased slightly to 3.7 percent.

For *Nepal*, except for 1991/1992, prices moderated due to the amicable resolution of the 15-month old trade and transit dispute with India and better supply conditions. The inflation rate was recorded at 21 percent in 1991/1992, due mainly to the devaluation of the Nepalese rupee vis-a-vis the US dollar. Following the devaluation, the government also reduced subsidies on administrative goods. Because of the Gulf War and relatively higher growth of the aggregate WPI of India, inflation edged down to 8.9 percent in 1992/1993. However, the Enhanced Structural Adjustment Program of the International Monetary Fund helped to stabilize macroeconomic situation and inflation was contained at 8.9 percent in 1993/1994. In the *Philippines*, the Gulf War which resulted in the hike in oil prices was a major factor. The period also saw a sharp depreciation of the peso, the imposition of import levy and the Mt. Pinatubo eruption in 1991. Inflation rose by 12.7 and 17.7 percent in 1990 and 1991 respectively. However, in 1993, inflation decelerated to 7.6 percent compared to 8.9 percent in 1992. The increase in 1993 was caused by food shortages due to successive typhoons, hike in housing rentals and tuition fees and excess liquidity originating from the increase in credit demand and large withdrawals of government deposits from the Central Bank. In 1994, inflation was contained at 9 percent. The increase was mainly due to agricultural shortages caused by typhoons, phased increase in minimum wages, a depreciating peso, higher interest rates and domestic liquidity growth.

Like Malaysia, excess demand in *Singapore* triggered by an overheated economy put pressures on inflation. Average inflation during 1990-1991 was 2.3 percent, due mainly to the increase in unit labor cost and also foreign inflationary pressures. The implementation of the Goods and Services (GST) tax in April 1994 and higher imported inflation caused domestic inflation to accelerate to 3.1 percent. The increase in inflation would have been higher if not for the intense competition among wholesalers and retailers which led to the partial absorption of the GST and the foreign price increases. Also, pressures in the labor

market were mitigated by the increased intake of foreign labor. *Sri Lanka*²¹ recorded an inflation rate of 21.5 percent in 1990, the highest since 1980. This was mainly due to the increase in food prices as a result of an upward revision of fertilizer prices. Higher public transport fares and postal rates as well as higher alcohol and cigarettes prices were also partly responsible. However, in 1991, the rate decelerated to 12.2 percent, due to a reduction in the control prices of bread and wheat. As the administrative prices in wheat flour, bread and kerosene were again reduced in 1994, inflation decelerated to 8.4 percent compared to 11.7 percent in 1993. Also, import duties of some consumer items were either waived or reduced. In *ROC-Taipei*,²² the inflation rate moderated to 3.62 percent 1991, due to the appreciation of New Taiwanese dollar as well as cuts on tariff imports. However, inflation accelerated to 4.46 percent in 1992, the largest increase in eleven years. This was due to typhoons which affected food prices and also increase in rents, educational and medical expenses. However, in 1993, inflation rate decelerated to 2.9 percent, the lowest increase in five years as food prices were generally stable. In 1994, the inflation rate accelerated to 4.09 percent, due to increase in prices of imports especially of primary commodities and petrochemical and a series of typhoons which damaged agricultural and piscicultural products. In *Thailand*,²³ inflation rose to 6.1 percent in 1990. This was mainly caused by aggregate demand pressures. Cost of production also increased due to the increase in the minimum wage rate, retail prices of petroleum as a result of the Gulf War as well as the increase in the price of imports and raw materials. However, in 1992, inflation decelerated to 4.1 percent compared to 5.7 percent in 1991, due to moderating demand and cost factors. In 1994, inflation accelerated to 5 percent compared to 3.3 percent in 1993, due mainly to shortages of certain crops caused by a drought in the previous year as well as floods in 1994, higher agricultural prices in the world market and the improvement of agricultural exports which added pressures on the domestic markets.

21. Based on Central Bank of Sri Lanka, *Annual Report*, various issues.

22. Based on Central Bank of China, Taipei, *Annual Report*, various issues.

23. Based on the Bank of Thailand, *Thailand Economic Performance and Outlook*, various issues.

Chapter 3

CURRENT POLICY ISSUES

1. Zero Inflation

What is an acceptable rate of inflation? Friedman (1969)²⁴ advocates that a negative inflation rate is optimal. However, Phelps (1973)²⁵ argues that in the context of optimal taxation, the optimal inflation rate should be positive. Is zero inflation, which can be generally defined as price level stability as against inflation rate stability, viable? There are several issues surrounding the viability of zero inflation rate. How is it going to be achieved? How long does it take? What is the cost of getting there? and once there, what is the relative benefit of zero inflation compared to inflation rate stability?

Hoskins (1991),²⁶ a proponent of zero inflation lists three criteria for proposing price level stability. In the long run, a central bank can control the price of goods and services denominated in its currency. Economic efficiency and both potential and actual growth can be promoted by a credible commitment to inflation objectives and lastly, price level stability is superior in economic sense to inflation rate stability.

The issue of whether central banks could have significant influence up to the extent of controlling prices is subject to empirical analysis. The second issue on credible policy has opened a whole arena for debate. Policy credibility and the reputation of policymakers depend on private agents' perception of and degree of confidence in the ability of the government to stick to the announced policy. The issue of credibility arises because of asymmetric information as private agents do not have complete knowledge of how a government may behave throughout the implementation period of the policy. Agénor (1993)²⁷

24. Friedman M., *The Optimum Quantity of Money and Other Essays*, Chicago: Aldine, 1969.

25. Phelps E.S., *Inflation in the Theory of Public Finance*, *Swedish Journal of Economics*, March 1973, pp. 67-82.

26. Hoskins W. L., *Defending Zero Inflation: All for Naught*, *Quarterly Review*, Federal Reserve Bank of Minneapolis, Spring 1991, pp. 16-20.

27. Agénor Richard-Pierre, *Credible Disinflation Programme*, Research Department, International Monetary Fund, 1993.

notes that there are several ways in which credibility problems may arise. Firstly, a stabilization program of disinflation may be inconsistent with the policy-mix being pursued. A disinflation program with no measure to limit the government sector budget could be easily perceived by private sector as inconsistent. Secondly, the optimal ex-ante and ex-post strategy of policymakers may differ. A classic example of this time-inconsistency problem is when once the nominal wages are set by the private sector, the government facing the expectation-augmented Phillips Curve has the incentive not to disinflate in order to increase output. Thirdly, imperfect information may lead the public to suspect that policymakers may renege on their anti-inflationary policy. Fourthly, there is considerable uncertainty surrounding the policy environment. If private agents could perceive that the government lacks the ability to completely control the policy instruments, then their expectations will be based on the fact that these policy targets may never be achieved. Lastly, potentially painful programs may create expectations that these programs may not last long.

To answer the third issue of whether price level stability is superior in the economic sense to inflation rate stability, one has to ask what is the cost of getting there? What is the benefit of zero inflation relative to some inflation?

Standard textbooks have pinpointed several effects of anticipated inflation.²⁸ Individuals who want to hold their real money constant during periods of rising prices would attempt to hold more money. Hence, inflation imposes a sort of tax on money balances as it involves a form of transfer of resources from money holders to the government. The interaction of inflation with the existing tax structure is also an issue of concern. Unless the existing income tax structure is completely indexed, there will be an increase of taxation of nominal income, presumably nominal income increases as a result of the anticipated inflation. This is more popularly known as 'bracket-creep-induced' inflation tax. Anticipated inflation could also distort financial decisions and cause misallocation of resources due to excessive relative price variability. Market interest rates tend to increase with inflation. Thus, economic agents will be less likely to hold a relatively large

28. For a lively discussion, see Garfinkel R.M., *What is An 'Acceptable' Rate of Inflation?*, A Review of the Issues, The Review, Federal Reserve Bank of St. Louis, July/August 1989, pp. 3-15.

amount of cash. Instead, they may make frequent trips to the banks, to their automatic teller machines (ATM), etc. This type of transaction cost is also known as 'shoe-leather' cost.

Economic agents negotiating for long-term labor contracts often use anticipated inflation as a yardstick in determining increments in nominal wages. With unanticipated inflation, wage earners will experience a reduction in their wage rate. Unanticipated inflation could also cause distortion in financial decisions made earlier. It transfers resources from net monetary creditors to net monetary debtors. Increased uncertainty of inflation could reduce the ability of markets to convey information regarding price movements because of excessive relative price variability. This loss of economic efficiency will have harmful effects on output and unemployment.²⁹ Inflation uncertainty could also cause an increase in risk premia of longer nominal bonds, leading to an increase in the real cost of capital. It may be difficult to establish the links between inflation and inflation uncertainty. Nevertheless, their effects are clear.

No doubt, proponents of zero inflation argue that zero inflation would eliminate all the costs associated with positive inflation. However, a more valid discussion would centre on the dynamics of reaching zero inflation. During the transition period, one has to ask whether there is any trade-off between unemployment and inflation. If there is a trade-off, the social and economic costs involved may be extremely excessive. Hoskins (1991)³⁰ agrees that in an economy where there are price contracts, the transition cost may be high as a transition to zero inflation 'could alter the real value of payments from those originally intended.' However, he argues that 'the implicit sources of friction [nominal contracts] that make lowering the inflation costly would also contribute to making inflation costly in and of itself' as these contracts involve resource costs. He also argues that if central banks are credible, private sector planning errors could be minimized during the transition periods. On the other hand, Dornbusch (1992)³¹ argues that in the process of being overly committed to zero inflation, policymakers

29. Friedman M., *Inflation and Unemployment*, **Journal of Political Economy**, June 1977..

30. Hoskin W.L., *Defending Zero Inflation: All for Naught*, **Quarterly Review**, Federal Reserve Bank of Minneapolis, Spring 1991, pp. 16-20.

31. Dornbusch R., *Lessons from Experiences with High Inflation*, **The World Bank Economic Review**, no. 1, vol. 6, January 1992.

may 'be tempted to make monetary policy and the exchange rate do what the fiscal policy has not achieved.' That is, a prolonged period of overvalued exchange rate and high real interest rates may stop inflation but at the expense of damaging the economy. Furthermore, Aiyagari (1991)³² points out, the public cannot be easily convinced that central banks will pursue any announced zero inflation policy right to the very end.

Even though the state of zero inflation is highly desirable, the transition costs from positive inflation to zero inflation could be extremely high. However, despite its high cost, one should not do not preclude the desirability of anti-inflationary policy. However, taking all into account, it also does not mean that a positive rate of inflation is never acceptable for any period.³³ What then is the desirable rate of inflation? According to Greenspan,³⁴ '[f]or all practical purposes, price stability means that expected changes in the average price level are small enough and gradual enough that they do not materially enter business and household decisions.' It seems that from the general consensus, inflation of 0-3 percent looks to be the standard definition of price stability. The International Monetary fund notes that if consumer durable goods are properly adjusted for quality, then a 1.5 to 2 percent inflation for the industrialized countries per year may be consistent with price stability.³⁵ Others such as Dornbusch and Fischer (1994)³⁶ argue that inflation in the range of 0-4 percent is entirely appropriate. Valdepeñas (1994)³⁷ states that there is meaning at central banking to stabilize prices at a low level of 2-3 percent annual inflation rate.

32. Aiyagari R.S., *Response to a Defense of Zero Inflation*, **Quarterly Review**, Federal Reserve Bank of Mineapolis, Spring 1991, pp. 21-24.

33. Garfinkel R.M., *What is An 'Acceptable' Rate of Inflation?, A Review of the Issues*, **The Review**, Federal Reserve Bank of St. Louis, July/August 1989, pp. 3-15.

34. Greenspan, A., **Congressional Record**, United States Senate, 19 February 1993, p. 21.

35. International Monetary Fund, *Price Stability*, **World Economic Outlook**, International Monetary Fund, Box 2, May 1993, pp. 24-25.

36. Dornbusch R., and Fisher S., **Macroeconomics**, Sixth Edition, McGraw-Hill Inc., 1994, p. 529.

37. Valdepeñas, Jr., B.V., *Market-Oriented Central Banking*, **SEACEN Staff Papers**, no. 52, The SEACEN Centre: Kuala Lumpur, 1994, p. 46.

2. Independence of Central Bank

Is there any relationship between the degree of independence of central bank and inflation? The degree of independence of central banks has recently attracted much attention. Various measures have been used to measure the degree of independence:

- Who makes monetary decision?
- Who appoints the Central Bank Governor and the Board of Director?
- How secure are their contracts?
- Who determines and influences the central bank's budget?³⁸

When one discusses the issue of independence of central bank, the New Zealand model comes into mind. The Reserve Bank of New Zealand is given a clear mandate: to achieve and maintain price stability. The Minister of Finance and the Governor of the Reserve Bank signed a Policy Targets Agreement (PTA) to set up the specific target and once given the specific target, it is left to the Reserve Bank 'to run the [monetary] policy without interference from politicians or pressure groups.'³⁹ The Government cannot ask the Reserve Bank to change this mandate. It can only do so through publicly negotiating a new contract with the Bank. On the other hand, the Governor of the Reserve Bank stands to lose his job if he fails to achieve the agreed target.

For the SEACEN countries, the degree of independence of the central banks and monetary authorities varies.⁴⁰ On the scale of degree of independence, the Bangko Sentral ng Pilipinas probably ranks the most independent central bank among the SEACEN member banks as the fiscal sector is not necessarily represented in the Monetary Board. In Indonesia, the conduct of monetary policy is directed by the Monetary Council consisting of the Ministers supervising the fields of finance and economy, and the Bank's Governor. In Korea, the Minister of Finance and Economy presides over the Monetary Board. In Malaysia, the Finance Minister may direct the Board to pursue certain line

38. Wood G., *Money and Independent Central Bank*, **Banking World**, October 1993, p. 30.

39. The Reserve Bank of New Zealand, **Annual Report**, 1993.

40. The SEACEN Centre, **SEACEN Bankwatch**, Kuala Lumpur, 1995.

of monetary policy. In Nepal, by Act, Nepal Rastra Bank is an autonomous entity. However, government nominees are the majority in the Board. In Singapore, the Finance Minister presides over the Monetary Authorities (MAS). However, MAS is empowered to formulate and implement monetary and exchange rate policy. In Sri Lanka as in Malaysia, the Finance Minister can direct the Board to follow certain government policy. In ROC-Taipei, the Central Bank only implements monetary policy and supervise banks while the Bank of Thailand is independent. However, nine out of eleven court members of the Bank of Thailand are appointed by the Cabinet upon recommendation of the Finance Minister. Thus, it is apparent that the SEACEN member central banks and monetary authorities may have yet to reach the level of independence achieved by the Reserve Bank of New Zealand. However, for the SEACEN countries, across the board, they do not differ much.

The hypothesis to be examined here is that the higher the degree of independence of the central bank, the more credible is its monetary policy⁴¹ as an independent central bank is supposed to be autonomous and not subject to any pressure from any political or pressure groups. According to Alesina and Gatti (1995),⁴² the benefit of an independent central bank 'eliminates politically induced output variability, since the monetary policy is not under the direct control of governments with changing preferences.' As Gregorio (1992)⁴³ points out, '[a]lthough the government may dislike inflation as much as people do, it also dislikes unemployment private agents will form their expectations knowing that the policymakers will prefer to partially accommodate the inflationary bias rather than to produce a large recession.'

The notions of credibility and rational behavior presume that economic agents are aware of what the government is doing, though the information content may not be necessarily be perfect and transparent. This premise is applicable both to the developed countries where the information such as up-to-date statistics is readily available and in the

41. The Economist (1994) notes that 'credibility is one of the most valuable assets an economic policy-maker can possess'. See ***The Economist, A Cruise Around the Phillips Curve, School Brief***, 19 February 1994, pp. 70-71.

42. Alesina A., and Gatti R., *Independent Central Banks: Low Inflation at No Cost, American Economic Review Papers and Proceedings*, vol. 85, May 1995, p. 200.

43. Gregorio J., *The Persistence of Inflation and General Stabilisation, Working Papers*, International Monetary Fund, 1992.

developing economies, where there may exist some persistent lags of information. Thus, one is of the opinion that the issue of credibility is relevant for the developing economies. However, the linkage between independence of central bank and credibility may not necessarily be clear cut. It can be argued that the 'if and only if' relationship between independence and credibility of a central bank may not be necessarily indisputable. Credibility could be established as long as economic agents see that the behavior of the central bank is consistent with its pre-set objectives. In other words, 'policymakers have to earn credibility.... so people learn to believe what they say.'⁴⁴ In such circumstances, independence is secondary and its presence is not an essential prerequisite to having credibility. In this case, independence acts to intensify the degree of credibility but not the source of it.

The importance of central banks behaving consistently over long periods cannot be undermined. As Kiguel (1989)⁴⁵ points out that 'there is no substitute for persistence and continuity in a stabilization effort.' Hence for the SEACEN countries, perhaps a rather more relevant issue is to ask whether policymakers have ever deviated significantly from the rules that they themselves set. That is, to examine whether there are any major principal differences in ex-ante and ex-post strategies of the central banks and the governments. Since the central banks and monetary authorities of the SEACEN countries are not fully independent, there are hardly any major conflicts of interest between these central banks and the governments. However, it is evident that especially for the case of Indonesia, Malaysia and Singapore, it is hard to find instances where policymakers made excessive changes in the direction of economic policies. In such a case, certainly, it is more beneficial to examine the conduct of the SEACEN central banks than examining the issue of independence. Furthermore, the central banks and monetary authorities of the SEACEN countries do not practice stop-go type of policies. Besides, they are given clear and unambiguous mandates to keep inflation low and to create expectations of low inflation (Table 3.1). These mandates represent the firm commitment on the part of the central banks of the SEACEN countries. Certainly,

44. Dornbusch R., and Fisher S., *Macroeconomics*, Sixth Edition, McGraw-Hill Inc., 1994, p. 458.

45. Kiguel M.A., *Inflation in Argentina, Stop and Go Since the Austral Plan*, **Working Papers**, The World Bank, March 1989, p. 35.

in the case of New Zealand, the clear mandate given to the Reserve Bank helps.

Empirically, this is supported by Moreno (1994)⁴⁶ who constructs the Cukierman, Webb and Neyapti (1992)⁴⁷ index for legal independence for seven SEACEN countries. He concludes that 'central bank independence does not explain low inflation in [these seven countries].' Another interesting finding by Barro (1995)⁴⁸ reveals no correlation between the independence index as measured by weighting numerous categories of legal provisions in the charter of the central banks and inflation. He concludes that 'merely by instituting legal changes appears to promote a more independent central bank does not help to contain inflation.'

Also, Fischer (1992)⁴⁹ points out that when there is a relatively stable government, inflation is likely to be lower as policymakers and institutions have the opportunity to establish reputations. The political situation in the relatively low inflation SEACEN countries, such as Indonesia, Korea, Malaysia, Singapore and ROC-Taipei has indeed been relatively stable.

3. Price Controls

Does administrative price policy work? Is it necessary? In the SEACEN countries, not all the prices of goods and services are set in the free markets. Certain items, mostly basic necessities, are administrated by the relevant authorities. Such items include rice, wheat, corn, cement, petroleum and pharmaceuticals. The main reason for the imposition of price ceilings is to ensure that these basic necessities are within the reach of the lower income group. However, some argue that price

46. Monero R., *Explaining Asia's Low Inflation*, **Weekly Letter**, Federal Reserve Bank of San Francisco, 4 November 1994.

47. Cukierman A., Webb S.B., and Neyapti B., *Measuring the Independence of Central Banks and Its Effects on Policy Outcomes*, **The World Bank Economic Review** 6(3), 1992, pp. 353-398.

48. Barro J.R., *Inflation and Economic Growth*, **Quarterly Bulletin**, Bank of England, May 1995, pp. 166-175.

49. Fischer S., *Lessons from Moderate Inflation*, **Monetary and Economic Studies**, Bank of Japan, vol. 10, no. 1, February 1992, pp. 25-26.

Table 3.1
ON MONETARY POLICY IMPLEMENTATION

Bank Indonesia ... is directed to ensuring that the growth of liquidity corresponds to projected growth rate equitable income distribution, a tolerable level of inflation and stable balance of payments.
Korea Primary Target: Price stability and stable growth of output.
Malaysia ... continued to address both the objectives of financial stability and control of inflationary pressures to provide the economy with the necessary environment to sustain high growth with price stability.
Nepal The ultimate objective is to ensure price stability and external payments sustainability.
The Philippines Bangko Sentral ng Pilipinas is explicitly mandated by law to ensure the maintenance of price stability conducive to a balanced and sustainable growth of the economy.
Singapore The Monetary Authority seeks to promote sustained and non-inflationary growth of the economy as well as to foster a sound and progressive financial services sector.
Sri Lanka Maintenance of monetary growth consistent with sustainable output and price stability [and] maintenance of a viable external account.
ROC, Taipei ... execution of its monetary policy to maintain financial and price stability.
Thailand ... promote economic stability in terms of stable domestic prices and sustainable external payments positions.

Sources: The SEACENBANK Watch, The SEACEN Centre, 1995.

controls create relative price distortions in the market. In implementing price controls, one has to weight the pros and cons. Some of the economic factors to be taken into account include efficiency considerations, the problem of estimating the effects of price controls on the overall economy and the cost of enforcement.⁵⁰ There is little doubt that price controls of these relevant items have some mitigating effects on the overall general prices in the short-run. The exact magnitude depends on the relative weights of these items in the overall consumer price index. For example, in Indonesia, in 1993, 18 items of which prices are administered accounts for 26.3 percent of CPI in weighted items.⁵¹ In Malaysia, as of April 1995, 8.2 percent of the items in the total weights are under the Price Control Act while 12 percent are under the Supplies Control Regulation where prices are supervised by the government.⁵² In the Philippines, from December 1989 up to early 1991, items under price controls average 26 percent of the total weights.⁵³ In Singapore, the Price Control Act is applied only to two commodities, namely rice and pork. In Thailand, the number of commodities subject to price control stood at 22 items in 1992.⁵⁴

One also has to bear in mind that these price ceilings and the list of items are not fixed but are constantly revised to reflect demand and supply conditions, the level of income as well as the spending patterns of households. In the long-run, wide-spread use of price controls may lead to misallocation of resources.

4. Underlying Inflation

Blinder (1982)⁵⁵ defines underlying inflation as the rate towards which the actual inflation tends to fluctuate. The Reserve Bank of Australia, the Reserve Bank of New Zealand and the Bank of England

50. Veron R.J., *Price Controls in the Philippines and Their Effects on Prices*, **Central Bank Review**, Central Bank of the Philippines, April 1992, pp. 20-26.

51. Bank Indonesia, **Annual Report**, 1993/1994.

52. S.G. Khoo, *CPI Still a Good General Measure*, **The STAR Newspapers**, Malaysia, 27 April 1995.

53. Veron R.J., *Price Controls in the Philippines and Their Effects on Prices*, **Central Bank Review**, Central Bank of the Philippines, April 1992, pp. 20-26.

54. The Bank of Thailand, **Country Paper**.

55. Blinder, A.S., *The Anatomy of Double-Digit Inflation in the 1970s*, in Hall R.E. (ed.), **Inflation**, The University of Chicago Press, 1982, pp. 261-264.

use the 'underlying' rate of inflation as an alternative measurement of the change in the consumer price index. The argument for a narrower measurement of inflation rate, the 'underlying' or 'core' inflation is that fluctuations in prices of certain components in the CPI are temporary and certain components in the CPI are influenced by factors such as changes in taxes. Thus, the official measure of CPI inflation may not reflect the underlying inflationary pressures. They may not capture the actual trend of inflation.

Perhaps the most common approach is to simply exclude certain items which are deemed seasonal or volatile and those subject to price control. For example, the Federal Treasury of Australia exclude items such as meat, seafood, tobacco, alcohol and items such as holiday travel, accommodation and housing.⁵⁶ Other measures of underlying inflation include the 'trimmed mean' method and the 'weighted median' inflation rates.⁵⁷ These two methods measure 'outliers' for a set of prices and if these 'outliers' are found to be more volatile than the standard average indices of inflation, they are assigned less weight but not totally excluded from the CPI.

Bangko Sentral ng Pilipinas (1994)⁵⁸ constructs two adjusted CPI. Firstly, by excluding the two most volatile components, i.e., food and energy-related items and secondly, by holding the top two components which have the highest standard deviation constant. The Bangko Sentral (1994) concludes that the adjusted 'core' inflation generally is lower and less volatile than reported inflation. However, the 'core' inflation generally follows the movement of reported inflation.

The Bank of England (1993)⁵⁹ notes that 'there is no reason to suppose that underlying inflation itself is not volatile.' The Bank of England (1993)⁶⁰ also warns that 'the risk remains, that, in stripping out

56. The Reserve Bank of Australia, *Measuring Underlying Inflation*, **The Reserve Bank of Australia Bulletin**, August 1994, p. 3.

57. See Bryan M., and Cecchetti S., *Measuring Core Inflation*, Federal Reserve Bank of Cleveland, **Working Papers**, no. 9304, 1992.

58. Bangko Sentral ng Pilipinas, *Measuring Long-Term Price Trend or 'Underlying' Inflation*, **2nd Annual Report**, 1994.

59. The Bank of England, 'Core' Inflation, in *Inflation Report*, **Bank of England Quarterly Bulletin**, May 1993, p. 156.

60. Bank of England, *Core Inflation*, **Inflation Report**, May 1993, Section 1.4, p. 9.

large price movements, the resulting index may be unrepresentative.' Furthermore, Kim (1990)⁶¹ concludes that due to the 'inevitable arbitrariness' in excluding certain components of the CPI, the calculated underlying inflation rate would be very difficult to interpret in the economic sense. Meanwhile, the Federal Reserve bank of Australia (1994)⁶² also points out that 'there is, ... no single, precise and unambiguous measures of underlying inflation: none of the possible measures fully comes to grip with the problem of distinguishing between *one-off* changes in the price level and *on-going* movements in prices.' The Federal Reserve also notes that perhaps the best method is to analyze and exercise judgment on the various methods available. It does appear that the methods currently available to derive the underlying trend⁶³ is mostly ad-hoc. Besides, in the long-run analysis, it may be sensible not to transform prices as the information content of prices could be partially lost.

61. Kim, M.W., *Measurement of the Underlying Rate of Inflation in Korea*, **Quarterly Economic Review**, The Bank of Korea, December 1990.

62. The Reserve Bank of Australia, *Measuring Underlying Inflation*, **The Reserve Bank of Australia Bulletin**, August 1994, p. 6.

63. For Example, the Hodrick-Prescott filter could be used to smooth excessive fluctuation and to derive its underlying trend. However, as new data become available, the method may be unreliable.

Chapter 4

THEORETICAL BASIS

Wage rates, productivity; that is what we should be discussing instead of all this nonsense about money supply.

Roy Harrod

*as quoted by Edward Jan Boomhoff in
Inflation, the Quantity Theory and
Rational Expectation: Studies in
Monetary Economics, 1980*

Inflation is always and everywhere a monetary phenomenon.

Milton Friedman

*in The Counter-Revolution in Monetary Theory
London; IEA (for Wincott Foundation)
Occasional Papers, No. 33, 1970*

1. Introduction

Debates on the causes of inflation have been going on for some-time with somewhat controversial conclusions. Economists have identified several causes of inflation. The monetarist faction would argue that '[i]nflation is always and everywhere a monetary phenomenon ... be produced only by a more rapid increase in the quantity of money than in output.'⁶⁴ On the other hand, the 'structuralists' would advocate that inflation is either 'cost-push' or 'demand-pull'. Discussions on inflation have also centered on 'seigniorage' inflation which results from the monetization of fiscal deficits. Although far from reaching a general consensus each faction is backed by sound theoretical foundations.

2. General Model

$$a1. \log(p) = a \log(p^t) + b \log(p^n)$$

64. Friedman M., *The Counter-Revolution in Monetary Theory*, London; IEA (for Wincott Foundation), *Occasional Papers*, no. 33, 1970.

where, $a+b = 1$

A general model⁶⁵ of the price level can be derived by assuming that the general price level (p) is a weighted average of the price level of tradable goods (p^t) and the price level of non-tradable goods (p^n),

2.1 Price: Tradable

$$a2. \log(p^t) = \log(e) + \log(p^f)$$

The price for tradable goods (p^t) is assumed to be a function of the exchange rate (e) and the foreign prices of trade partners (p^f). Exchange rate fluctuation could influence prices through intermediate goods as well as final goods. Thus, imported inflation is a determinant of overall inflation for an open economy.

2.2 Price: Non-Tradable

$$a3. p^n = f(ED, CF)$$

The inflation rate for non-tradable goods (p^n) is a function of excess demand (ED) and cost push factors (CF). Cost-push factors could be attributed to a host of non-monetary influences such as unit labor cost, supply shortages and monopolies in setting their pricing policies. Higher wages paid by employers without a corresponding increase in productivity could also be classified as a cost-push factor in the sense that wages are part of production cost. It also implicitly implies that producers as profit maximizing agents would mark-up the price of goods and services.

2.3 Excess Demand

$$a4. \log(P^n) = \log(Ms) - \log(Md/p)$$

65. The World Bank and the International Monetary Fund have used various versions of this general model. See Chibber A., *Africa's Rising Inflation: Causes, Consequences, and Cures*, **Working Papers**, The World Bank, February 1991, and Moser G.G., *The Main Determinants of Inflation in Nigeria*, **Working Papers**, The International Monetary Fund, June 1994.

According to the Walras Law, an excess demand in a market must be equal to an excess supply in another market.⁶⁶ In this case, the excess demand is reflected in the money market, i.e., the excess of real money supply (M_s/p) over real money demand (M_d/p).

2.4 Money Supply

$$a5. M_s = f(MP, FP)$$

Money supply in this context is determined by the direction of the monetary policy (MP) as well as the fiscal policy (FP) stance. Often, the conduct of monetary policy is not independent from fiscal policy. The government can borrow from the central bank or it can borrow from the public to finance its budget deficit. *Ceteris paribus*, borrowing from central bank results in money creation which increases high-powered money. This to monetarists means that the excessive monetary growth would result in higher inflation.

2.5 Money Demand

$$a6. M_d/p = f(y, i, \Pi^e)$$

Real money demand is modeled in the standard manner, where it is a function of real income (y), opportunity cost of holding real balances (i) and inflationary expectation (Π^e) for period t formed at period $t-1$.

With Muth's⁶⁷ (1974) rational expectation:

$$a7. \Pi^e = \Delta \log(P_t) + (\bar{\omega}_t)$$

$\Delta \log(P_t)$ = Actual inflation (Π_t) in period t

66. Khan (1980) argues that because of the relative underdeveloped financial markets, the substitution effect between money and goods is more important than between money and other financial assets. See Khan M.S., *Monetary Shocks and the Dynamics of Inflation*, **Staff Papers**, vol. 27, no. 2, International Monetary Fund, 1980, pp. 250-284.

67. Muth J.F. (1974), *Estimation of Economic Relationships Containing Latent Expectations Variables*, In Lucas, R.E. and T.J. Sargent (eds.), **Rational Expectations and Econometric Practice**, University of Minnesota Press, MN., 1981.

where, $\text{Cov}(\Pi_t, (\omega_t)) = 0$

Substitute a7 into a6 and take log:

$$\text{a8. } \log(\text{Md}/p) = \alpha_1 \log(y) - \alpha_2 \log(i) - \alpha_3 \Delta \log(P_t) + \tau_t$$

3. Testable Equation

Taking equations a8 and a4 into account, equation a3 becomes:

$$\text{a9. } \log(p^n) = \beta_1 \log(Ms) - \beta_2 \log(y) + \beta_3 \log(i) + \beta_4 \Delta \log(P_t) + \psi_t$$

Substitute equation a9 into a1:

$$\text{a10. } p = f(Ms, y, i, e, p^f, \Delta \log(P_t) + (\omega_t), CF)$$

with the expected sign of $Ms, i, e, p^f, \Delta \log(P_t) + (\omega_t)$ and CF positive and y negative

- p = General price index
- p^f = Foreign prices
- y = Real income
- CF = Cost push factor
- Ms = Money supply
- i = Interest rate
- e = Exchange rate, domestic per foreign currency

3.1 Real Income

In the above model, income and price level are negatively correlated as the dynamics of the process is through the money market. That is, there is no trade off. According to the structuralists, because of various rigidities of elasticity in the economy, e.g., supply constraint, there is likely to be a trade-off between prices and output. Thus, real income may take a positive sign.⁶⁸

68. It can also be shown with a discrete time version of the rational staggered contract model, prices can be shown to be positively related to output.

See Chandha B., Masson P. and Meredith G., *Models of Inflation and the Costs of Disinflation*, **Staff Papers**, vol. 39, no. 2, International Monetary Fund, 1992.

3.2 Interest Rates

The Fisher hypothesis,⁶⁹ which defines the relationship between nominal rate of interest and expected inflation, is one of the pillars of neo-classical monetary theory. The Fisher equation states that the expected real rate of interest (p^e) is the nominal rate (i) less the expected rate of inflation (Π^e).

$$p^e = i - \Pi^e$$

In the long run, we could assume that $\Pi^e = \Pi$, hence the correlation between the real rate and nominal interest rate is zero. As such, a 1-percentage point increase in nominal interest rate would lead to similar increase in inflation. A weaker assumption would be that the real rate is random. In this case, there would still be a one-to-one relationship between nominal interest rate and inflation. This is reflective of the situation where price setters take into account the ex-post Fisher Effect⁷⁰ which implies that the relationship between nominal interest rates and realized inflation may result in persistence in inflation without requiring additional price stickiness. In other words, higher nominal interest rates could be transmitted into higher cost by price setters.

On the other hand, nominal interest rates play a major role in the formulation of monetary policy to control inflation. Higher interest rates are supposed to dampen inflationary pressure by reducing aggregate demand.

3.3 Short-Run Inflation

Recent analysis on inflation has focused on the long-run and short-run inflation. This has more or less created a truce between the two schools of thought on long-run inflation. Ball (1993)⁷¹ states that 'there

69. Fisher I., *The Rate of Interest*, New York, MacMillan, 1907.

70. Barsky R., *The Fisher Hypothesis and the Forecastability and Persistence of Inflation*, *Journal of Monetary Economics*, January 1987, pp. 3-24.

71. Ball L., *What Causes Inflation?*, *Economic Review*, 1993, Federal Reserve Bank of Philadelphia, March/April 1993, p. 3.

is a clear consensus about the long-run causes of inflation - the determinants of average inflation over a decade or so - [the culprit being too rapid money growth].

The short-run behavior of inflation - the ups and downs from year to year - is only partly understood'. Many argue that, the short-run divergence in inflation rate is a result of demand as well as price shocks. The so-called 'adjustment inflation'⁷² is 'temporary and thus can lead to inflationary 'bubbles'.

Hence, in the analysis of short-run inflation, the following questions could be answered:

- (i) To what extent do central banks use monetary policy to accommodate inflation?
- (ii) To what extent does inflation lead to a depreciation of the exchange rate?
- (iii) Is the ex-post Fisher equation valid?
- (iv) Is interest rate an optimal instrument in controlling inflation?

4. Empirical Methodology: A Review of the Theory

4.1 Unit Roots and Persistence of Inflation

This study will test for unit roots in economic time series to determine whether the series is trend stationary or difference stationary. Following the interpretation of the order of integration of a particular time series, unit root tests suggested by Dickey and Fuller (1979)⁷³ could be used to measure persistence of the time series.

The augmented Dickey-Fuller (ADF) regression is of the form:

$$b1. \quad x_t = \alpha + \rho x_{t-1} + \sum_{i=1}^K \alpha_i \Delta x_{t-i} + \varepsilon_t$$

72. Little D., Cooper R., Worden W., and Rajapatirana S., ***Boom, Crisis, and Adjustment***, The World Bank, 1994.

73. Dickey, D.A., and Fuller W.A., *Distribution for Autoregressive Time Series with a Unit Root*, ***Journal of the American Statistical Association***, vol. 74, June 1979, pp. 427-31.

where, x is the variable of interest, k is the number of lags⁷⁴ of the first difference of Δx in order to make ε_t serially uncorrelated.

If a time series is $I(0)$, shock at time, say t , would not have any long-run effects as opposed to a series that has a unit root. A time series with a unit root has an impulse response function that does not converge to zero. This implies that a shock at $t=0$ will have permanent effects.

4.2 Test for Mean Stationarity/Trend Stationarity of Time Series

Kwiatkowski-Phillips-Schmidt-Shin Test (KPSS)⁷⁵ derive the KPSS to test the null hypothesis of no unit root by estimating either,

for trend stationarity

$$b2. \quad x_t = \alpha_0 + \alpha_1 t + \varepsilon_t$$

and for mean stationarity

$$b3. \quad x_t = \alpha_0 + \varepsilon_t$$

The KPSS test statistics is given by, $(1/|s^2(\tau)T^2|) \sum_{i=1}^T S_t^2$

$$\text{where, } S_t = \sum_{i=1}^t e_i$$

$$t = 1 \dots T$$

74. Several ways have been suggested to detect the optimal lag length. Among them are the Information Criteria (Akaike (1973)) and the Schwartz Criterion Schwartz (1978). Hall (1990) and Campbell and Perron (1991) suggested starting off with a priori, say $k = k_{\max}$. If the last lag is significant, then select $k = k_{\max}$, or else reduce the lag by one until the last included lagged is significant.
75. Kwiatkowski D., Phillips P.C.B., Schmidt P., and Shin Y., *Testing the Null Hypothesis of Stationarity Against the Alternative of a Unit Root*, **Journal of Econometrics**, vol. 54, October/December 1992, pp. 159-178.

The variance of the residuals is computed using the Newey and West's (1987)⁷⁶ method given by:

$$b4. \quad s^2(\tau) = T^{-1} \sum_{t=1}^T \varepsilon_t^2 + 2T^{-1} \sum_{s=1}^{\tau} b(s, \tau) \sum_{t=s+1}^T \varepsilon_t \varepsilon_{t-s}$$

where, T = sample size, the weighting function $b(s, \tau)$ is given by:

$$b(s, \tau) = 1-s/(1+\tau)$$

Because the null hypothesis is no unit root, the KPSS test could in fact complement the ADF test. If the ADF test fails to reject the null hypothesis of unit root and the KPSS rejects its null hypothesis, then there is reason to believe that the series is truly difference stationary. If the KPSS fails to reject the null, there is reason to believe that the 'data are not sufficiently informative to be sure whether they are stationary or integrated.'⁷⁷

4.3 Long-Run Equilibrium

The investigation into the degree of persistence becomes necessary in the analysis of long-run inflation. In the long run, if actual prices tend to adjust to their 'equilibrium' position(s) then cointegration tests could be conducted to verify the existence of these long-run relationship(s).⁷⁸

76. Newey W.K. and West K.D., *A Simple Positive Semi-Definite Heteroskedasticity and Autocorrelation Consistent Covariance Matrix*, **Econometrica**, vol. 55, May 1987, pp. 703-708.

77. Kwiatkowski D., Phillips P.C.B., Schmidt P., and Shin Y., *Testing the Null Hypothesis of Stationarity Against the Alternative of a Unit Root*, **Journal of Econometrics**, vol. 54, October/December 1992, p. 176.

78. Hakkio C., and Rush M. (1991) point out that, since cointegration is a long-run concept, tests with longer spans of data are better than tests with merely larger numbers (higher frequency but shorter spans) of observations. See 20, Hakkio C., and Rush M., *Cointegration: How Short is the Long Run?*, **Journal of International Money and Finance**, vol. 10, no. 4, December 1991, pp. 571-581.

4.4 Cointegration

The concept of cointegration is defined in the literature by Granger (1981)⁷⁹ and Engle and Granger (1987)⁸⁰ as:

The component of the vector x_t are said to be cointegrated of order d, b denoted $x_t \sim CI(d, b)$ if,

- (i) all component of x_t are $I(d)$; and,
- (ii) there exist a vector $a \neq 0$ so that $z_t = a'x_t \sim I(d-b)$, $b > 0$. The vector a is called the cointegrating vector.

Engle and Granger (1987)⁸¹ introduced the residual-based two step (EG) test for cointegration. It capitalizes on the concept of the ordinary Least Square (OLS) estimates. Stock (1987)⁸² shows that the OLS estimates are highly efficient as they converge in probability to their true values as the sample size tends to infinity as compared to a more normal situation where they converge as the square root of the sample size tends to infinity. This result is termed “super” consistency.

4.5 Uniqueness of Cointegrating Vector

When the case of multivariate variables is considered, there may be more than one cointegrating vector implying that there may be more than one long-run equilibrium relationship among the variables. Johansen (1988)⁸³ provides a method in which the cointegrating vectors could be estimated. It also allows the number of cointegrating vectors to be statistically tested.

b5. Consider $Y_t = M_1Y_{t-1} + M_2Y_{t-2} + M_3Y_{t-3} + \dots + M_kY_{t-k} + \varepsilon_t$

79. Granger C.W.J., *Some properties of Time Series Data and Their Use in Econometric Model Specification*, **Journal of Econometrics**, vol. 16, no. 1, 1981, pp. 121-130.

80. Engle R.F., and Granger C.W.J., *Co-integration and Error Correction: Representation Estimation and Testing*, **Econometrica** 55, pp. 251-276.

81. Ibid.

82. Stock J.H., *Asymptotic Properties of Least Squares Estimators of Cointegrating Vectors*, **Econometrica** 55, pp. 1035-1056.

83. Johansen S., *Statistical Analysis of Cointegrating Vector*, **Journal of Economic Dynamics and Control**, vol. 12, pp. 231-254.

where, M_i is a $n \times n$ matrix

This equation can be reparameterized as:

$$b6. \Delta Y_t = \Phi_1 \Delta Y_{t-1} + \Phi_2 \Delta Y_{t-2} + \dots + \Phi_{k-1} \Delta Y_{t-k+1} + \Psi Y_{t-k} + \varepsilon_t$$

where, $\Phi_i = -I + M_1 + M_2 + \dots + M_i$, $i = 1 \dots k$ and I is a $n \times n$ identity matrix

Note that if $Y_t \sim I(1)$ then the terms in equation b6 are all $\sim I(0)$ except for ΨY_{t-k} which is $\sim I(1)$. A relationship between ΔY_t and ΨY_{t-k} could only exist if ΨY_{t-k} defines one or more stationary linear combinations. Johansen shows that the matrix Ψ can be expressed as a product of two $n \times k$ matrices α , β i.e., $\Psi = \alpha\beta'$ and α is a matrix of the error correction coefficients and β is such that $\beta'Y_t \sim I(0)$. The rank(r) of Ψ gives the number of cointegrating vectors.

The maximum likelihood estimation of the full set of possible cointegrating vectors β^{84} could be obtained by calculating a set of eigenvalues obtained by computing canonical correlation between ΔY_t and Y_{t-k} , correcting for all intervening lags. The likelihood ratio test for the null hypothesis at most r cointegrating vectors against the general unrestricted model is given by

$$b7. -T \sum_{i=r+1}^n \ln(1-\lambda_i)$$

where, $\lambda_1 > \lambda_2 > \dots > \lambda_n$ are eigenvalues obtained by the canonical correlation process.

The maximum eigenvalue test, defined as:

$$b8. -T \ln(1-\lambda_{i+1})$$

84. There may be as many as $n-1$ cointegrating vectors, where n is the number of variables. Not all the linear combinations may have economic interpretation. In practice, economic priors as well as statistical theory are used to choose among the possible cointegrating vectors.

is to test the null hypothesis of i cointegrating vectors against $i+1$ cointegrating vectors. Tabulations of the critical values for both hypotheses can be found in Johansen and Juselius (1990).⁸⁵

Recursive Ordinary Least Squares (OLS) could be used to test the structural parameters for stability.

4.6 Short-Run Dynamics

The stability of the dynamic adjustment path of inflation to the equilibrium relationship(s) could provide a useful guide for short-term policy decisions. If there is cointegration among a set of variables then there exists the error correction model (ECM). Note that the reparameterized equation (Equation b6) is in fact a general form of the error correction model known as the Vector Error Correction Model (VECM). Note that if $\text{rank}(r) = 0$, there is no cointegrating vector and equation b6 is in fact an unrestricted VAR in first differences, and if $\text{rank}(r) = \text{number of endogenous variables}(n)$ then all the variables are not integrated and a VAR in level is appropriate. On the other hand, if $0 < \text{rank}(r) < n$, the VAR model with error correction term involving the levels of the series is appropriate. The impulse response functions as well as the decompositions of the forecast variance can be then calculated.

4.7 Testing Procedure

Data in this analysis are subjected to ADF unit root and the KPSS tests. Following Perron (1988),⁸⁶ the most general model with a time trend and a non-zero drift is first tested. If the null hypothesis is accepted, then the absence of a time-trend is acceptable. The next step is to test the model with only non-zero drift. Again, if the null is rejected, then, the drift could be considered to be insignificant. If at any stage the null is rejected, the alternative of trend stationarity is accepted. Since the unit root test is also sensitive to the duration of

85. Johansen S., and Juselius K., *Maximum Likelihood Estimation and Inference on Cointegration*, **Oxford Bulletin of Economics and Statistics**, vol. 52, 1990, pp. 169-210.

86. Perron P., *Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications*, **Journal of Economic Dynamics and Control**, vol. 12, 1988, pp. 297-332.

the lag periods, the sequential tests by Hall (1990) and Perron (1991) whereby tests are conducted starting off with a priori lag length are used. However, because of limited sample size, the priori lag length (k) is set to three. The quarterly data are all deseasonalized.

Johansen Maximum Likelihood Cointegration tests will also be used. For annual data, a lag specification of one is proposed while for the quarterly data, a lag length of four is used. If any cointegration vector is detected, then an error correction model will be constructed and the dynamics analyzed.

Chapter 5

EMPIRICAL EVIDENCE

1. Preliminary Investigation

It is evident that food accounts for around 30-40 percent of the weighting of the CPIs (Table 5.1). The second highest weight is housing. However, note that for some SEACEN countries, the weight of food has declined over the years. Because of different spending habits, dissimilarities in the construction of the CPI are to be expected. However, going by the statistics, a comparison of the CPI among the SEACEN countries looks plausible.

The contemporaneous correlations among the various price indices show that they are at least 90 percent correlated. For the inflation rates, the correlation coefficient among the various inflation rates are lower, ranging from 0.49775 to 0.96166 (Tables 5.2-5.3). This is to be expected as price inflations are more volatile. Correlation coefficients, however, do not tell us whether the deviation of the price indices and their inflation rates over the last twenty years is short run or long run in nature. One has to analyze the time series properties of the series.

2. Time-Series Properties

There is evidence to suggest that the time series properties of price inflation of the SEACEN countries, except for Myanmar, are indeed stationary. For the annual data, the sequential unit root tests indicate that the series are integrated of order zero. i.e., of $\sim I(0)$ (Table 5.4 and Appendix E). This conclusion is supported by the KPSS test in which the null hypothesis of no unit roots is clearly not rejected (Table 5.5). Sequential Johansen maximum likelihood tests are also performed on a pair-wise basis on the various price inflations. Accordingly, if there are n endogenous variables in the equations and if there are also n cointegrating equations, this implies that none of the n endogenous variables are integrated, i.e., they are all integrated of order zero. The results of the Johansen tests (Table 5.6) show that at least in one of the possible five Johansen's frameworks, there exist two cointegrating vectors, suggesting that the endogenous variables, in this case, the pair-wise price inflations are in fact stationary. Using quarterly series, the ADF and the KPSS tests likewise show similar results for Indonesia, Korea, Malaysia, the Philippines and Singapore (Tables 5.10 and 5.11 and Appendix F).

Table 5.1

CPI WEIGHTS

	Indonesia		Korea		Malaysia		Singapore		Thailand	
	Apr. 1988- Mar. 1989	1990=100	1985=100	1994=100	1990=100	Oct. 1992- Sep. 1993	Sep. 1987- Aug. 1988	1990=100	1986=100	
Food	34.66	32.49 ^{1/}	37.99 ^{1/}	34.9 ^{3/}	34.6 ^{3/}	29.95	39.77	39.30	39.56	
Housing	27.85	14.17	12.94	5.6	5.7	23.41 ^{6/}	17.17 ^{6/}	25.65	20.05	
Fuel & Light		4.53 ^{2/}	7.61 ^{2/}	21.1 ^{4/}	20.5 ^{4/}					
Clothing & Footwear	11.31	8.84	7.44	3.6	3.9	6.06	5.70	5.35	5.15	
Transport & Communication		9.36	6.46	17.9	18.7	15.83	14.5	12.36	9.67	
Medical Care		5.45	7.24	1.9	1.7	2.8	5.0	5.77	5.22	
Recreation, Education & Entertainment		14.24	11.49	5.8 ^{5/}	5.1 ^{5/}	5.70 ^{7/}	2.49 ^{7/}	7.58	11.37	
Tobacco & Beverages				3.6	5.1			3.98	3.98	

1/ Food & beverages

2/ Including water

3/ Including furniture & furnishing

4/ Including gross rent

5/ Including cultural services

6/ Including fuel & utilities and household durables

7/ Education only

Table 5.2
CONTEMPORANEOUS CORRELATION AMONG VARIOUS PRICE INDICES
(Annual Basis)

Indonesia	LCPI	LGDPD	LWPI	Philippines	LCPI	LGDPD	LWPI
LCPI	1.00000	0.99732	0.99540	LCPI	1.00000	0.99916	0.99815
LGDPD	0.99732	1.00000	0.99940	LGDPD	0.99916	1.00000	0.99782
LWPI	0.99540	0.99940	1.00000	LWPI	0.99815	0.99782	1.00000
Korea	LCPI	LGDPD	LPPI	Singapore	LCPI	LGDPD	
LCPI	1.00000	0.99823	0.98694	LCPI	1.00000	0.99142	
LGDPD	0.99823	1.00000	0.98885	LGDPD	0.99142	1.00000	
LPPI	0.98694	0.98885	1.00000	Sri Lanka	LCPI	LGDPD	LWPI
Malaysia	LCPI	LGDPD	LPPI	LCPI	1.00000	0.99222	0.99619
LCPI	1.00000	0.93365	0.90723	LGDPD	0.99222	1.00000	0.99085
LGDPD	0.93365	1.00000	0.96739	LWPI	0.98619	0.99085	1.00000
LPPI	0.90723	0.96739	1.00000	ROC, Taipei	LCPI	LGDPD	LWPI
Myanmar	LCPI	LGDPD		LCPI	1.00000	0.99230	0.94719
LCPI	1.00000	0.98984		LGDPD	0.99230	1.00000	0.92636
LGDPD	0.98984	1.00000		LWPI	0.94719	0.92636	1.00000
Nepal	LCPI	LGDPD		Thailand	LCPI	LGDPD	LWPI
LCPI	1.00000	0.99544		LCPI	1.00000	0.99764	0.99295
LGDPD	0.99544	1.00000		LGDPD	0.99764	1.00000	0.99542
				LWPI	0.99295	0.99542	1.00000

Table 5.3
CONTEMPORANEOUS CORRELATION AMONG VARIOUS PRICE INFLATION
(Annual Basis)

Indonesia	LCPI	LGDPD	LWPI	Philippines	LCPI	LGDPD	LWPI
LCPI	1.00000	0.85608	0.76642	LCPI	1.00000	0.92635	0.93167
LGDPD	0.85608	1.00000	0.94610	LGDPD	0.92635	1.00000	0.93723
LWPI	0.76642	0.94610	1.00000	LWPI	0.93167	0.93723	1.00000
Korea	LCPI	LGDPD	LPPI	Singapore	LCPI	LGDPD	
LCPI	1.00000	0.89551	0.94177	LCPI	1.00000	0.74256	
LGDPD	0.89551	1.00000	0.90581	LGDPD	0.74256	1.00000	
LPPI	0.94177	0.90581	1.00000	Sri Lanka	LCPI	LGDPD	LWPI
Malaysia	LCPI	LGDPD	LPPI	LCPI	1.00000	0.49525	0.66689
LCPI	1.00000	0.49775	0.40592	LGDPD	0.49525	1.00000	0.50985
LGDPD	0.49775	1.00000	0.86633	LWPI	0.66689	0.50985	1.00000
LPPI	0.40592	0.86633	1.00000	ROC, Taipei	LCPI	LGDPD	LWPI
Myanmar	LCPI	LGDPD		LCPI	1.00000	0.72078	0.87365
LCPI	1.00000	0.81274		LGDPD	0.72078	1.00000	0.72794
LGDPD	0.81274	1.00000		LWPI	0.87365	0.72794	1.00000
Nepal	LCPI	LGDPD		Thailand	LCPI	LGDPD	LWPI
LCPI	1.00000	0.42564		LCPI	1.00000	0.92305	0.93116
LGDPD	0.42564	1.00000		LGDPD	0.92305	1.00000	0.96166
				LWPI	0.93116	0.96166	1.00000

LCPI=log (Consumer Price Index)
 LGDPD=log (GDP Deflator)
 LPPI=log (Producer Price Index)
 LWPI=log (Wholesale Price Index)

Table 5.4

SEQUENTIAL UNIT ROOT TESTS (Annual)

	Indonesia 1/	Korea 2/	Malaysia 3/	Myanmar 4/	Nepal 5/	Philippines 6/	Singapore 7/	Sri Lanka 8/	ROC, Taipei 9/	Thailand 10/
LM1	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)	I(0)	I(1)	I(1)	I(1)
LM2	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)	I(0)	-	I(0)	I(0)
LGDP	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
TGDP	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)
LEX	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(0)	I(1)	I(1)	I(1)
D12M	I(1)	I(1)	I(1)	I(1)	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)
D6M	I(1)	I(1)	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)	I(0)	I(1)
LGDPD	I(0)	I(0)	I(0)	I(2)	I(1)	I(1)	I(0)	I(1)	I(0)	I(0)
LCPI	I(0)	I(0)	I(0)	I(2)	I(1)	I(1)	I(0)	I(1)	I(0)	I(0)
LWPI	I(0)	I(0)	I(0)	I(1)	I(1)	I(1)	I(0)	I(1)	I(0)	I(0)
LME	-	-	-	-	-	I(1)	-	I(1)	I(0)	I(0)

1/ PPI=WPI

2/ D12M=ALS

2/ 3/ 5/ D6M=D3M

4/ D12M=TBAM

+ Marginally at 10% significance

++ Marginally at 5% significance

All variables except (interest rates and output gap) are in log

D(.) Difference once

LM1=Money Supply M1

LM2=Money Supply M2

LGDP=Real GDP

LEX=Exchange rate per US Dollar

D12M=12-month deposit rates

D6M=6-month deposit rates

D3M=3-month deposit rates

TBAM=Treasury Bill Rates:All Maturity

ALS=Average Lending Rates

LGDPD=GDP Deflator

LCPI=Consumer Price Index

LPPI=Producer Price Index

LWPI=Wholesale Price Index

LME=Average wage rate

TGDP=Difference between actual and trend Real GDP

Table 5.5

**KWIATKOWSKI TEST FOR TREND AND
MEAN STATIONARITY
(Yearly Data)**

		D(LCPI)	D(LGDPD)	D(LWPI)
Indonesia	Trend	0.065273	0.054797	0.036584
	Mean	0.384129	0.423368	0.58523
Korea 1/	Trend	0.087709	0.118919	0.07688
	Mean	0.51997	0.843867	0.619772
Malaysia 1/	Trend	0.187998	0.073809	0.113229
	Mean	0.323119	0.249132	0.180033
Myanmar	Trend	0.185855	0.062005	-
	Mean	0.395989	0.318604	-
Nepal	Trend	0.037163	0.042023	-
	Mean	0.264292	0.092081	-
Philippines	Trend	0.044208	0.052642	0.065416
	Mean	0.103738	0.071571	0.184867
Singapore	Trend	0.056163	0.060772	-
	Mean	0.307112	0.279306	-
Sri Lanka	Trend	0.016449	0.114148	0.058554
	Mean	0.272201	0.113721	0.090434
ROC, Taipei	Trend	0.057548	0.079505	0.057922
	Mean	0.321841	0.122516	0.41949
Thailand	Trend	0.063139	0.059343	0.05575
	Mean	0.307588	0.2633	0.338031

1/ LWPI=LPPI

LCPI=Log of Consumer Price Index

LGPD=Log of GDP Index

LWPI=Log of Wholesale Price Index

LPPI=Log of Producer Price Index

D(.) Difference once

Table 5.6

JOHANSEN MAXIMUM LIKELIHOOD COINTEGRATION TEST
The Number of Ranks for Inflation Rates

		Lags	None No Intercept No Trend	None Intercept No Trend	Linear Intercept No Trend	Linear Intercept Trend	Quadratic Intercept Trend
Indonesia	D(LCPI) D(LGDPD)	(1,3)	2	1	2	1	2
	D(LCPI) D(LWPI)	(1,3)	2	1	2	1	2
	D(LGDPD) D(LWPI)	(1,2)	0	0	0	1	2
Korea	D(LCPI) D(LGDPD)	(1,4)	0	0	0	1	2
	D(LCPI) D(LPPI)	(1,2)	0	0	0	1	2
Malaysia	D(LCPI) D(LGDPD)	(1,1)	1	1	2	1	2
Nepal	D(LCPI) D(LGDPD)	(1,1)	1	2	2	1	2
Philippines	D(LCPI) D(LGDPD)	(1,3)	1	2	2	2	2
	D(LCPI) D(LWPI)	(1,2)	0	0	1	0	2
	D(LGDPD) D(LWPI)	(1,3)	0	1	1	1	2
Singapore	D(LCPI) D(LGDPD)	(1,2)	2	2	2	1	2
Sri Lanka	D(LCPI) D(LGDPD)	(1,1)	0	0	2	0	2
	D(LCPI) D(LWPI)	(1,1)	1	1	2	1	2
	D(LGDPD) D(LWPI)	(1,3)	0	1	2	1	2
ROC, Taipei	D(LCPI) D(LGDPD)	(1,1)	2	1	2	1	2
	D(LCPI) D(LWPI)	(1,1)	0	1	2	1	2
	D(LGDPD) D(LWPI)	(1,2)	1	2	2	1	2
Thailand	D(LCPI) D(LGDPD)	(1,1)	0	0	2	1	2
	D(LCPI) D(LWPI)	(1,1)	0	0	0	0	2
	D(LGDPD) D(LWPI)	(1,1)	0	1	2	2	2

All variables in log
 LCPI=Consumer Price Index
 LGDPD=GDP Deflator
 LPPI=Producer Price Index
 LWPI=Wholesale Price Index
 D(.) Difference Once

Table 5.7
GRANGER CAUSALITY ANALYSIS
BUDGET DEFICIT AND MONEY SUPPLY

N.H. Lags	DEF → M1		M1 → DEF		DEF → M2		M2 → DEF		
	F Statistics	Probability	F Statistics	Probability	F Statistics	Probability	F Statistics	Probability	
Korea	3	18.3557	0.00001 ***	1.483	0.25278	0.5686 *	3.01837	0.74125	0.54124
	2	3.0599	0.06928 *	1.47907	0.25173	0.06455 *	3.15251	1.27462	0.30129
	1	0.73481	0.40057	0.27194	0.60725	0.04896 **	4.34404	0.35254	0.55873
Malaysia	0	3.0599	0.06928 *	1.47907	0.25173	0.06455 *	3.15251	1.27462	0.30129
	3	2.16881	0.12922	0.71278	0.55772	0.03032 **	3.77847	1.598	0.22684
	2	2.25874	0.13181	1.46996	0.25493	0.04185 **	3.7681	2.51581	0.10733
Myanmar	1	3.85834	0.06287 *	1.16466	0.29274	0.06101 *	3.91866	0.77953	0.38728
	0	2.25874	0.13181	1.46996	0.25493	0.04185 **	3.7681	2.51581	0.10733
	3	1.08346	0.4097	2.32609	0.15115	0.08009 *	3.02832	4.25547	0.0352 **
Nepal	2	2.35231	0.14109	4.08123	0.04723 **	0.06827 *	3.32342	0.19455	0.82556
	1	4.36171	0.0555 *	5.65386	0.03221 **	0.09271 *	3.19735	0.63585	0.43689
	0	2.35231	0.14109	4.08123	0.04723 **	0.06827 *	3.32342	0.19455	0.82556
Philippines	3	2.32152	0.11657	9.28705	0.00102 ***	0.00043 ***	11.1177	2.29585	0.11935
	2	1.5392	0.24301	16.0235	0.00012 ***	0.00068 ***	17.8052	5.98383	0.01078 **
	1	0.26239	0.61438	6.12092	0.02296 **	0.00022 ***	20.7695	8.02034	0.01065 **
Sri Lanka	0	1.5392	0.24301	16.0235	0.00012 ***	0.00068 ***	17.8052	5.98383	0.01078 **
	3	1.18218	0.34435	7.56314	0.00177 ***	0.57882	0.67451	1.90932	0.16427
	2	0.73086	0.49392	6.81035	0.00555 ***	0.01711 **	5.02025	2.7847	0.08572 *
Thailand	1	0.35777	0.55585	6.15522	0.02123 **	0.1443	2.29178	3.96989	0.05887 *
	0	0.73086	0.49392	6.81035	0.00555 ***	0.01711 **	5.02025	2.7847	0.08572 *
	3	3.21585	0.051 *	0.62616	0.60849	0.04668 **	3.31914	3.14452	0.05425 *
	2	0.97378	0.39668	1.61298	0.2268	0.01826 **	5.04161	3.44259	0.0542 *
	1	0.69849	0.41317	9.63202	0.0056 ***	0.24799	1.41603	15.0927	0.00092 ***
	0	0.97378	0.39668	1.61298	0.2268	0.01826 **	5.04161	3.44259	0.0542 *
	3	1.90106	0.16776	2.01888	0.14946	0.28356	1.37726	6.14127	0.00505 ***
	2	0.44321	0.64844	2.67989	0.09435 *	0.20783	1.7084	1.8018	0.19207
	1	0.00267	0.95929	2.41257	0.13531	0.83034	0.04707	1.52776	0.2301
	0	0.44321	0.64844	2.67989	0.09435 *	0.20783	1.7084	1.8018	0.19207

M1 = Narrow Money
M2 = Broad Money
DEF = Budget Deficit
* 10% significance
** 5% significance
*** 1% significance

Both the ADF and the KPSS tests indicate there are indeed sufficient evidence to conclude that the inflation rates (measured by different indices) of the SEACEN countries (except for Myanmar) are stationary. This is an important statistical implication which suggests that any shock to the price inflations would eventually smooth and wither out. That is, there is no element of persistence in inflation rates. Why do we worry about persistence in inflation? Inflation, as we know is not without cost. Ball and Cecchetti (1990)⁸⁷ point out that inflation uncertainty over the long horizon is associated with the persistence in inflation. Walsh (1991)⁸⁸ argues that the weight of output in the government's objective is a positive function of the degree of persistence in inflation rates. Hence, the cost may possibly be the loss of output.

It is clear that the effect of the two-oil shocks has a tremendous impact on the SEACEN countries (Chart 2.1). However, one could see that except for Myanmar, the impact of these shocks was minimal over the longer period. This stationarity characteristic of the series is in fact one of the factors that prevents the nine SEACEN countries from experiencing hyperinflation despite the two-oil shocks. For Myanmar, any shock to the price inflation will be that of shock magnification. There is in fact visual evidence to suggest prolonged-effect of the oil-shocks. Price inflations computed by using the various indices seem to be on an upward trend since 1970.

3. Fiscal Deficit and Money Supply

Several methods of testing the degree of monetization are available. Protopadakis and Siegal (1986)⁸⁹ use the non-parametric method of rank correlation to link excess growth rate of debt minus real growth of GDP to excess money supply, defined as the rate of growth of money supply minus the real growth of GDP. Fres-Felix (1992)⁹⁰ uses

87. Ball L, and Cecchetti S.g., *Inflation and Uncertainty at Short and Long Horizons, Brooking Papers on Economic Activity*, 1990, pp. 215-54.

88. Walsh C.E., *Inflation Inertia and Optimal Disinflation, New Zealand Economic Papers*, 1991, pp. 141-151.

89. Protopadakis A., and Siegel. J.J., *Are Government Deficits Monetized?*, **Business Review**, Federal Reserve Bank of Philadelphia, November/December 1986, pp. 13-22.

90. Fres-Felix M.L., **Public Sector and Monetary Policy in the SEACEN Countries**, The SEACEN Centre: Kuala Lumpur, 1992.

the identity equation of money supply to examine the impact of government deficit on monetization. Protopadakis and Siegel (1987)⁹¹ use a single reduced form equation of current annual money growth regressed on its lags and the lags of annual debt growth and real GNP. De Haan and Zelhorst (1990)⁹² use vector autoregression estimation (VAR) to estimate the impact of budget deficit on money supply. Dejthamrong (1993)⁹³ uses polynomial lags.

Granger Causality analysis between fiscal deficit and money supply, M1 and M2 is carried out for seven SEACEN Countries for the period between 1970 to 1993/1994. Indonesia, Singapore and ROC-Taipei, which have consistent balanced budgets or budget surpluses are excluded in this analysis. For Korea, Malaysia and Myanmar, there are some empirical evidence to indicate that fiscal deficit does in fact Granger-cause money supply (M1) (Table 5.7). However, the results are less unambiguous for broad money (M2). For Korea, Malaysia, Myanmar, Nepal, the Philippines and Sri Lanka, the null hypothesis that money supply is not Granger-caused by fiscal deficit is clearly rejected by the Granger causality tests. However, for Thailand, fiscal deficit does not seem to influence money supply. This evidence is supported by Dejthamrong (1993)⁹⁴ who argues that this may be due to the alignment of the Thai baht to a basket of currencies with the US dollar as the major currency. Moreover, over the period analyzed, the fiscal deficit was in surplus for some periods.

4. Estimation Results: Annual Data

The variables chosen in the estimation depend on their time series properties as reported in Table 5.4. If the price indices are found to be stationary, then the ordinary least squares (OLS) with corresponding stationary endogenous variables will be estimated. However, if the price indices are found to be non-stationary, then the Johansen maximum likelihood tests will be conducted. All variables except the output

91. Protopadakis A., and Siegal J.J., *Are Money Growth and Inflation Related to Government Deficit, Evidences from Ten Industrialized Economies*, **Journal of International Money and Finance** 6, pp. 31-48.

92. De Haan and Zelhorst D., *The Impact of Government Deficits on Money Growth in Developing Countries*, **Journal of International Money and Finance**, 9, 1990.

93. Dejthamrong T., *The Budget Deficit: Its Impact on Money Supply and Output in Selected SEACEN Countries*, The SEACEN Cente: Kuala Lumpur, March 1993.

94. Ibid.

Table 5.8

REGRESSION RESULTS
(Annual Data)

Dependent Variable: Price Index	Indonesia 1/	Korea 2/	Malaysia 3/	Singapore 4/	ROC, Taipei 5/
Constant	-0.96371 *** -3.88928	-0.34832 *** -3.00155	0.007148 0.421693	1.041488 *** 3.023425	-2.511859 ** -2.509771
Output Gap	0.54041 *** 2.13136	-0.63817 *** -2.31233	1.516465 *** 4.241342	0.667519 10.21172 ***	-0.795865 ** -2.331648
Output Gap(-1)			-1.224868 *** -4.069902		
Money	0.38287 *** 5.18841	0.12967 *** 2.76289		0.371855 32.58039 ***	0.193675 *** 2.956074
Money(-1)			0.286382 *** 2.18227		
Interest	0.01278 *** 3.39709	0.01228 *** 5.15231	-0.013497 *** -2.363677		0.046513 *** 6.033906
Wage Rate		0.08746 2.03127 ***			
Exchange Rate				0.613394 *** 3.023425	0.450303 ** 2.382026
Price Index(-1)	0.38734 *** 3.54749	0.78300 *** 9.63823			0.541563 *** 3.91487
R-Squared	0.99758	0.99804	0.723236	0.982934	0.990434
Adjust R-Squared	0.99705	0.99746	0.658115	0.980239	0.987777
S.E of Reg	0.04960	0.03545	0.032849	0.037263	0.047947
Sum Squared Resid	0.04428	0.02136	0.018344	0.026381	0.041381
Log Likelihood	39.27193	47.65262	46.76786	45.2262	42.30146
F-Statistics	1857.89900 ***	1727.57800 ***	11.10605 ***	264.7765 ***	372.7288 ***
Diagnostic Tests					
<i>Autocorrelation</i>					
Breusch-Godfrey LM					
Lm(1)	1.32265	2.13476	0.205711	0.859973	0.949982
Lm(2)	3.48041	3.82983	0.25445	3.51022	1.334189
Durbin's h(alt)	1.00129	1.27583	-0.222768	0.264587	-0.845831
Ljung-Box Q(1)	1.37420	1.88930	0.1773	0.3953	0.9312
Ljung-Box Q(2)	2.99710	3.02520	0.2598	2.201	1.0433
<i>Heteroskedasticity</i>					
Arch					
Arch(1)	1.32438	1.39952	0.141193	0.120323	2.691606
Arch(2)	1.74436	2.02568	2.845823	1.000322	4.070013
White	13.10039	11.74381	5.790922	1.605726	19.31417 **
<i>Functional Form</i>					
Ramsey Reset(2)	1.66141	3.80148 *	3.582504 *	2.46414	2.588832
<i>Normality</i>					
Jacque-Bera	0.60020	0.47158	1.096354	2.06654	2.75819

1/ LGDPR, TGDPR LM1 D(012M)

2/ LGPI TGDPR LM1 D12M D(LOGME)

3/ D(LGDPD) TGDPR TGDPR(-1) D(IM(-1)) D(D3M)

4/ LGDPR TGDPR IM1 D(LEX)

5/ LGPI TGDPR LM1B D3M LEX

*** 1% significant

** 5% significant

* 10% significant

gap and interest rate variables are in log. The output gap variable is defined as the differential between actual and trend real GDP.

For Indonesia, Korea, Malaysia, Singapore and ROC-Taipei, price indices are found to be stationary. Across the board, the elasticity of money supply ranges from 0.1297 for Korea to 0.3829 for Indonesia (Table 5.8). For Malaysia, the elasticity of the first lag of money supply with respect to the inflation rate as measured by the GDP deflator is 0.2864. For Singapore and ROC-Taipei, the elasticity figures are 0.3719 and 0.1937 respectively. For this group of countries, the coefficients of money supply are all positive and significant at the 1-percent level. However, for output gap, the results vary. For Korea and ROC-Taipei, the coefficients of output are negative, while for Indonesia, Malaysia and Singapore, they are positive.

For the exchange rate variable, in Singapore and ROC-Taipei, the coefficients are significant. This is hardly surprising for the case of Singapore. The magnitude of the coefficient of exchange rate is as large as the output gap. This implies that the change in exchange rate and the output gap are equally important determinants of prices. The coefficients of the interest rate variable, except for Malaysia, are all positive for Indonesia, Korea, Singapore and ROC-Taipei. However, the semi-elasticities of interest rate in these countries are relatively small in comparison with the elasticities of the other variables.

All the estimations above are subject to autocorrelation tests: Brusch-Godfrey LM tests, Durbin's *h* (alt) tests for the presence of lags of exogenous variables, and the Ljung-Box tests. For heteroskedasticity, the Autoregressive Conditional Heterodasticity tests and the White tests are conducted. For functional forms, the Ramsey Reset tests are used and for testing normality, the Jacque-Bera statistics are computed.

Except for the equation of ROC-Taipei, which shows a 5-percent significance in the White test, all diagnostic tests indicate that the equations are well-specified. The recursive residuals of cumulative sums (CUSUM), CUSUM of squares and the recursive coefficients show that they are all within the two-standard deviation band, suggesting the models are relatively stable throughout the period analyzed (Table 5.8 and Appendices C.1-C.5).

For Myanmar, the price index is found to be of order- $I(2)$ while for Nepal, the Philippines and Sri Lanka, the price variables are found

to be of order-1(1). For Thailand, the CPI index is marginally accepted as stationary at the 5-percent significance level. For the case of Myanmar, Johansen tests involving the inflation rate are used. The likelihood ratio tests (LR) indicate one cointegrating vector for Thailand, two for Myanmar and Nepal, three for Sri Lanka and four for the case of the Philippines (Table 5.9). The criterion for choosing the appropriate cointegrating vector is based on the fact that some of these coefficients in these cointegrating vectors have elasticities of unrealistic magnitudes, often exceeding 1.

For Myanmar (vector 1), the elasticity of money to inflation rate is 0.054 while income is negatively related to inflation rate, with an elasticity of 0.256. The coefficient of exchange rate is positive with an elasticity of 0.045. For Nepal (vector 1), the Philippines (vector 2), Sri Lanka (vector 1) and Thailand (vector 1), the elasticities of money supply to prices are 0.498, 0.300, 0.546 and 0.368 respectively. For Myanmar, Nepal and Sri Lanka, the income elasticities to prices are negative with magnitudes of 0.256, 0.475 and 0.197 respectively while for the Philippines and Thailand, the elasticities are 0.710 and 0.017 respectively. The coefficients of the exchange rate for the Philippines, Sri Lanka and Thailand are 0.791, 0.386 and 0.178 respectively. For Nepal, it is negative but relatively small at 0.008. This could be attributed to the characteristics of the Nepalese exchange rate where it has a fixed exchange rate regime with the Indian currency but flexible (market-determined) with convertible currencies. The coefficients of interest rate, except for Sri Lanka, are positive but relatively small.

5. Estimation Results: Quarterly Data

The estimation sample is based on the period subsequent to major interest rate reforms. Indonesia liberalized its interest rates in 1983, Malaysia in 1978, the Philippines in 1982 and Singapore in 1975. Korea, however, has a more gradual approach to liberalization in interest rates.⁹⁵

For the quarterly data, the same unit root testing procedure is conducted. As the sample size is sufficiently large, vector error correction models (VECM) are estimated. As in the annual data, the variables

95. Soekarni M., *Financial Reforms and Transmission Mechanism of Monetary Policy in the SEACEN Countries*, The SEACEN Centre, 1995.

Table 3.9
JOHANSEN COINTEGRATION TEST ^{a/}

MYANMAR 1/

Eigenvalue	LR	5% CV	1% CV	No. of CE(s)
0.83148	66.15215	16.07	84.45	None
0.67608	41.06835	34.91	41.07	At Most 1
0.504189	17.74714	19.86	24.6	At Most 2
0.13275	2.990392	9.24	12.97	At Most 3

^{a/1/} Asymptotic rejection of the hypothesis at 5% (N) significance level.
L.R. test indicates 1 cointegrating equation(s) at 5% significance level.

Estimated Cointegrating Coefficients

Vector	Price Index 1/	Money	Income	Ex-Rates	Constant
1	2.198008	0.138854	-0.65015	0.11807	6.422562
2	-1.723254	-0.081735	1.0112	0.255346	12.71713

^{a/1/} Asymptotic rejection of the hypothesis at 5% (N) significance level.
L.R. test indicates 2 cointegrating equation(s) at 5% significance level.

NEPAL 2/

Eigenvalue	LR	5% CV	1% CV	No. of CE(s)
0.849424	100.3959	76.07	84.45	None
0.748624	60.63678	53.12	60.16	At Most 1
0.621437	31.35817	34.91	41.07	At Most 2
0.11155	1.11551	9.24	12.97	At Most 3

^{a/1/} Asymptotic rejection of the hypothesis at 5% (N) significance level.
L.R. test indicates 2 cointegrating equation(s) at 5% significance level.

Estimated Cointegrating Coefficients

Vector	Price Index 1/	Money	Income	Ex-Rates	Constant
1	10.71194	5.33436	-5.082404	-0.084555	46.35224
2	-1.7794228	2.861889	-15.64686	2.81353	145.2622

THAILAND 5/

Eigenvalue	LR	5% CV	1% CV	No. of CE(s)
0.89818	71.720	58.35	84.45	None
0.484548	35.1433	30.89	41.07	At Most 1
0.44512	20.77653	24.31	29.75	At Most 2
0.260409	7.226471	12.53	16.31	At Most 3
0.072598	0.281326	3.84	9.51	At Most 4

^{a/1/} Asymptotic rejection of the hypothesis at 5% (N) significance level.
L.R. test indicates 1 cointegrating equation(s) at 5% significance level.

Estimated Cointegrating Coefficients

Vector	Price Index 1/	Money	Income	Ex-Rates	Constant
1	-0.345986	0.34776	0.016854	0.165877	0.033586

PHILIPPINES 3/

Eigenvalue	LR	5% CV	1% CV	No. of CE(s)
0.885995	111.1228	76.07	84.45	None
0.67608	67.608	53.12	60.16	At Most 1
0.534854	37.58648	34.91	41.07	At Most 2
0.421440	19.52226	19.86	24.6	At Most 3
0.275302	7.405598	9.24	12.97	At Most 4

^{a/1/} Asymptotic rejection of the hypothesis at 5% (N) significance level.
L.R. test indicates 4 cointegrating equation(s) at 5% significance level.

Estimated Cointegrating Coefficients

Vector	Price Index 1/	Money	Income	Ex-Rates	Constant
1	1.822509	-0.327161	-2.941167	-1.384092	0.020300
2	-1.0000	0.17969	1.61389	0.75894	-0.0111
3	-0.949425	-1.822321	4.238449	3.41282	-0.15683
4	-3.506007	-0.587874	7.83357	4.32221	-0.044821

SRI LANKA 4/

Eigenvalue	LR	5% CV	1% CV	No. of CE(s)
0.89729	100.8732	58.35	84.45	None
0.748421	54.3721	30.89	45.58	At Most 1
0.60063	25.38271	24.31	29.75	At Most 2
0.238512	6.101168	12.53	16.31	At Most 3
0.071869	0.370062	3.84	6.51	At Most 4

^{a/1/} Asymptotic rejection of the hypothesis at 5% (N) significance level.
L.R. test indicates 3 cointegrating equation(s) at 5% significance level.

Estimated Cointegrating Coefficients

Vector	Price Index 1/	Money	Income	Ex-Rates	Constant
1	-1.0000	0.18858	-1.4285	-0.5327	0.05004
2	2.407039	-5.627719	2.316447	5.70209	-0.100348
3	-2.859102	1.456212	-0.528921	1.028818	-0.045795

Figure in parenthesis are normalized on the price index by dividing through the estimated coefficients by the estimated coefficient of the price index.

^{a/1/} Asymptotic rejection of the hypothesis at 5% (N) significance level.

^{a/2/} Asymptotic rejection of the hypothesis at 1% (N) significance level.

1/ LGDPD LM1 LGDPD LEX

2/ LGDPD LM2 LGDPD LEX

3/ LGDPD LM1 LGDPD LEX D2M

4/ LGDPD LM1 LGDPD LEX D12M

5/ LGDPD LM1 LGDPD LEX D12M

Table 5.10

THE SEQUENTIAL UNIT ROOT TESTS

(Quarterly Data)

	Indonesia	Korea	Malaysia 1/	Philippines 2/	Singapore 3/
LM1	I(1)	I(1)	I(1)	I(1)	I(1)
LM2	I(1)	I(1)	I(0)	I(1)	I(1)
LGR	I(0)	I(0)	I(1)	I(1)	I(1)
TGR	I(0)	I(0)	I(0)	I(0)	I(0)
LEX	I(1)	I(0)	I(1)	I(1)	I(0)
DR	I(0)	I(0)	I(1)	I(0)	I(1)
LGD	I(1)	I(1)	I(1)	I(1)	I(1)

LM1 = Log of money supply M1

LM2 = Log of money supply M2

LGR = Log of real GDP

TGR = Differential between actual and trend real GDP

LEX = Log of exchange rate per US dollar

DR = Deposit rates

LGD = Log of GDP deflator

1/ LGR = Production index

2/ LGR = Log of real GNP

1/2/3/ LGDP = Log of consumer price index

chosen for the cointegrating analysis are based on the time series properties. (Table 5.10). For Indonesia, Johansen maximum likelihood cointegrating tests are estimated with LCPI (consumer price index), LM2 (money supply M2) and LEX (Exchange rate). For Korea, the equation is based on LGD (GDP deflator) and LM2. For Malaysia, LCPI, LPR (production index), LM1 (money supply M1), DR (deposit rates) and LEX. For Singapore, LCPI, LGR (real GDP) and DR and for the Philippines, LCPI, LNR (real GNP), LM2, TBILL (Treasury bill rate) and LEX. For the case of Singapore, LM2 is not included because it is highly correlated with LGR.

For Indonesia, Korea and Singapore, apart from the variables in the cointegration equations, other stationary variables of interest are included in the VECM. As the ordering of the variables is important, this analysis orders the goods-sector series before the financial series. It is assumed that the monetary authorities and asset markets will react to shocks more quickly.⁹⁶ For the impulse response function, initial shocks to each series are one standard deviation of errors in their respective equations.

6. Impulse Response Function

The impulse responses of the VECM are reported in Chart 5.1 to Chart 5.4. For Indonesia, Malaysia and the Philippines, a shock to prices persists. A positive shock to prices is estimated to reduce money supply in Indonesia and Malaysia. For Korea, and the Philippines, monetary policy seems to be slightly accommodating. However, the response of money to prices in Singapore seems to oscillate. This could be probably due to the fact that the Monetary Authority of Singapore does not have a strong monetary policy stance. A positive shock to money on the other hand, leads to an increase in prices in Indonesia, Korea and Singapore reaching their peaks in the third quarter, but the shock does not have any permanent effect. However, for the case of Malaysia and the Philippines, a shock to money seems to have a lasting effect on prices. This is because a positive shock to money seems to have some positive effects on output for Indonesia, Korea and Singapore.

96. Orden D., and Fisher L., *Financial Deregulation and the Dynamics of Money, Prices and Output in New Zealand and Australia*, *Journal of Money Credit and Banking*, vol. 25, May 1993, pp. 276-291.

Table 5.11

**KWIATKOWSKI TEST FOR TREND AND
MEAN STATIONARITY
(Quarterly Data)**

		LGD)	D(LGD)
Indonesia	Trend	0.124075	0.904901
	Mean	0.074988	0.072275
Korea	Trend	0.181525	0.148382
	Mean	1.278238	0.167536
Malaysia 1/	Trend	0.228066	0.186373
	Mean	1.343120	0.363456
Philippines 1/	Trend	0.195083	0.048833
	Mean	1.278510	0.152042
Singapore 1/	Trend	0.289623	0.123742
	Mean	1.542561	0.136878

1/ LGD=LCPI

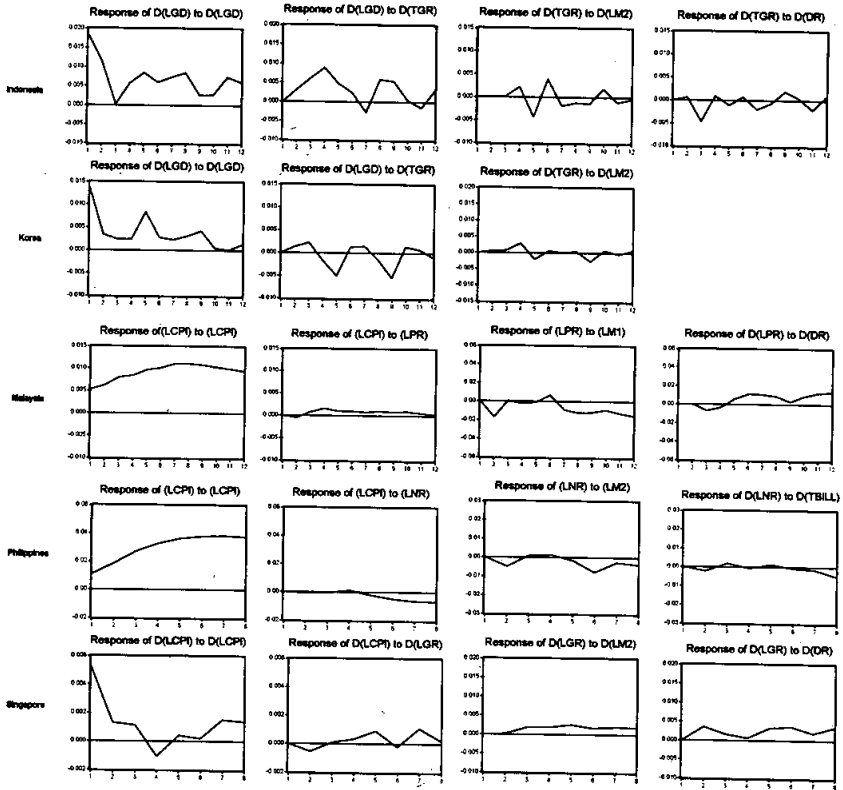
LCPI=Log of Consumer Price Index

LGD=Log of GDP Index

D(.) Difference once

Chart 5.1

Response to One S.D. Innovations



Prices oscillate to a shock in output for Indonesia, Korea and Singapore. For Singapore, output shock causes an initial decrease in prices but after the third quarter, prices start to accelerate. For Malaysia, the response of prices to output shock is positive throughout the quarters. Accordingly, there appears to be some kind of rigidities of elasticity in the economy, e.g., supply, labour or distributive constraints. There is apparently a trade off between prices and output. For the Philippines, output shock is estimated to cause a decrease in prices from fourth quarter onwards suggesting that there is no trade-off in the short run.

For interest rate, it is apparent that Malaysia is the only case where a shock in money leads to a decrease in interest rate (up to 10 periods). For the Philippines and Singapore, it seems that interest rate responds positively to a shock in money and therefore, a positive shock to interest rate leads to an increase in prices. This price 'puzzle' has been well documented.⁹⁷ Sims (1992)⁹⁸ argues that the price puzzle can be explained by the fact that the authorities systematically raise interest rates in response to expectations of future prices but by not 'large' enough to prevent prices from increasing. It is also likely that interest rate reflects expectations of future increase in money supply.⁹⁹

For Indonesia, Malaysia, the Philippines and Singapore, the response of interest rate to prices is positive throughout the quarters. It is interesting to note that for the case of the Philippines, output seems to decline as a result of a shock in interest rate and this apparently leads to an increase in prices. Note earlier that for the case of the Philippines, the evidence suggests that there is no trade-off between output and prices in the short run. For all the five countries analyzed here, evidence also suggests the neutrality of money. Nominal money supply has minimal impact on real income.

97. Baïke N., and Emery K., *Understanding the Price Puzzle*, **Economic Review**, Federal Reserve Bank of Dallas, Fourth Quarter, 1994, pp. 15-26.

98. Sims C., *Interpreting the Macroeconomic Time Series Facts: The Effects of Money Supply*, **European Economic Review** 36, June 1992, pp. 975-1000.

99. Rotemberg J., Driscoll J., and Poterba J., *Money, Output and Prices: Evidences From a New Monetary Aggregate*, **Journal of Economic Statistics**, January 1995, vol. 13, no. 1, pp. 67-83

Chart 5.2

Response to One S.D. Innovations

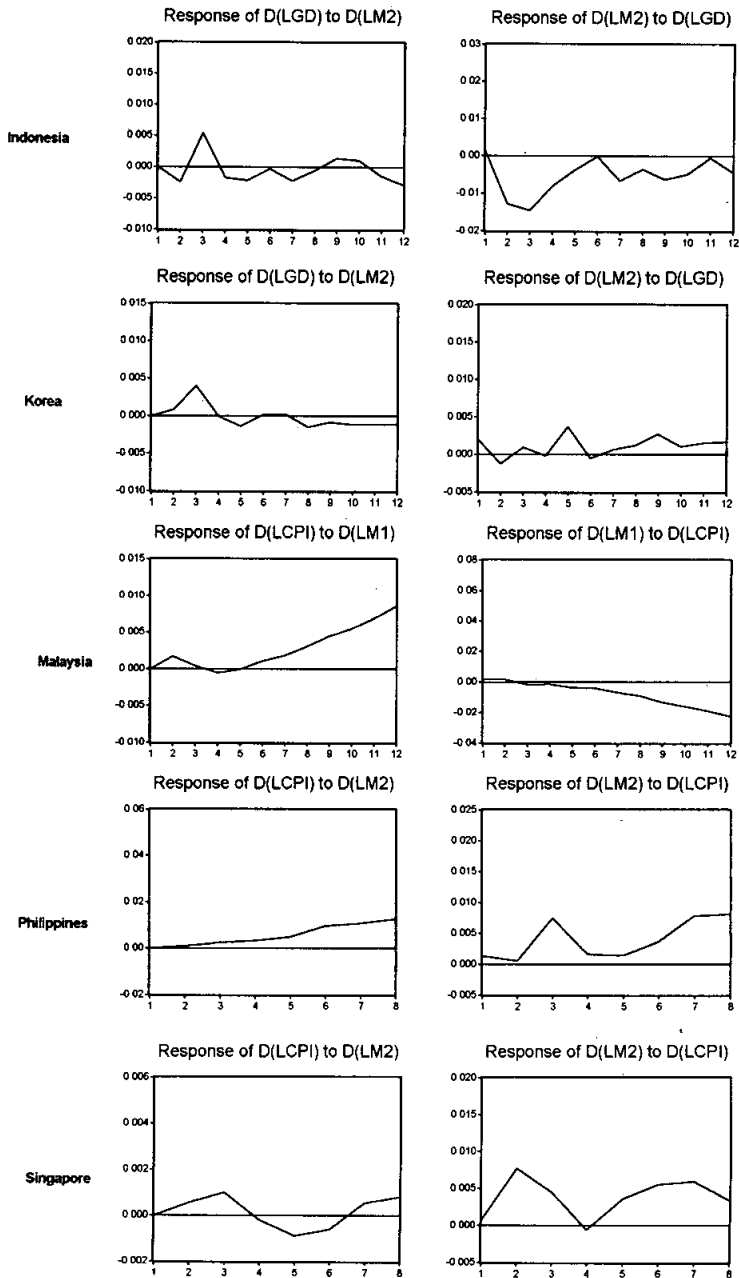


Chart 5.3

Response to one S.D. Innovations

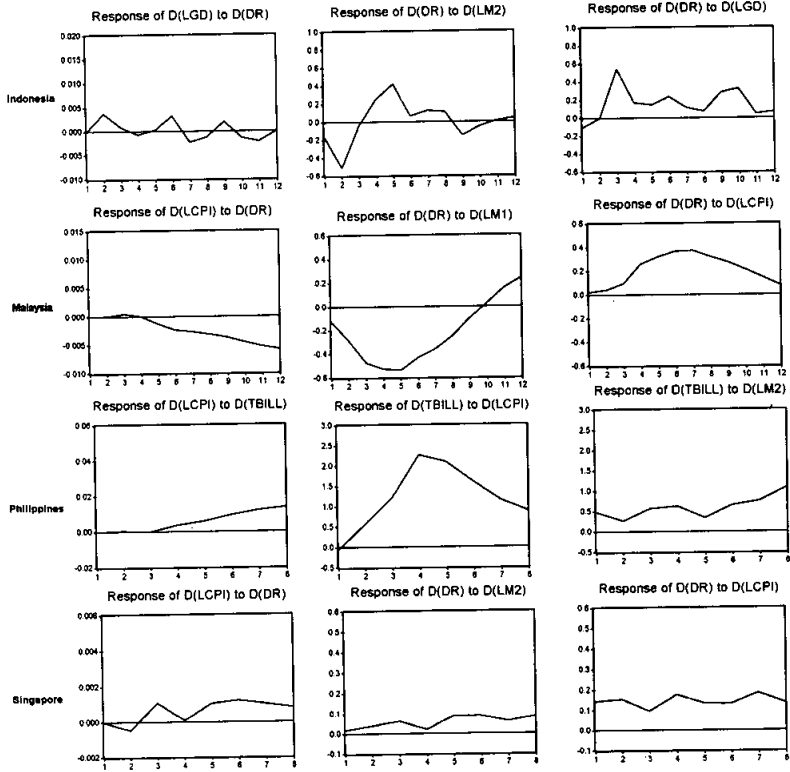


Chart 5.4

Response of one S.D. Innovations

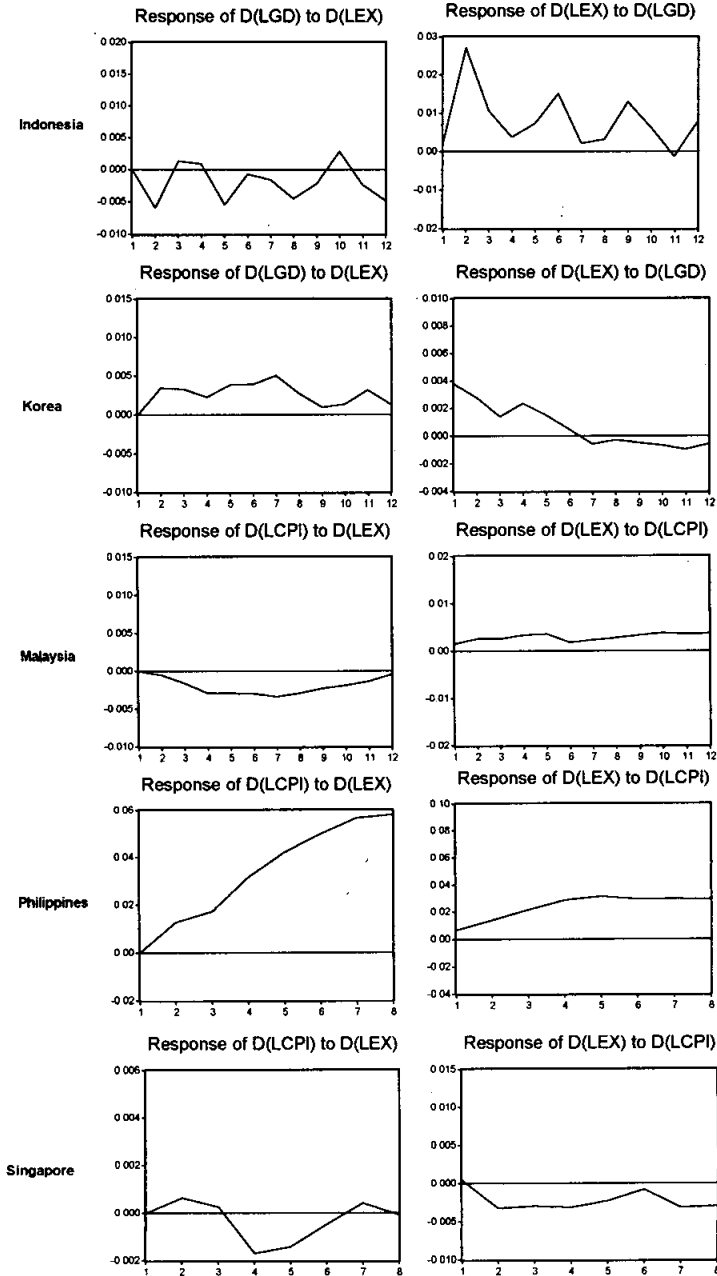
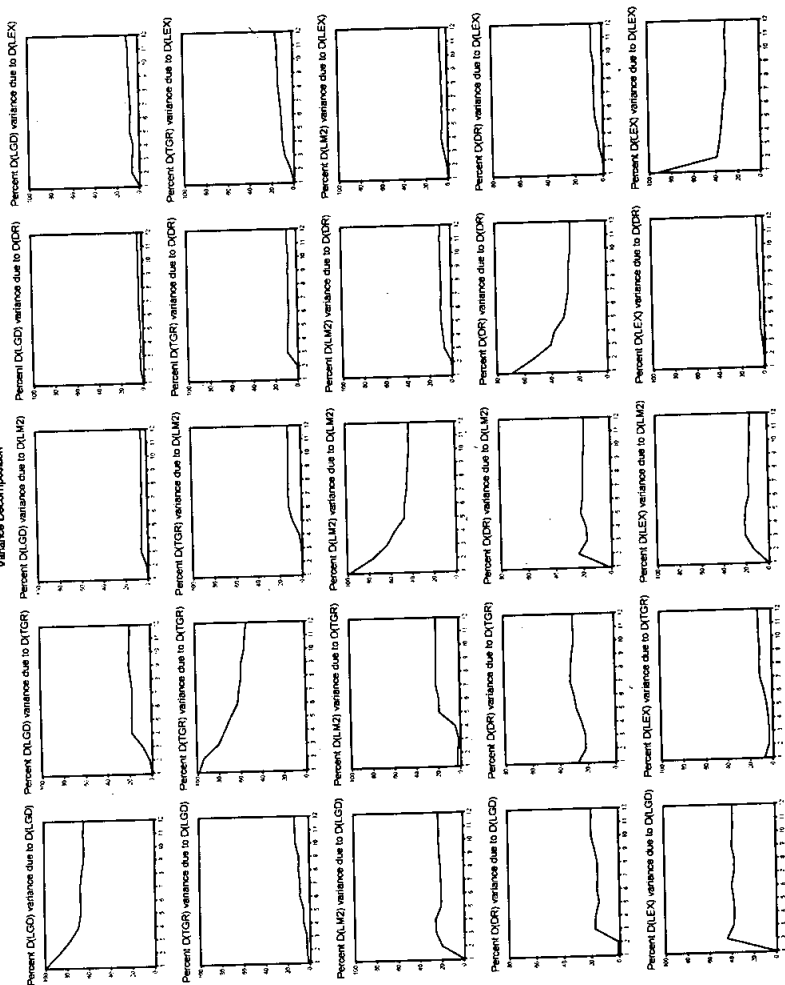


Chart 5.5
Indonesia
Variance Decomposition



It is evident that for the case of Korea and the Philippines, an appreciation of the domestic currency will help to reduce prices. For the case of Singapore, a depreciation of the Singapore Dollar leads to an increase in the inflation up to the third quarter. From the sixth quarter onwards, prices start to move up again. This is also evident in the case of Singapore in which a shock to prices leads to an appreciation of the exchange rate. For Malaysia, the response of prices in the short run seems to contradict the fact that depreciation will lead to an increase in prices. This apparent contradiction could be due to two reasons. One, the exchange rate used in this analysis for consistency purposes is the domestic currency per US dollar. The second reason could be due to the fact that any depreciation of the currency leads to the expectation of a restrictive monetary policy.

7. Variance Decomposition

The variance decompositions suggest that innovations in the prices explain a large fraction of the variation in themselves (Charts 5.5-5.9). After eight quarters, innovations in prices explain around 66 percent of variation in prices in Indonesia, 67 percent in Korea, 86 percent in Malaysia, 37 percent in the Philippines and 67 percent in Singapore. This seems to suggest that prices appear to be highly exogenous, suggesting apart from monetary and fiscal policies, that one of the more effective ways to control prices is to dampen inflationary expectations.

Innovations in output explain about 18 percent of the variance of prices in Indonesia, 10 percent in Korea, 1 percent in Malaysia, 4 percent in Singapore and 37 percent in the Philippines. Note that output in Malaysia is proxied by industrial production. After eight quarters, innovations in money contribute about 4 percent of the variance of prices in Indonesia, 5 percent in Korea, 3 percent in Malaysia, 2 percent in the Philippines, while those in interest rate contribute 3 percent for the case of Indonesia and Malaysia, 10 percent in Singapore and 2 percent in the Philippines.

The difficulty of predicting exchange rate using structural model is indeed reflected in the fact that the exchange rate is largely explained by its own past. After the first quarter, innovations in exchange rate explain around 90 percent of its own variance in Indonesia, 84 percent for the case of Korea, 88 percent in Malaysia, 41 percent in Singapore

and 71 percent in the Philippines. After four quarters, the contribution of exchange rate to the variance in prices ranges from 5 percent in Indonesia and 39 percent in the Philippines. For the case of Singapore, the contribution is around 9 percent.

8. Diagnostic Tests

The recursive coefficients of the price equations of the VECM are presented in appendix D.1 to appendix D.5. All the coefficients are within the two-standard deviation band, indicating that the reduced form price equations are relatively stable. Except for the normality tests, all the other diagnostic tests seem to show that the models are adequately specified (Table 5.12). However, the residuals of the some of the financial variable equations such as interest rate, exchange rate and money supply appear to be non-normal. As in the case of the Korea, the interest rate variable is excluded from the model as it exhibits extreme non-normality. For the other countries, dropping the interest rate variable has little effect on the diagnostic tests of the other reduced form equations. The non-normality of the financial variables could be due to the increased volatility of these variables following financial deregulation.¹⁰⁰

The residuals, actual and fitted values of the price equations are presented in Chart 5.10, suggesting a reasonable good fit. The error correction terms of the price equations are all correctly signed with magnitudes of -0.71 for Indonesia, -0.41 for Korea, -0.03 for Malaysia and the Philippines and -0.06 for Singapore, suggesting that the speed of adjustment to the long-run equilibrium is relatively fast for Indonesia and Korea following a shock.

9. Findings

The foregoing empirical evidence suggests that the various measurements of price inflations do in fact move together in the long run. Cointegration of inflation rates suggests that policymakers could exploit the fact that these price inflations form a stable long-run relationship. For example, targetting the consumer price inflation as a policy measure for price stability may be a reasonably good policy as in the long

100. Orden D., and Fisher L., *Financial Deregulation and the Dynamics of Money, Prices and Output in New Zealand and Australia*, *Journal of Money Credit and Banking*, vol. 25, May 1993, pp. 276-291.

Chart 5.5
Korea

Variance Decomposition

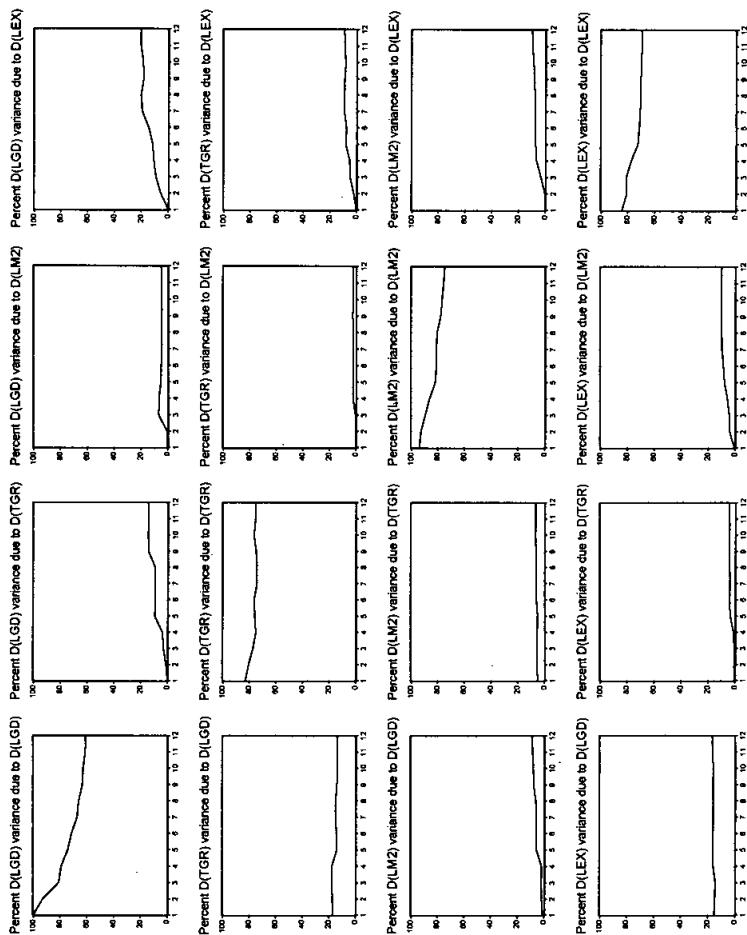


Chart 8.7
Materia
Variance Decomposition

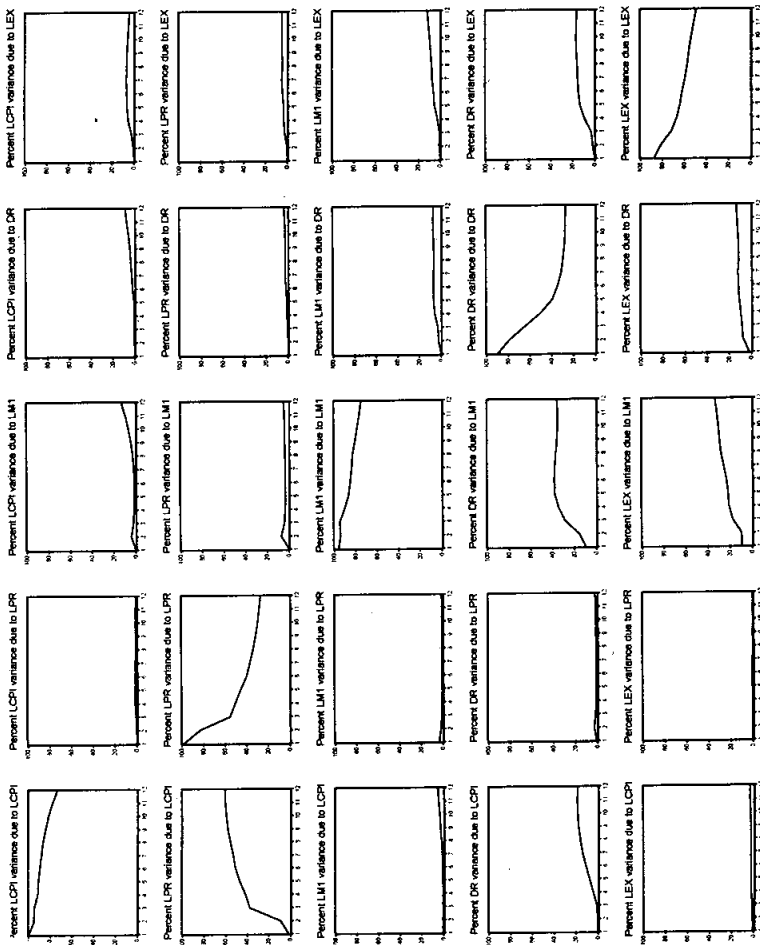


Chart 3.8

Philippines

Variance Decomposition

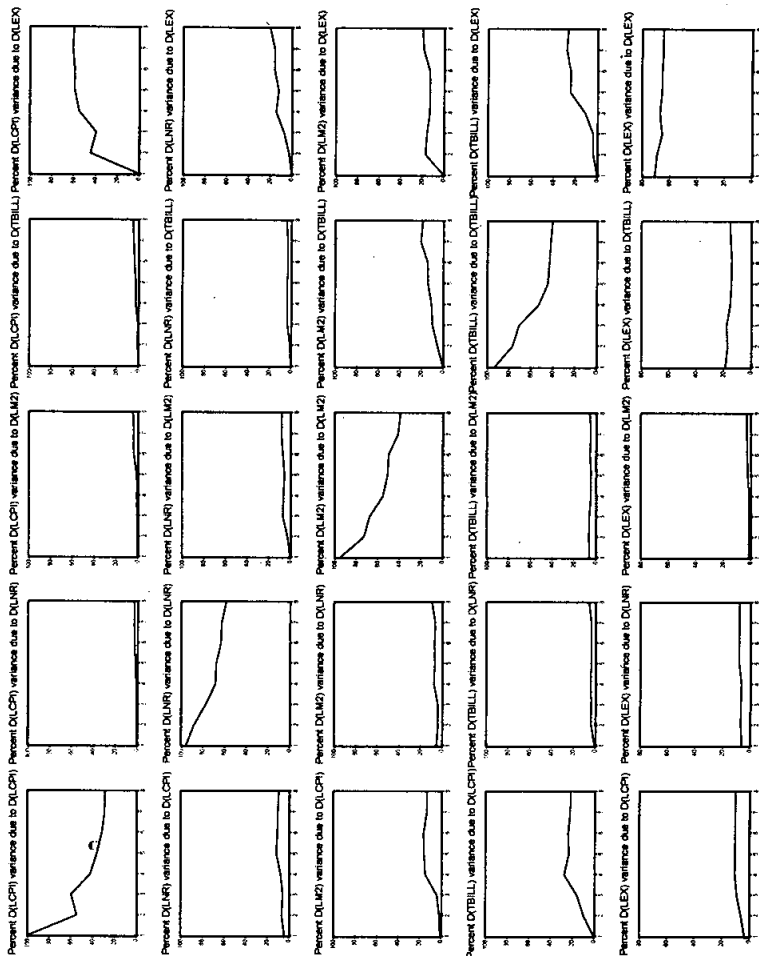


Chart 5.6
Singapore

Variance Decomposition

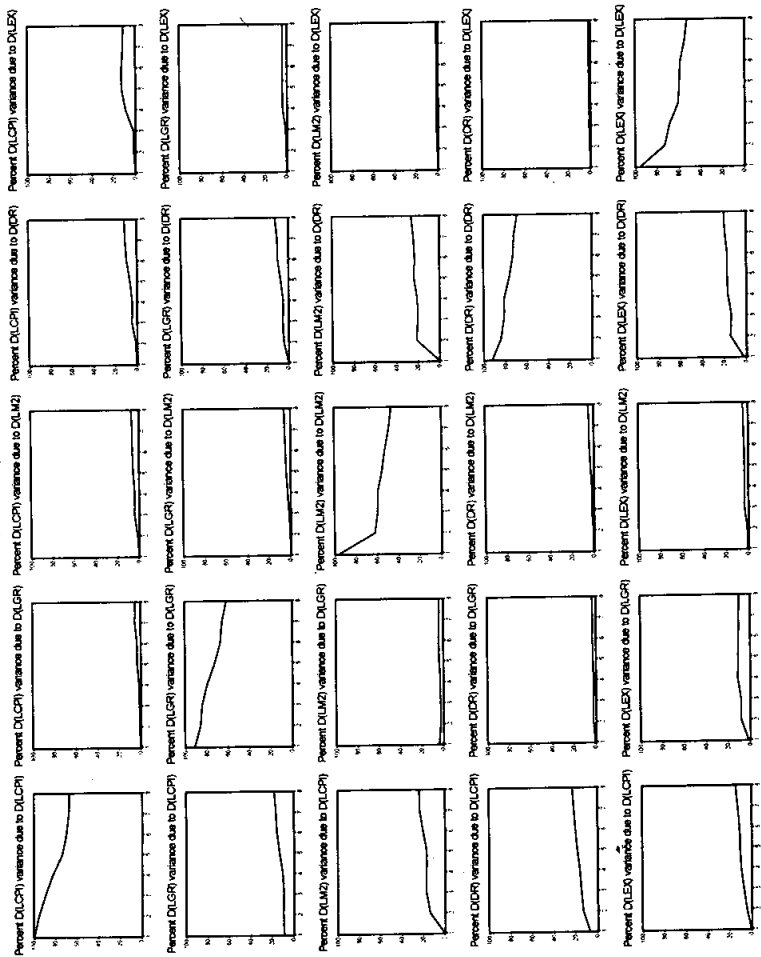


Chart 5.10

Actual, Fitted and Residuals of the Price Equation of the VECM

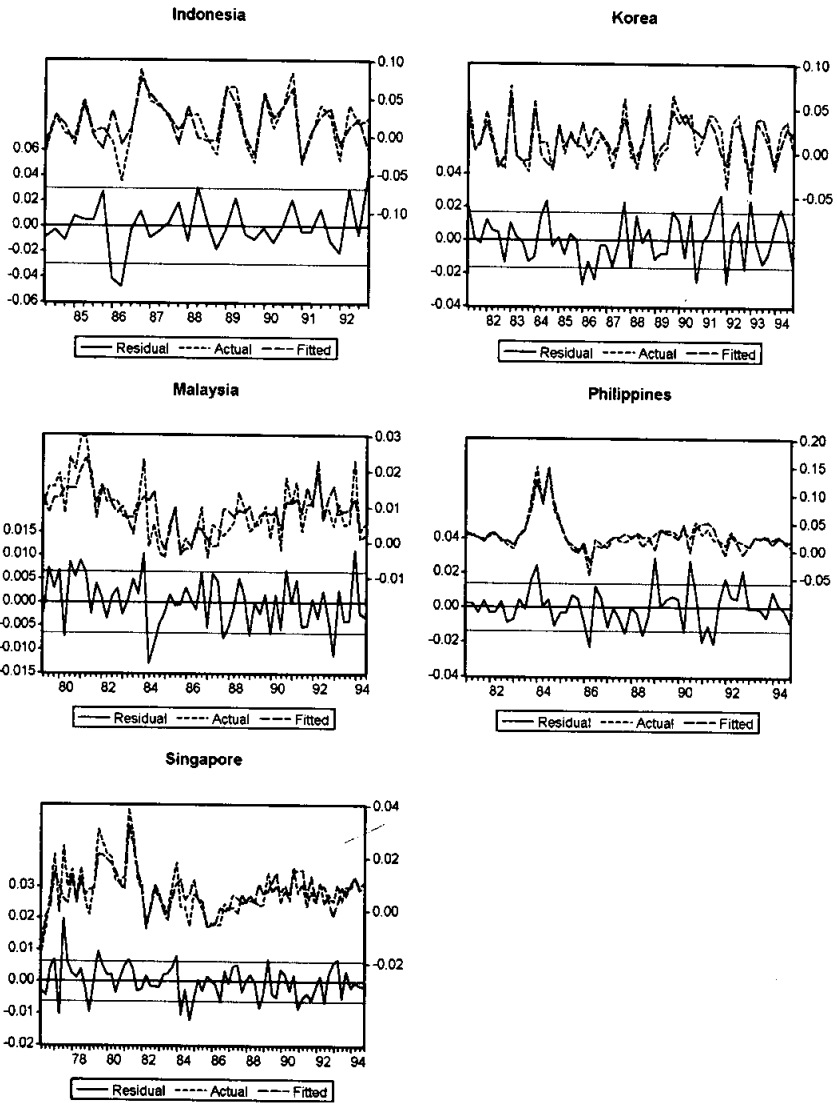


Table 5.12
DIAGNOSTIC TESTS FOR THE VECTOR ERROR CORRECTION MODEL (VECM)
(Quarterly Data)

	Error Term	R-Square	LM(4)	ARCH(4)	Q(4)	J-B
Indonesia	LGD	0.700760	0.750896 *	0.963280	1.497100	0.495896
	TGR	0.742923	2.681989 ***	0.745432	5.847600	0.875965
	LM2	0.872343	1.409059	0.846515	5.003600	4.694500
	DR	0.713785	0.480028	0.126292	3.132300	12.37000 ***
	LEX	0.780568	5.435865 **	0.391123	7.143800	7.314403 **
Korea (without DR)	LGP	0.716711	0.867795	0.237260	1.563800	1.350994
	TGDR	0.849384	0.770327	0.963970	1.806000	1.579164
	LM2	0.268966	2.794411	0.767025	1.991200	1.296301
	DR	0.703456	2.329513 *	0.441215	2.290900	1.797014
	LEX					
Malaysia	LCPI	0.555102	0.334429	1.249696	0.561500	0.564538
	LPR	0.599953	0.799160	6.035672 ***	1.110300	7.905320 **
	LM1	0.464500	0.702191	0.167029	0.503500	11.879590 ***
	DR	0.677069	1.745817	0.098999	2.211000	3.590958
	LEX	0.346076	0.223095	1.221399	0.559800	0.065855
Philippines	LCPI	0.871201	2.406642 *	0.210950	3.906900	2.084174
	LNR	0.722701	1.721107	1.203876	5.553800	1.844460
	LM2	0.619916	4.131071 ***	0.151390	6.521000	3.409999
	TBILL	0.717380	2.014203	0.734502	4.498100	1.934345
	LEX	0.428782	0.347471	2.559423	0.550300	19.722240 ***
Singapore	LCPI	0.670041	0.387439	0.923067	0.688100	8.356541 **
	TGDR	0.267820	0.478351	0.691099	0.409900	13.308330 ***
	LM2	0.536163	0.761323	0.320219	1.167800	1.680685
	DR	0.464693	1.610234	6.325489 ***	1.862300	15.895070 ***
	LEX	0.392760	0.435630	0.073425	0.370300	0.586658

LM(4): Fourth Order Breusch-Pagan LM Test Statistics for autocorrelation
ARCH(4): Fourth Order Autoregressive Conditional Heteroskedasticity Statistics
Q(4): Fourth Order Ljung-Box Statistics for autocorrelation
J-B: Jarque-Bera Statistics for normality

* 10% significance
** 5% significance
*** 1% significance

run, change in the consumer price index may indeed be a good indicator of the change in the overall price level. However, the caveat here is that the weights used in calculating the consumer price index must be as up-to-date as possible.

This study also finds that money supply is indeed the common denominator for the cause of inflation. However, the elasticity estimates suggest that prices are highly non-homogeneous in the SEACEN countries, suggesting that prices do not respond fully to an increase in money supply in the long run. In many Southern Cone economies, there is relatively high degree of monetary accommodation.¹⁰¹ However, for the case of Indonesia, Malaysia, Korea and the Philippines, there is hardly any evidence to suggest that in times of rising prices, the monetary authorities pursue accommodating monetary policies. It is also interesting to note that except for Thailand, in all the countries analyzed, the fiscal deficit is found to Granger-cause money supply, suggesting the importance of fiscal policy in the overall formulation of anti-inflationary program.

The conventional wisdom of a trade-off between output and prices is not present in all cases. For Korea, ROC-Taipei, Myanmar, Nepal and Sri Lanka they are negatively related. However in the case of Indonesia, Malaysia, the Philippines, Singapore and Thailand, there is a trade-off suggesting a structuralist view which postulates that there exist various rigidities of elasticity in the economy, e.g., supply constraint. It is interesting to note that the short-run response of prices to output is negative for the case of the Philippines. This suggests that with proper management of economic growth, inflation can in fact be contained.

The study also focuses on the controversial use of interest rates to control inflation. In the SEACEN countries, higher nominal interest rates can be brought about by different means, such as higher reserve requirements, higher discount rates, intervention by the monetary authorities in the money market as well as direct control of capital inflows. With the foregoing evidence, interest rate policy per se may not be necessarily be an effective instrument in managing prices. There

101. Peng Wen-Sheng, *Inflation Persistence and Monetary Accommodation in Six Pacific Basin and Latin American Developing Economies*, The University of Birmingham, 25 February 1993, p.18.

is evidence to suggest that in the long run, inflation rates tend to go up with interest rates. As mentioned earlier, this is possibly due to the fact that the response of the monetary authorities is one of incompleteness, i.e., the authorities systematically raise interest rates in response to expectation of future prices but somehow this appears insufficient to prevent price increases. It also seems that in this case higher nominal interest rate is transmitted into higher cost by price setters.

Rather than promoting savings, systematic increases in interest rate may instead induce spending. When consumers expect interest rate to keep rising, certain types of fixed loans, such as hire purchases may in fact increase as they realize that they will lose out if they postpone their consumption to a later date. Also a gradual incremental increase in interest rate will have a much lower effect in controlling prices than an one-off increase. However, a one-off increase in interest rate may be detrimental to economic growth. Moreover, if interest rate is pushed too high relative to international interest rates, the interest rate differential gap will widen, promoting capital inflows and creating a situation of excess liquidity in the country. This surge in capital inflows was experienced in several SEACEN countries, especially Malaysia, Sri Lanka and Thailand in the 1990's.

Interest rate policy to manage inflation apparently works well in Malaysia and Sri Lanka. This is probably due to the fact that financial liberalization in Malaysia and Sri Lanka based on market principles began relatively early. For Indonesia, Korea, Nepal, the Philippines and Thailand, major deregulation packages began only in the early 1980's. ROC-Taipei began its liberalization in the late 1980's. It is thus apparent that the mixed-outcome for interest rates for these SEACEN countries could be attributed to the prolonged regime of financial repression.¹⁰²

In Malaysia, in the 1970's, interest rates of finance companies and commercial banks were formally deregulated in August 1973 and October 1978 respectively. It is also apparent that Malaysia's exchange

102. Valdepeñas (1994) finds for the case of the Philippines mixed-results of the ADF and KPSS tests on interest rate for government securities. He attributes it to the prolonged regime of financial repression. See Valdepeñas, Jr., V.B., *Market-Oriented Central Banking, Staff Papers*, no. 52, The SEACEN Centre: Kuala Lumpur, 1994.

rate control regulations have also been very liberalized.¹⁰³ Theoretically, under a flexible exchange rate regime, a restrictive monetary policy will put pressure on interest rate and hence induce capital inflows. This will cause the domestic currency to appreciate, hence reducing inflationary pressures. However, for Malaysia, empirical evidence suggests otherwise. This is perhaps due to occasional interventions of the central bank to smooth out excessive fluctuations in the exchange rate. Also as mentioned earlier, the link between exchange rate appreciation and prices is apparently not strong. This in line with a study by Bank Negara Malaysia¹⁰⁴ which concludes that the reasons could be due to demand inelasticity, market structures and the reluctance of traders to pass on the benefits to consumers.

One must also distinguish between a permanent increase in interest rates and a temporary one. According to Calvo and Vegh (1995),¹⁰⁵ a permanent increase in interest rates would lead to a permanent appreciation in exchange rate while a temporary increase in interest rates would initially lead to an appreciation the currency. However, the domestic currency will eventually depreciate below the level prior to the appreciation. This is perhaps another reason why interest rate policy is effective in Malaysia. The interest rate variable for the annual series for the period 1970-1994 is stationary suggesting that interest rate is indeed relatively stable during this period.

103. Kim D.H., *The Effects of Foreign Participation in the Financial Sector of the SEACEN Countries*, The SEACEN Centre, 1995.

104. Bank Negara Malaysia, *Annual Report*, 1993, pp. 315-320.

105. Calvo G.A., and Vegh C.A., *Fighting Inflation with High Interest Rates: The Small Open Economy Case Under Flexible Prices*, *Journal of Money Credit and Banking*, vol. 27, no. 1, February 1995, pp. 49-66.

Chapter 6

TOWARDS A MORE EFFECTIVE MANAGEMENT OF INFLATION IN THE SEACEN COUNTRIES

1. Monetary Policy

The main objective of financial liberalization calls for more efficient use of real and efficient resources amongst financial economic users.¹⁰⁶ Financial liberalization which alters the nature of the banking system and credit policies can induce a change in the structural relationship between inflation and other economic variables. This is supported by Hamann (1993)¹⁰⁷ who notes that 'financial reforms entailed greater exchange rate flexibility, liberalization of interest rates and the emergence of new financial instruments ... [and] [as] a result, both exchange rate and interest rates could be expected to play an increasingly important role in the transmission process.' Financial liberalization can also change the expectations of the markets and according to the Lucas critique,¹⁰⁸ the changing expectations can affect how the economy operates.

In the past, the SEACEN countries relied on more direct instruments such as direct commercial banks' credit control, import tariff and direct price controls to control inflation. However, following financial liberalization, these traditional instruments had become less effective. For example, direct control of credit of commercial banks does not necessarily lead to a reduction in liquidity as they could always source their funds overseas.¹⁰⁹ Currently, a host of additional instruments are available to the central banks in their conduct of monetary policies. Open market operation (OMO) has become a main instrument. In many SEACEN countries, several measures were taken to enhance the

106. Kim, D.H., *The Effects of Foreign Participation in the Financial Sector of the SEACEN Countries*, The SEACEN Centre, 1995.

107. Hamann J., *Financial Liberalization and the Information Content of Money in Indonesia, Korea and the Philippines*, *Working Papers*, International Monetary Fund, November 1993, p. 21.

108. Lucas R.E., *Economic Policy and Evaluation in Karl Brunner and Alan Meltzer (eds), The Phillips Curve and Labour Markets*, vol. 1, Carnegie-Rochester Conferences on Public Policy, Journal of Monetary Economics, Suppl., 1976, pp. 19-46.

109. Patrawimolopon P., Country Chapter.

effectiveness of OMO. These measures included increasing the frequency of issuance of securities, raising the maximum level for security rediscounting, extending the maturity of securities, lowering the nominal value and increasing the upper limit for the utilization of inter-bank funds. Indonesia, Korea, Malaysia, the Philippines, Sri Lanka and Thailand have actively used OMO to curb liquidity.

It is apparent that financial liberalization has led to an increase in capital mobility. Thus, the task of macroeconomic management, in particular managing inflation, has become increasingly arduous and complicated. Interest rate policy per se, traditionally believed to be an effective instrument in controlling inflation may not necessarily remain viable as interest rate differentials may sway movement in capital flows. For example in 1993, Malaysia's relatively high interest rates were causing inflows of speculative capital and the authorities had to introduce several unconventional measures to contain inflationary pressures as a result of excess liquidity generated by the capital inflows. Such measures included the redefinition of the eligible liabilities base of banking institutions to capture all foreign funds inflows, the setting of an upper ceiling by the Central Bank for net non-trade related external liabilities after deducting inflows of commercial banks, and requiring for commercial banks to deposit with the Central Bank the Ringgit funds of foreign banking institutions held in non-interest bearing vostro accounts. Furthermore, all residents were prohibited under the Exchange Control Act, 1953, from selling short-term monetary instruments (those deemed to be monetary policy instruments used by the central bank to influence liquidity - Bank Negara bills, Treasury bills (T-bills), government securities (including Islamic securities) with remaining maturity of one year or less, Cagamas (Housing Cooperation) bonds with remaining maturity of one year or less, bankers acceptances and negotiable instruments of deposits) to non-residents. This restriction also included private debt securities (including commercial papers but excluding securities convertible to ordinary shares) with remaining maturity of one year or less. However, interest rates were maintained at the relatively high level through higher reserve requirement ratio.

Our empirical findings indicate that the authorities should be consistent in their interest rate policy once it is decided that interest rate policy would be used to curb liquidity in order to dampen inflationary pressure. A reduction in interest rates in the case of Malaysia may have the desired result of curbing speculative capital inflows but it will also

create the expectation that the authorities have somewhat 'softened' on their stand on inflation.¹¹⁰

Interest rate is also found to be one of the causes of inflation. For some SEACEN countries, it seems that an increase in interest rates transmits into higher production cost, leading to a markup of goods and services. For these countries, a gradual reduction of interest rates may be desirable in order to break down the expectation of the markets. In such a case, additional direct quantitative measures should be implemented to absorb any excessive liquidity. It is worth noting that despite the availability of market-oriented instruments, direct instruments remain effective. This may include setting upper ceiling on the Treasury's deposits maintained with the commercial banks. For example, in Indonesia, during the Gulf War crisis in 1990/1991, Rp. 8.1 trillion from state-owned enterprises' and agencies' deposits with domestic banks was converted into special Bank Indonesia Certificate (SBI). Malaysia has also occasionally shifted government deposits between the Central Bank and the commercial banks in order to either increase or reduce liquidity in the banking system. It has also on several occasions centralized the Employees Provident Fund excess funds with the Central Bank. In Nepal, the Central Bank has issued directives for commercial banks to restrict overdraft credit facilities and also allowed commercial banks to charge penal interest on expiry of repayment period. Occasionally, there were regulations to restrict disbursement of loans to non-productive activities. These measures included restricting loans for hoarding or speculative purposes. Others included limiting loans on hire-purchases for motor vehicles and tightening eligibility criterion for the issuing of credit cards.

2. Exchange Rate Policy

There is little doubt that external shocks have tremendous impacts on the domestic economy.¹¹¹ This is especially true for the SEACEN economies which rely heavily on the foreign sector. These were par-

110. Bank Negara Malaysia only allowed interest rate to edge slightly downwards to narrow the interest rate differentials.

111. Wijnbergen (1991) notes that 'external shocks can destroy consistency between fiscal programmes and inflation targets, causing reserve losses, exchange rate changes and higher inflation.' See Wijnbergen S., *Fiscal Deficit, Exchange Rate Crisis and Inflation*, *Review of Economic Studies*, June 1991, pp. 81-91.

ticularly evident during the two oil-shocks. Financial liberalization has also enhanced the price mechanism in the foreign exchange market. This may generate a vicious cycle involving the exchange rate and the domestic prices.¹¹² Evidence suggests that the exchange rate is an important determinant of price stability for Indonesia, Korea, the Philippines, Singapore, Sri Lanka, ROC-Taipei, and Thailand. This is hardly surprising given the relative high degree of 'openness' of the external sector in these countries. However, except for Singapore, the exchange rate is never explicitly used to control inflation.

It is noted that the openness of the Singapore economy makes interest rate uncontrollable.¹¹³ In the case of Singapore, it is argued that a 'weak currency would merely lead to a temporary improvement in export competitiveness [as] over the medium-to-long term, wage increase in response to higher CPI increases and a tighter labour market would negate any short-term gains in competitiveness.¹¹⁴ Hence, for Singapore, exchange rate policy is a relatively more effective anti-inflationary instrument than monetary policy. A lesson to be learned from Singapore is that it has always discouraged the internationalization of the Singapore Dollar as it may lead to increased volatility of the currency.¹¹⁵

3. Fiscal Policy

The relationship between money creation and budget deficit is almost a direct one in a less developed financial market while in a more developed financial market, the linkage is less obvious.¹¹⁶ The reason is that in a relatively less developed financial market, the market is not sufficiently developed to absorb the persistent increase in government debt and hence the central bank is 'forced' to purchase much

112. Kim Seung-Hwan, Country Chapter.

113. Soekarni M., ***Financial Reforms and Transmission Mechanism of Monetary Policy in the SEACEN Countries***, The SEACEN Centre, 1995.

114. Liang L.C., Country Chapter.

115. Soekarni M., ***Financial Reforms and Transmission Mechanism of Monetary Policy in the SEACEN Countries***, The SEACEN Centre, 1995.

116. Protopadakis A., and Siegel J.J., *Are Government Deficits Monetized?*, ***Business Review***, Federal Reserve Bank of Philadelphia, November/December 1986, pp. 13-22.

of the debt, resulting in an increase in monetary base and hence money supply. In this case, the budget deficit becomes the main determinant of the rate of growth in money supply. However, in these circumstances, the government could also borrow abroad. On the other hand, in a relatively more developed financial market, the market may be able to absorb most of the debts resulting in a less obvious linkage between budget deficit and rate of growth of money supply.

Monetization of the deficit occurs when a central bank creates money to finance government deficit. There are two possible reasons why excess rate of growth of money supply and debts are related. Firstly, if the rate of growth of debt is greater than zero, the government may find it difficult to sell any additional debts at the prevailing interest rates. Raising interest rates to attract buyers could crowd out investment and ultimately economic growth will be impeded. Therefore, central banks eager to maintain economic growth may be tempted to monetize these debts instead.

Moreover, if there is a strong linkage between inflation and money supply, central banks may be tempted to reduce the burden of debt by increasing the rate of increase of money supply since inflation imposes a sort of tax to transfer resources from money holders to the government. However, in the longer run, only the unanticipated inflation would reduce the burden of debts because as soon as inflation is fully anticipated, economic agents would have incorporated anticipated inflation into the interest rates. Hence, the effects of policymakers trying to stay ahead 'of the expectations of [economic agents often lead] to a continuously accelerating inflation.'¹¹⁷ Moreover, Corfield and Rae (1992)¹¹⁸ also argue that a 'high and persistent fiscal deficit increases the probability of monetizing the deficit in the future.' Moreover, in an effort to realize a higher level of revenue, the government may be tempted to raise tax rates, particularly on indirect taxes. This could lead to inflationary pressure through the cost-push factor.¹¹⁹

On the other hand, a budget deficit which is debt financed may not lead to an increase in inflation in the short run. However, it may

117. Ibid, p. 16.

118. Corfield I., and Rae D., *Inflation - What's that Got to Do with the Price of Fish, Discussion Papers*, Reserve Bank of New Zealand, June 1992.

119. Mathema S. R., Country Chapter.

raise future deficits through the accumulation of interest expense. The Olivera-Tanzi effect, which states that fiscal deficit is dependent on the rate of inflation, may be the cause of persistence in inflation. Higher inflation reduces tax revenue of the government which in turn leads to higher deficit and this may generate a 'spiral' effect.

Based on Edwards and Tabellini (1991),¹²⁰ an inflation tax barometer is computed. From Chart 6.1, it is apparent that apart from the two oil-shocks, the inflation tax revenue of the SEACEN countries is relatively small. However, for Myanmar and Nepal, there is evidence that the inflation tax is trending upwards. Indonesia, Singapore and ROC-Taipai have been experiencing consistent balanced/surplus budgets. On the other hand, Malaysia achieved its first balanced budget in 1992, Thailand in 1991 and for the Philippines, the first time in twenty years, a surplus budget in 1994. For these countries, the fiscal stance provides the strongest possible signals to economic agents that the government is taking the initiative to contain inflationary pressures. It may also be necessary to reschedule large government projects to lessen the impact on inflation. Inefficient public enterprises should also be privatized to reduce the expenditure burden of the government.

4. Moderating Economic Growth

There is also a need to boost output for several SEACEN countries. An increase or decrease in production per se does not necessarily have an impact on inflation. For an increase in output to put pressures on inflation, it has to be accompanied by supply-side and infrastructure bottlenecks. On the other hand, an increase in production together with a well-placed distribution system to alleviate supply bottlenecks could have a negative impact on inflation. For example, a major problem in Nepal is the lack of extensive transportation and communication networks which has resulted in escalating regional prices. To boost agricultural output, a number of SEACEN countries are taking steps to increase production. For example, in Malaysia, the Central Bank established a fund for food scheme to encourage food production to alle-

120. Inflation tax is defined as inflation rate times the ratio money/GDP. See Edwards S., and Tabellini G., *Explaining Fiscal Policies and Inflation in Developing Countries*, *Journal of International Money and Finance*, 1991, no. 10, pp. s16-s48.

viate food shortages. However, for countries such as Nepal, it is important to realize that any subsidy component incorporated in agri-inputs including agricultural credit may result in a net increase in money supply.¹²¹

However, for countries that consistently experience relatively high economic growth, there is a need to moderate economic growth. Unless economic growth is moderated, there will be inflationary pressures. To moderate the economy while it is over-heating involves several challenges on the part of policymakers. Does moderating economic growth lead to the expectation that a downturn in the business cycle is on its way? If it does, the authorities must ensure that the expectation of the public is not distorted. Furthermore, the government must be motivated enough to take the initiative to pursue balanced/surplus budgets. Perhaps the biggest setback is that prices are sticky downwards. As prices take time to stabilize, the authorities may lose sight of its ex-ante objectives.

5. Labor Market

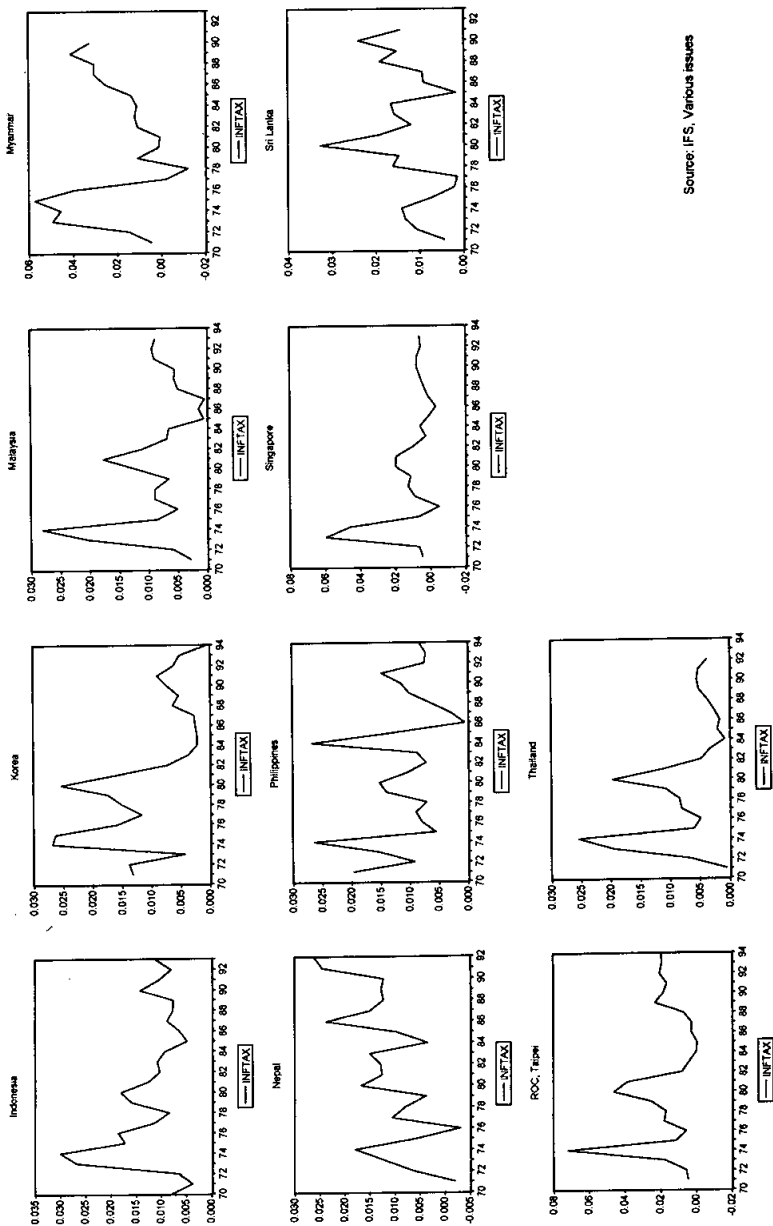
Workers/unions set their nominal wages not only according to actual price increases but also in response to increases in expected prices. Between wages and prices, excessive wage increases could lead to vicious inflationary cycles. Several scenarios can be constructed.¹²² Suppose excess demand is a determinant of inflation. This excess demand could be generated by 'loose' monetary supply or expansionary fiscal policy. If excess demand is less than zero, this does not imply that inflation will not increase. At the very least, workers are interested to maintain their current and anticipated incomes constant. They will take into account their future cost of living. This is in part measured by expected inflation. Thus, when workers demand higher wages, actual inflation will be affected. On the other hand, if excess demand is greater than zero, wages would be bid up as employers tend to offer higher wages in order not to lose any workers.

Indexation of wages, a form of wage contract whereby wages are pegged to changes in the cost of living often measured by the consumer price index, is a popular de facto system in the SEACEN coun-

121. Mathema S.R., Country Paper.

122. Humphrey T.M., *Some Controversies in the Theory of Inflation in Essay on Inflation*, Third Edition, Federal Reserve Bank of Richmond, 1982.

Chart 8.1
Inflation Tax



Source: IFS, Various issues

tries. The argument for this kind of indexation is that the purchasing power would be preserved. The argument against it is that it could lead to a perpetual spiral effect, linking wage increase to inflation. If productivity drops, then indexation could also lead to an increase in unemployment. Horrigan (1981)¹²³ argues that if the main reason why government refuses to implement anti-inflationary policies is that it may cause a recession, then indexation 'facilitates an anti-inflationary program by reducing its costs.' However, the relationship between indexation and employment is a complicated one. He further argues that indexation can moderate fluctuations in employment caused by a demand shock but in the presence of a supply shock, it does the opposite. A demand shock will lead to an increase in prices but it does not affect productivity. On the other hand, a supply shock will reduce productivity. Therefore, real wages must fall to maintain the prevailing level of employment. Since indexation causes wages to be sticky downwards, a drop in employment is inevitable.

Formal long-term contracts¹²⁴ which could introduce an element of persistence in the inflation rates are uncommon in the SEACEN countries with weak unions and large informal sectors. However, periodic adjustments of salaries of civil servants are common. While it may be true that the quantum of these adjustments is often used as a yardstick for the private sector, in the SEACEN countries excessive wage demand pressures are often associated with the shortage of labor, rather than inflationary expectations. Malaysia, Singapore and ROC-Taipei, have pursued relaxed immigration policies as temporary measures to arrest the problem of shortage of labor. However, it is recognized that in these countries, unless economic growth moderates, labor shortage will

123. Horrigan B., *Indexation: A Reasonable Response to Inflation*, **Business Review**, Federal Reserve Bank of Philadelphia, September/October 1981, pp. 3-11.

124. Long-term contracts could be seen as a form of indexation. According to Solimano (1990), indexation may in fact help to serve as a 'guideline....and acts as an anchor that may help to prevent a price explosion in the phase of price decontrol.' If actual inflation is falling but not the expectation of it, workers would have demanded higher wages as their demand is based on their expectations of inflation, not the actual inflation rates. Indexation in this case helps to overcome the spiral inflation. Once the economy has stabilized, it makes sense to let the markets gradually determine the equilibrium level of wage rate. However, which indices to use as a yardstick remains ambiguous. See Solimano A., *Inflation and the Costs of Stabilization: Historical and Recent Experiences and Policy Lessons*, **The World Bank Research Observer**, vol. 5, no. 2, July 1990, p. 181.

be a persistent problem. In these circumstances, it is very likely that some forms of increase in compensations may be unavoidable.

However, Hill and Robinson (1989)¹²⁵ note that 'increase in wages are not the root cause of inflation.' Although wages can serve as a leading indicator of inflation, one has to bear in mind that wage growth, because of its short lead time and potential measurement problems should not be relied upon exclusively as a guide for monetary policy.¹²⁶

6. Building-Up a Social Consensus

In price stabilization process, policymakers are faced with the prisoner's dilemma.¹²⁷ An unstable equilibrium exists when price setters do not increase the prices of their goods and services (Chart 6.2). In this case, every price setter suspects that the others will inflate even if he/ she does not. If price setter A inflates but not price setters B, then B will lose out. On the other hand, if price setter B does not inflate, then it is likely that A will. Therefore, the optimal strategy for both of them is to inflate. Both price setters reap rewards and the cost of inflation is distributed throughout the entire society. This can be easily generalized to the case of more than two producers.

In many cases, price setters take advantage of the expectation that prices are sticky downwards. For example, the reduction of import tax and/or exchange rate appreciation should have resulted in lower prices of imported goods. However, in such circumstances, price setters, aiming for larger profits, will be reluctant to pass on the benefit of price reductions to consumers. Thus, inflation according to Henry Wallich 'is like a country where nobody speaks the truth.'¹²⁸

125. Hill J.K., and Robinson K.J., *Money, Wages, and Factor Scarcity as Predictors of Inflation*, **Economic Review**, Federal Reserve Bank of Dallas, May 1989, pp. 21-29.

126. Hill J.K., and Robinson K.J., *Money, Wages, and Factor Scarcity as Predictors of Inflation*, **Economic Review**, Federal Reserve Bank of Dallas, May 1989, p. 28.

127. Corfield I., and Rae D., *Inflation - What's that Got to do with the Price of Fish*, **Discussion Papers**, Reserve Bank of New Zealand, June 1992.

128. Wallich H., as quoted in *The Case for Price Stability, The First London School of Economics Bank of England Lectures, given by the Governor at the LSE on 11 November 1992*, **Quarterly Bulletin**, Bank of England, November 1992, p. 447:

Chart 6.2
A PRISONER'S DILEMMA
of Anti-Inflationary Policy

Price Setter A

	INFLATE	DO NOT INFLATE
INFLATE	Both reap Rewards Society pays for costs of Inflation 'Stable' equilibrium	B reaps Rewards A loses out Unstable equilibrium
DO NOT INFLATE	A reaps Rewards B loses out Unstable equilibrium	Price Stability-Society gains but both have expectations that the other party will inflate Unstable equilibrium

Price Setter B

If price setter A inflates, price setter B will follow suit because B will lose out if he does not inflate and vice versa. Both are inclined to inflate their prices because of the rewards they both could reap by doing so. However, if both do not inflate, it will be an unstable equilibrium as each suspects the other will inflate.

Building-up a social consensus according to Fortin (1991)¹²⁹ is the key part of any anti-inflationary policy. Funke and Hall (1994)¹³⁰ also note that the absence of inflationary spiral in Germany could be attributed to the fact that price setters and wage bargainers setting moderate targets. How do we build up a social consensus? Perhaps, the answer lies in consumerism. Consumers must be educated of their rights and price setters their obligations. In Korea, the Price Stabilization and Fair Trade Act was enacted in 1975. In Malaysia, there is a Ministry of Consumer Affairs to monitor prices and in Thailand, the Anti-Profiteering Act and the Price-Fixing and the Anti-Monopoly Act aim to prevent profiteering and monopolized activities.

7. Stabilization Policies of Southern Cone Countries

It is also prudent to learn from the experiences of the Southern Cone countries regarding their inflation stabilization programs. The main purpose of stabilization policies for these countries is to 'bring down inflation on a permanent basis and, if possible, at a low economic cost.'¹³¹ A number of lessons could be learned to ascertain why seemingly feasible stabilization program fails in the Southern Cone Countries.

Arce (1994)¹³² points out three reasons why heterodox policies which employ price and wage controls and at the same time exercise fiscal austerity with social responsibility may not work. The first is known as the synchronization problem. Austerity drive, price and wage controls may be discriminatory, in the sense that the allocation of the burden is not uniform. The program will only gain support only if everyone feels that they are 'allocated' a fair share of the costs. This is a form of the prisoner's dilemma. A prime example of this is the Mexico heterodox program which started in 1987 where entrepreneurs

129. Fortin, P., The Phillips Curve, *Macroeconomic Policy and the Welfare of Canadians, Canadian Journal of Economics* 24(4), 1991, pp. 774-803.

130. Funke M., and Hall S., *Is the Bundesbank Different from Other Central Banks, A Study Based on P, Empirical Economics* 19, 1994, pp. 691-707.

131. Solimano A., *Inflation and the Costs of Stabilization: Historical and Recent Experiences and Policy Lessons, The World Bank Research Observer*, vol. 5, no. 2, July 1990, p. 167.

132. Daniel G. Arce M., *Fiscal Policies and the Theory of Conflict Inflation*, The Manchester School of Economics and Social Studies, December 1994. pp. 425-437.

were accused of trying to break down established agreements, thus leading to demands to end wage freeze.¹³³

The second reason is the so-called coalitional agreements. Without enforceable contracts, all parties, including the government will be tempted to deviate from the agreements if they feel that by doing so, they stand to gain. Thus, Solimano (1990)¹³⁴ notes that without credibility, stabilization policies would be extremely costly in the short to medium term. The third reason is the misperception of the government. The government may end the stabilization program when it feels that the economy has stabilized when in fact it has not. This premature ending of the program can cause destabilization. This factor was responsible for the collapse of the Brazilian Cruzado program.¹³⁵

Another way to control inflation commonly used in the Southern Cone countries is to let the exchange rate depreciate less than the inflation rate. This method of using the exchange rate is the nominal anchor approach to control inflation. The exchange rate is normally set to reflect the inflation rates of trading partners. Once the exchange rate is set, monetary and fiscal policies would be determined, i.e., they become endogenous. Corden (1994)¹³⁶ points out that if the policy signals are clear and credible to economic agents, then wages and prices will adjust without much loss of output. Vegh (1992)¹³⁷ also concludes 'an exchange rate-based stabilization program that is fully credible [could reduce] inflation rate instantaneously at no real cost.'

Suppose the government devalues its currency less than the rate of inflation. However, if wages (e.g., in the presence of wage indexation) and prices of non-tradables are slow to adjust, the exchange rate

133. For further discussion, see Navarrete J.E., *Mexico Stabilisation Policy*, **CEPAL Review**, 1990, pp. 31-44.

134. Solimano A., *Inflation and the Costs of Stabilization: Historical and Recent Experiences and Policy Lessons*, **The World Bank Research Observer**, vol. 5, no. 2, July 1990, pp. 167-185.

135. Baer W., and Backerman P., *The Decline and Fall of Brazil's Cruzado*, **Latin American Research Review**, 1989, pp. 35-64.

136. Corden M.W., *Exchange Rate Policy in Developing Countries*, in **Approach to Exchange Rate Policy**, International Monetary Fund, 1994, pp. 65-89.

137. Vegh C.A., *Stopping High Inflation*, **Staff Papers**, The International Monetary Fund, vol. 39, no. 3, September 1992, p. 655.

will appreciate, possibly leading to a disequilibrium of the balance of payments. Furthermore, if the fiscal sector does not adjust then, the disequilibrium could be persistent. However, Arora and Kumar (1994)¹³⁸ point out that 'the more open the economy, the smaller is the real exchange rate appreciation resulting from inflation in the non-traded sector.' In this case, if the Marshall-Lerner conditions hold, the decline in trade balances and hence, reserves, would be smaller. However, in the scenario of capital mobility, if the exchange rate is not credible and if economic agents view that the exchange rate as being overvalued, domestic interest rates will have to increase to mitigate the outflow of capital. As such, monetary policies may have to be so severely restrictive to sustain the exchange rate that 'there are limits to this instrument.'¹³⁹

138. Arora V.B., and Kumar M.S., *Trade Reform and Inflation Stabilization, Working Papers*, International Monetary Fund, November 1994, p. 17.

139. Corden M.W., *Exchange Rate Policy in Developing Countries, in Approach to Exchange Rate Policy*, International Monetary Fund, 1994, p. 84.

Chapter 7

SUMMARY AND CONCLUSION

The common theme relating to anti-inflationary programs in the 1990's appears to be some form of a policy dilemma. With the opening of the capital account, there is increased interaction between interest rates, exchange rate and monetary policies.¹⁴⁰ Domestic policies which have become increasingly dependent on policies of other countries dictate harmonization of monetary, exchange rate and interest rate policies. As we have seen, determined anti-inflationary programs can be thrown off guard by surges in capital inflows. The best solution is to introduce additional measures while maintaining the anti-inflationary policy stance so as to instill elements of credibility and at the same time eliminate uncertainty regarding future inflation rates. We have also seen that external shocks particularly the two-oil shocks and the escalating commodities prices were partly responsible for the inflationary episodes of the SEACEN countries. From the analysis, it can be seen that commodity prices and external shocks triggered off inflation but inflation rates did moderate in most of the SEACEN countries.¹⁴¹

Fiscal consolidation seems to contribute to some extent to the low inflation rates in some of the SEACEN countries. The importance of coordination between fiscal and monetary policy to fight inflation cannot be undermined. As Sargent and Wallace (1981)¹⁴² point out that if the budget deficit is persistent, the central bank cannot by its own policy choices prevent inflation. Thus, the established indirect link between fiscal deficit and inflation through money supply makes fiscal policy a powerful tool in an anti-inflationary program. However, for countries that experience a trade-off between output and prices, a reduction in deficit may cause a fall in output in the short run, inevitably leading to a temporary rise

140. The Bank of Korea, Research Department, **Financial Liberalization and Internationalization in Korea**, 1994.

141. This is in line with Dornbusch and Fischer (1993). They examine several countries which have experienced moderate inflation rates. Dornbusch R., and Fischer S., *Moderate Inflation*, **Economic Review**, The World Bank, vol. 7, January 1993, pp. 1-44.

142. Sargent T.J., and Wallace N., *Some Unpleasant Monetarist Arithmetic*, **Quarterly Review**, Federal Reserve Bank of Minneapolis, 5(3), Fall 1981, pp. 1-17.

in inflation. However, tightening of budget deficit to the non-inflationary financing path is in line with the current exchange rate liberalization.

Giugale and Dinh (1990)¹⁴³ argue that the implied tightening on money creation 'may render the exchange rate controls unnecessary, as agents find the holding of domestic-currency-dominated assets much more appealing, assuming they have confidence, and evidence, that the government sticks to its plan.' For countries that have been persistently running fiscal deficits, a re-composition of government expenditure may be necessary not only to reduce the deficits but also to increase productivity. One such re-composition is the privatization of public enterprises. It is also important not to let the accumulation of deficit grow too large as excessive accumulation of deficits over the years may render fiscal policy unusable for counter-cyclical purposes.¹⁴⁴

As mentioned earlier, even when the right fundamental policies are in place, inflation may still persist.¹⁴⁵ As it is often argued that once the mechanism that initiate inflation is set in motion, the control of inflation becomes a herculean task. For an economy that is consistently experiencing relatively high inflation, *ceteris paribus*, the expectation on future inflation would be likely to be relatively high. In what psychologists term as 'self-fulfilling prophesy', these expectations would feed through to actual inflation. With the SEACEN economies becoming more sophisticated, the issue of credibility becomes of utmost important. If the persistence in inflation is caused by expectation, probably the only viable solution is for the authorities to pursue credible policies in order to break down these expectations.

Macfarlane (1993)¹⁴⁶ discusses three important issues which may influence the rate of inflation in the next millennium. He argues that Asian countries, with large pools of skilled as well as semi-skilled labor,

143. Giugale M., and Dinh H.T., *Money, Inflation and Deficit in Egypt*, **Working Papers**, The World Bank, December 1990, p. 40.

144. The Reserve Bank of Australia, *The Art of Monetary Policy*, Talk by the Governor, B.W. Fraser to the 23rd Conference of Economists, Surfers Paradise, 26 September 1994, **The Reserve Bank of Australia Bulletin**, October 1994, pp. 17-25.

145. Corfield I., and Rae D., *Inflation - What's that Got to Do with the Price of Fish*, **Discussion Papers**, Reserve Bank of New Zealand, June 1992.

146. Macfarlane I.J., *Inflation and Productivity*, **Reserve Bank of Australia Bulletin**, 1993, p. 4.

coupled with the ability of the labor force to adapt quickly to the transfer of technology, would be able to produce cheaper goods, particularly that of manufactured goods. Furthermore, the increased competition from world trade as a result of trade liberalization means that there would be pressure for the non-Asian countries to be more competitive. Globally, this means lower prices. The increased mobility of direct investments also implies that there is a change of power in wage bargaining. Workers in the industrialized countries, especially in high-tech manufacturing, realize that excessive demand would drive employers to relocate their companies to Asia. Also new technology such as computerization would mean lower cost, especially in the services and financial sectors.

Whether one believes in the prophesy of Macfarlane or not, the burden of central bankers in their efforts to manage inflation certainly does not lessen. *The Economist* (1995)¹⁴⁷ states that '[i]nflation's future path depends largely upon the skills of central bankers, many of whom now stand accused of stifling growth with excessively tight monetary policy.' Surely the key to successful implementation of inflation programs in some of the low-inflation SEACEN countries lies in the boldness, swiftness, seriousness and consistency in which the authorities act to control inflation.

147. *The Economist*, *What Happened to Inflation?*, 16 September 1995, p. 89.

APPENDICES

Appendix A

Data Source and Definition

1. Annual Data

All series (except for interest rates) are from various issues of the International Financial Statistics, Yearbook (IFS), various issues. For Sri Lanka, real Gross Domestic Product (GDP) is obtained from the SEACEN Financial Statistics (SFS).

1.1 Sample Size

Korea, Malaysia, Philippines, Singapore, ROC-Taipei and Thailand: (1970-1994)

Indonesia, Myanmar Nepal and Sri Lanka: (1970-1993)

2. Quarterly Data

Real GDP

Indonesia:	Central Bureau of Statistics(CBS)
Korea:	The Bank of Korea
Singapore:	The Monetary Authority of Singapore

Real GNP

Philippines:	IFS

Production Index

Malaysia:	IFS

Exchange Rates:	IFS

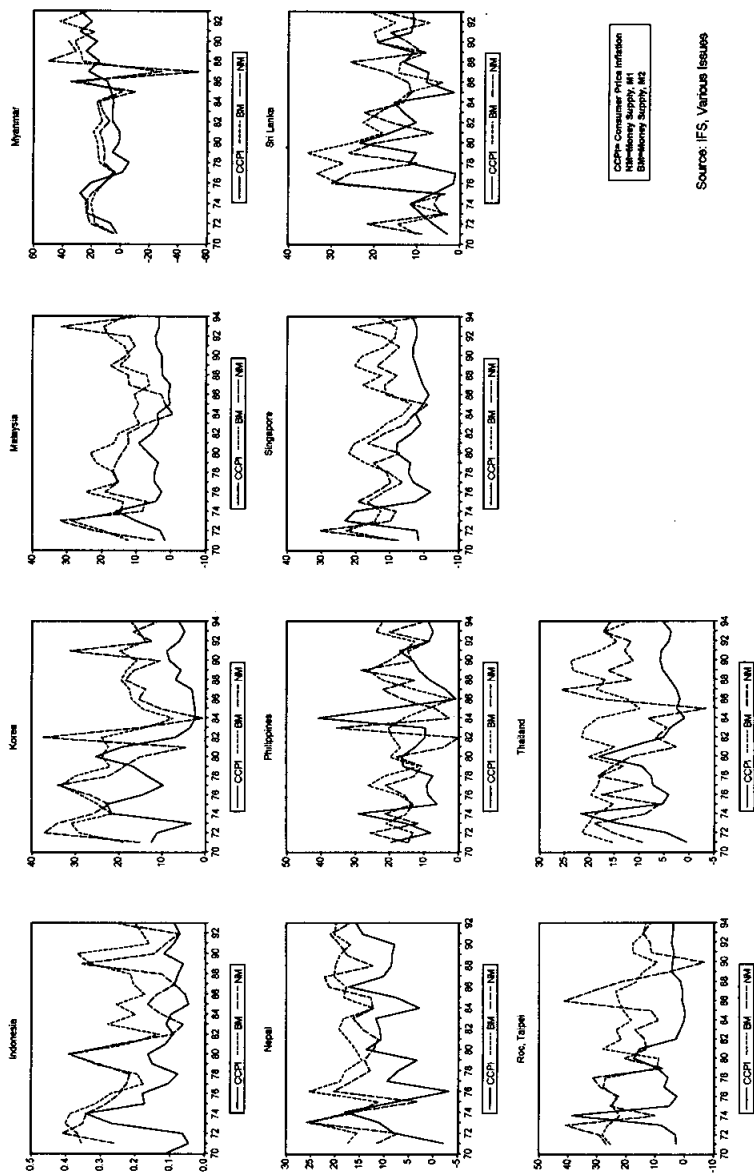
Interest Rates:	Statistical Bulletins and Annual Reports of respective central banks and statistic departments

Prices:	Statistical Bulletins and Annual Reports of respective central banks and statistic departments. The GNP deflator of the Philippines is obtained from the IFS

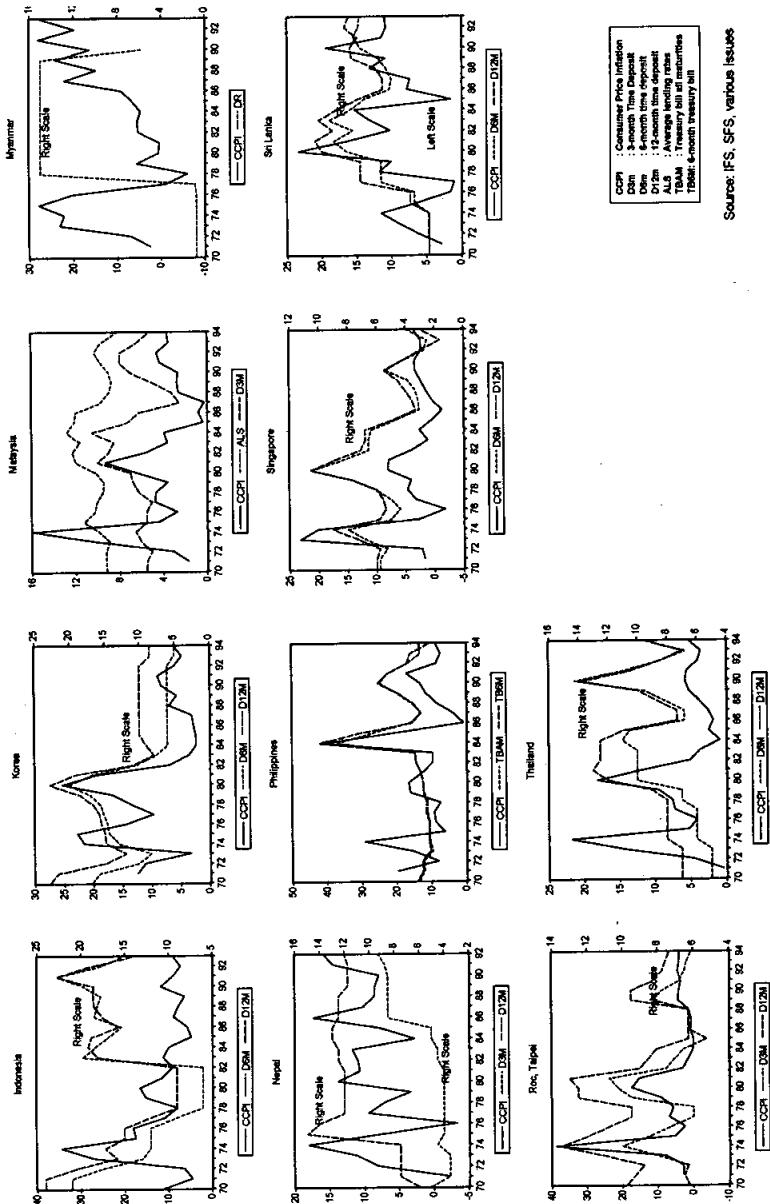
2.2 Sample Size

Indonesia	: (1983.1-1992.4)
Korea	: (1980.1-1994.4)
Malaysia	: (1978.1-1994.3)
Philippines	: (1979.4-1994.4)
Singapore	: (1975.1-1994.4)

Appendix B.1
Consumer Price Inflation and Growth of Money Supply

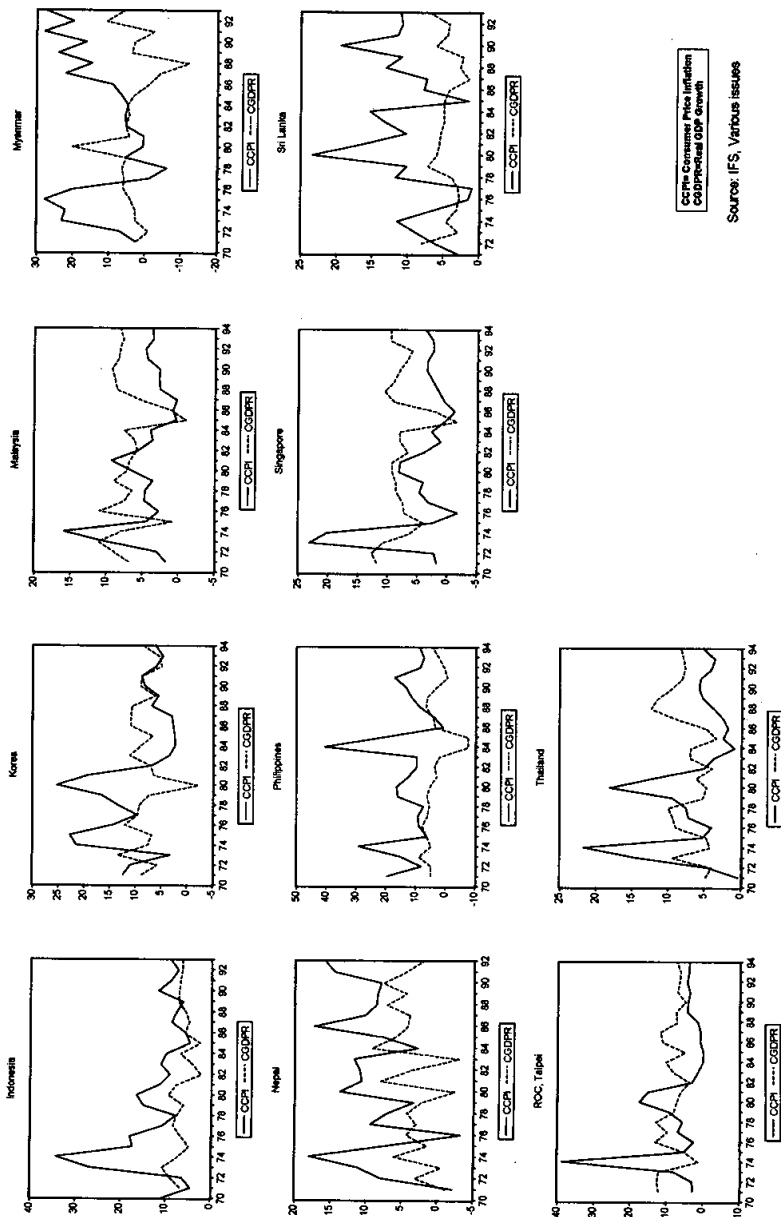


Appendix B.2 Consumer Price Inflation and Interest Rates



Source: IFS, SFS, various issues

Appendix B.3
Consumer Price Inflation and Real GDP Growth

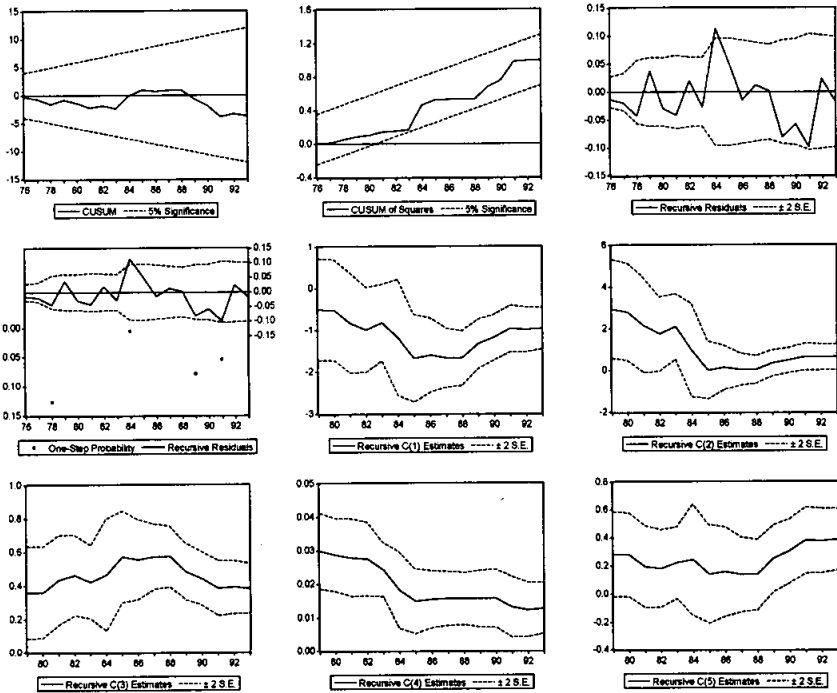


CPI: Consumer Price Inflation
GDP: Real GDP Growth

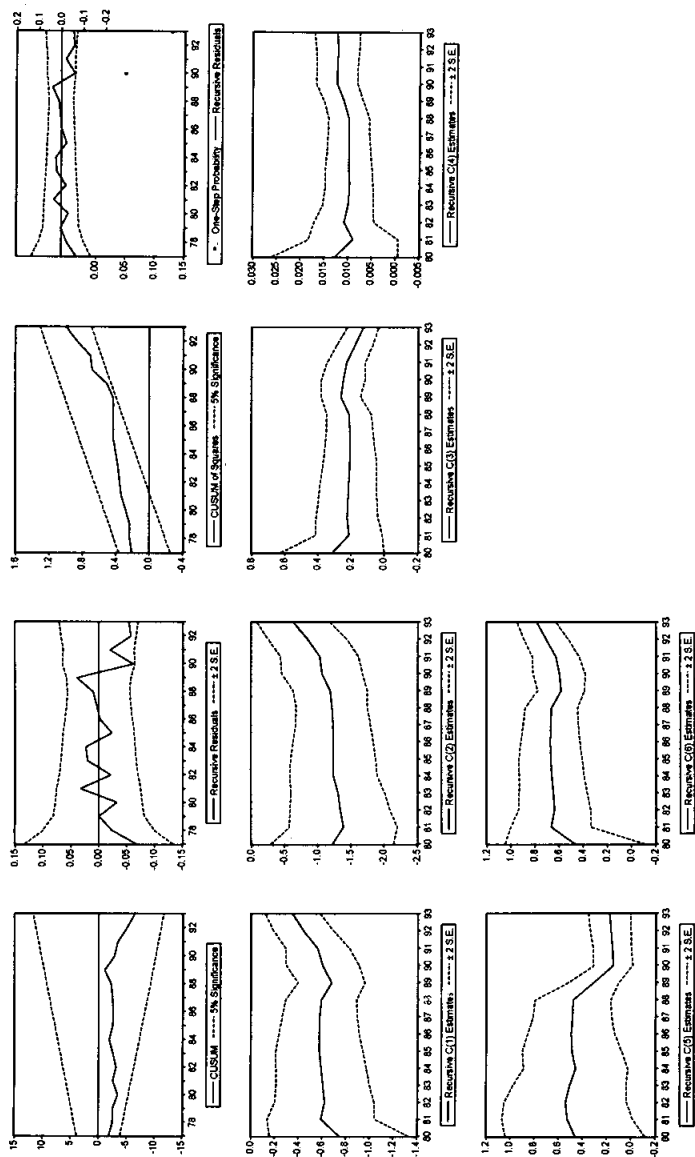
Source: IFS, Various issues

Appendix C.1

Indonesia
Recursive Coefficients/Residuals
 $lgdpd=f(c,lgpr,lm1,d(d12m)lgdpd(-1))$
1970 -1993

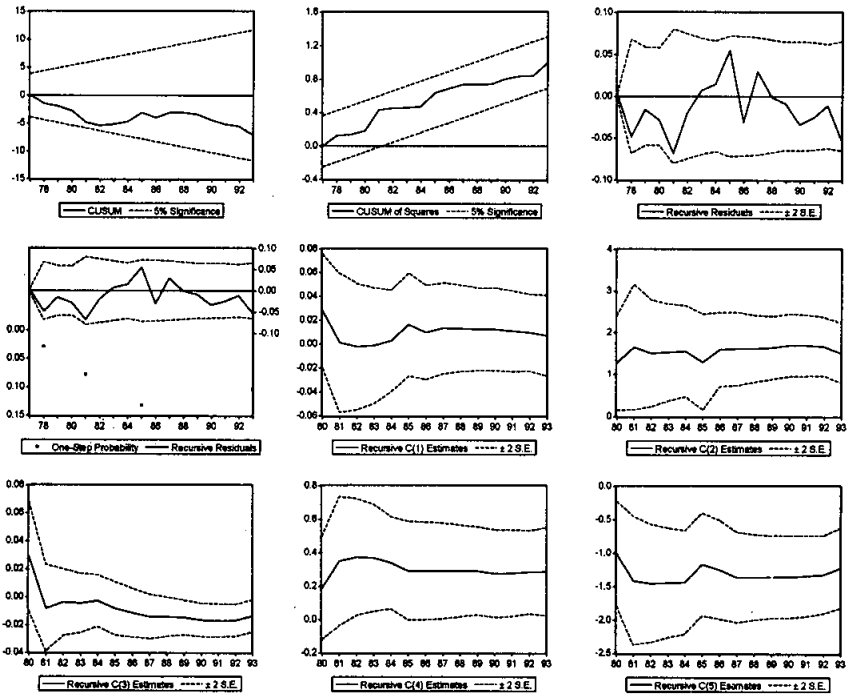


Appendix C.2
Korea
Recursive Coefficients/Residuals
lcp1=c(pri,m1,d12m,d(logme))
1970-1994



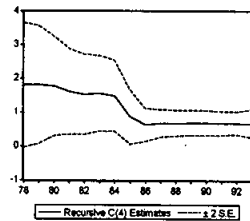
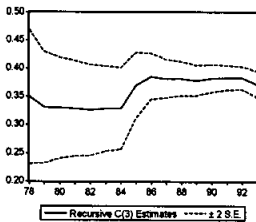
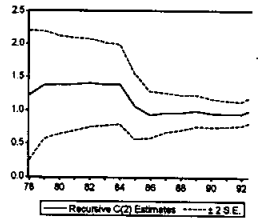
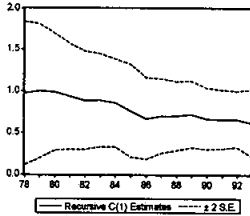
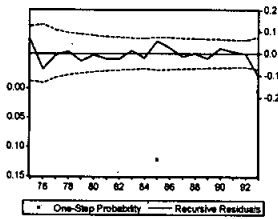
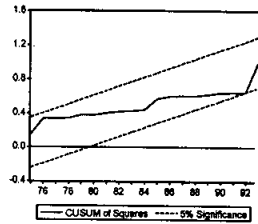
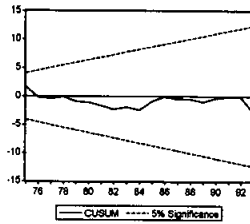
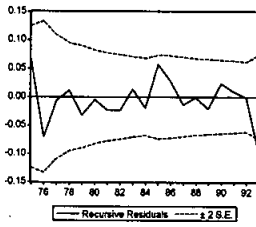
Appendix C.3

Malaysia
Recursive Coefficients/Residuals
 $d(\lgdpd)=f(c,\lgdpr,\lgdpr(-1),d(\ln m1(-1))\ d(3m))$
1970-1994



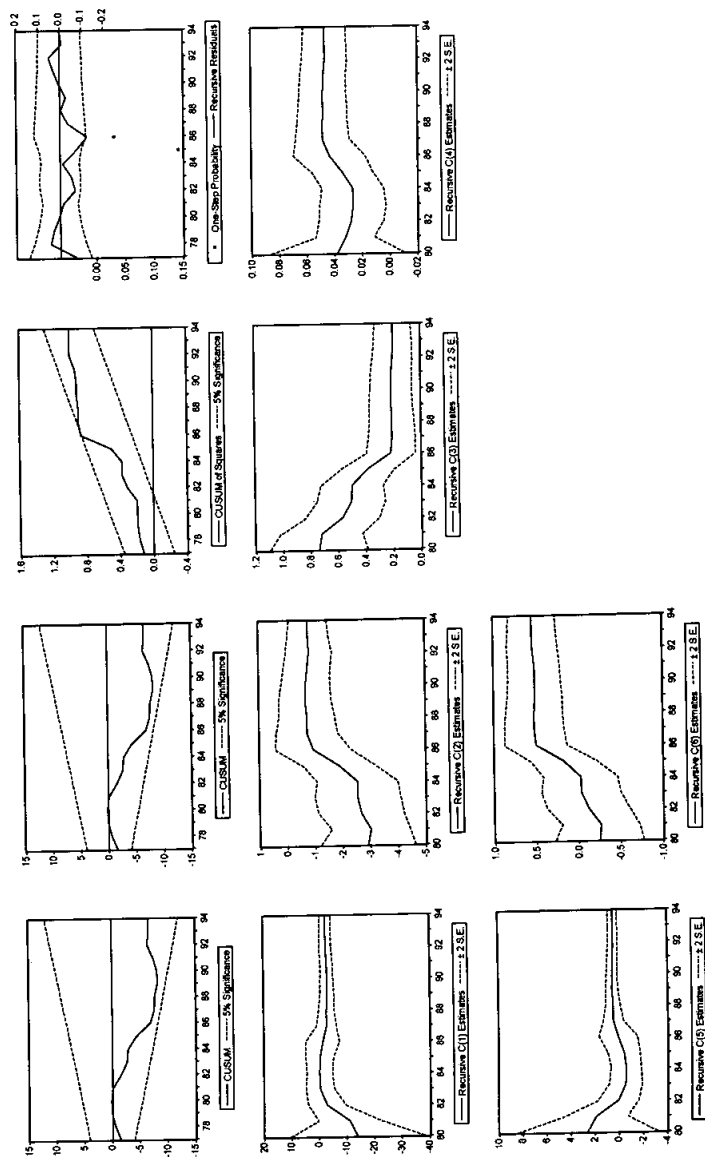
Appendix C.4

Singapore
Recursive Coefficients/Residuals
 $lgdp = f(c, lgdp, im1, dlex)$
1970-1994

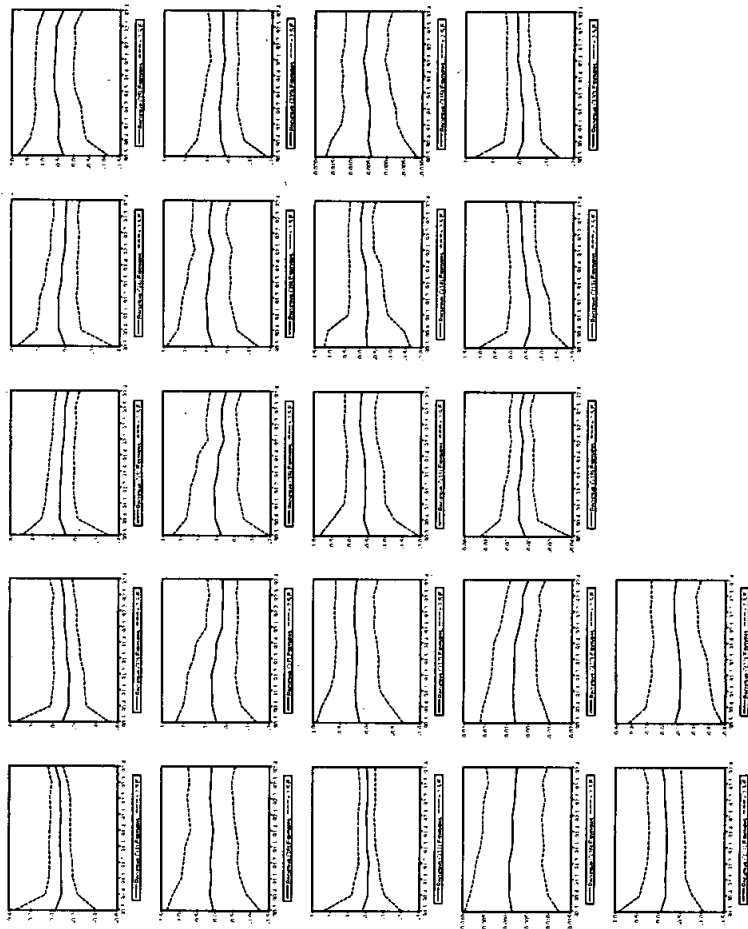


Appendix C.5

ROC, Taipei
Recursive Cointegration (Residuals)
Kp=[cagr,im,b,dm,ret]
1970-1994

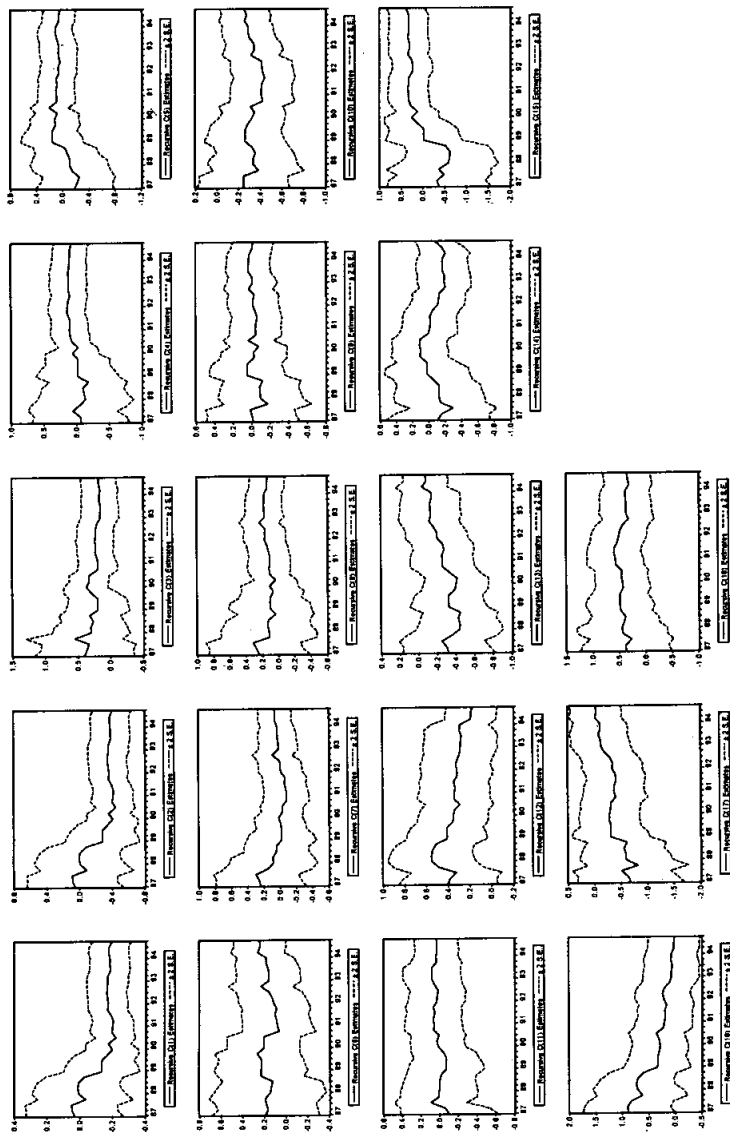


Recursive Coefficients of the Price Equation of the Vector Error Correction Model



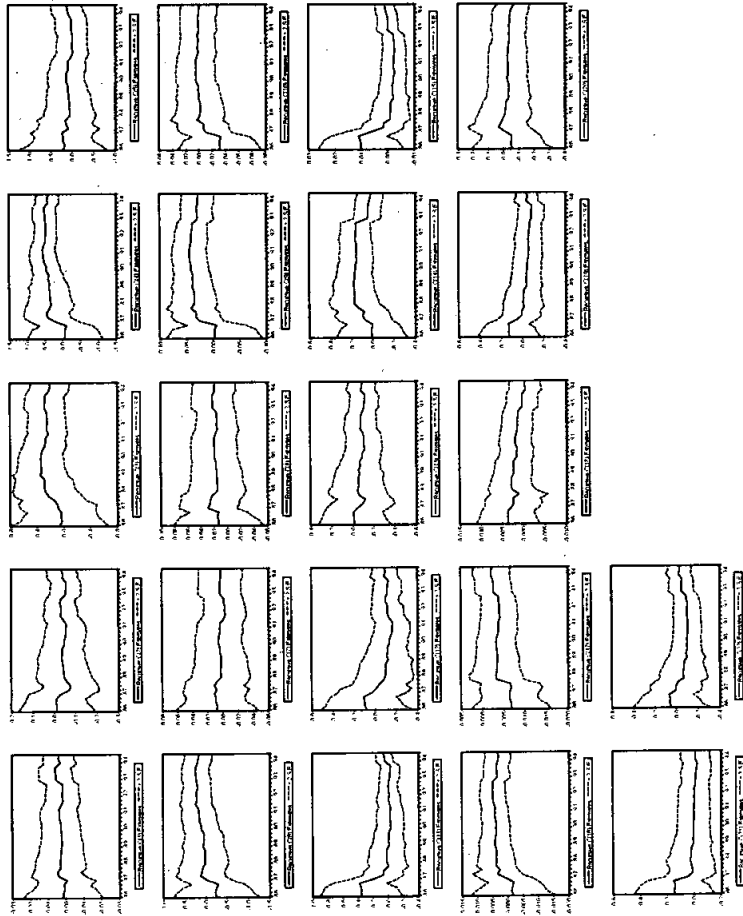
Appendix D.2
Korea

Recursive Coefficients of the Price Equation of the Vector Error Correction Model

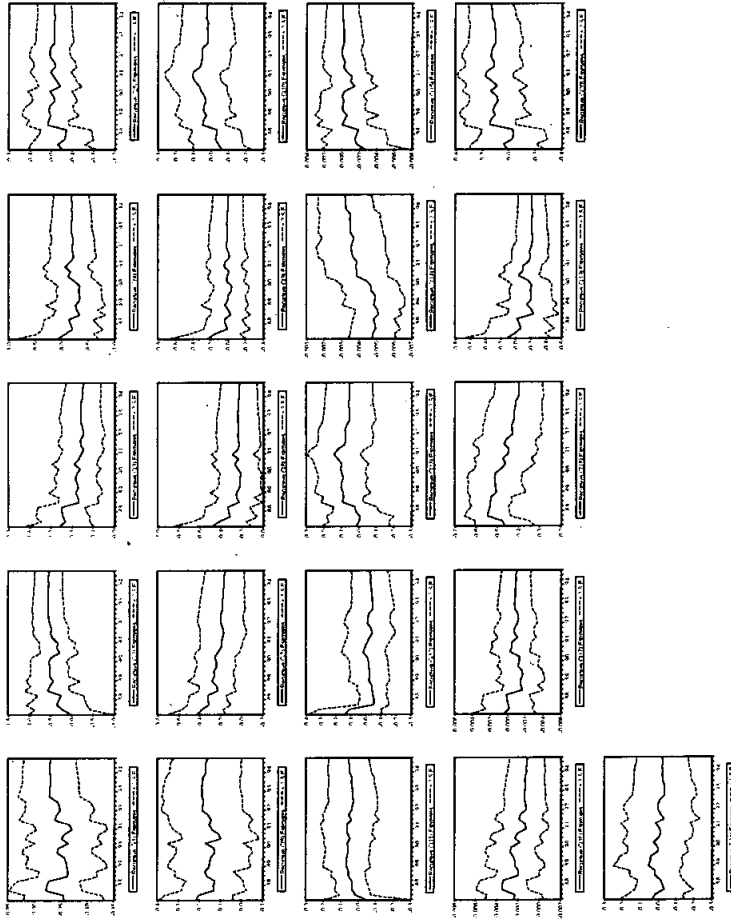


Appendix D.3
Malaysia

Recursive Coefficients of the Price Equation of the Vector Error Correction Model

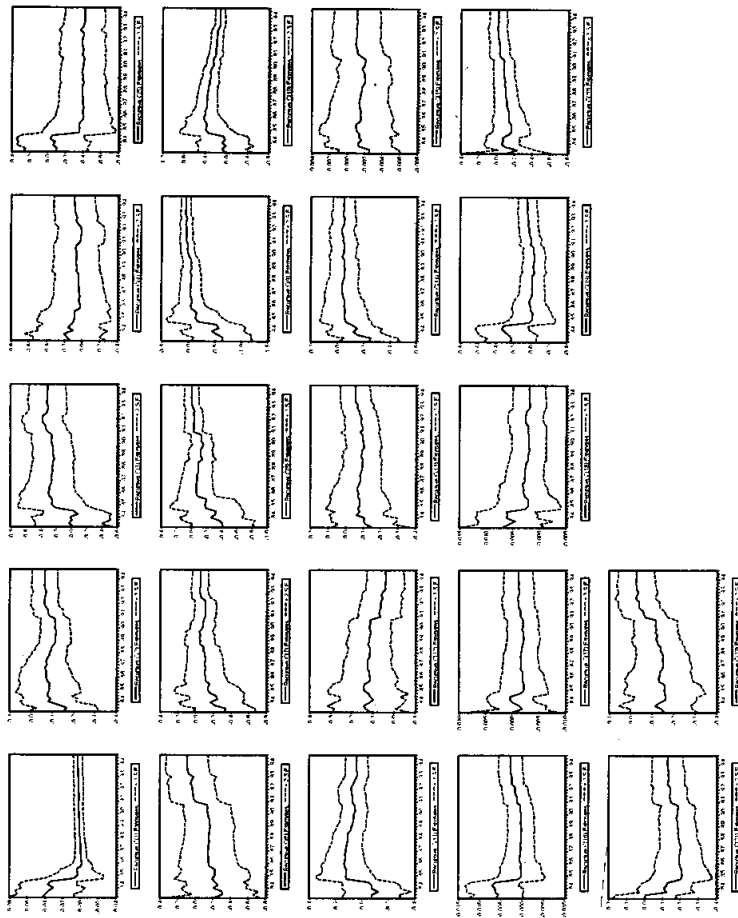


Appendix D.4
Philippines
Recursive Coefficients of the Price Equation of the Vector Error Correction Model



Appendix D.5
Singapore

Recursive Coefficients of the Price Equation of the Vector Error Correction Model



Appendix E

SEQUENTIAL UNIT ROOT TESTS
(ANNUAL DATA)

Variable	Type	Age	Indonesia	Korea 1/	Malaysia 2/	Myanmar	Nepal 3/	Philippines 4/	Singapore	Sri Lanka	ROC, Taipei 5/	Thailand
			ADF	ADF	ADF	ADF	ADF	ADF	ADF	ADF	ADF	ADF
LM1	uc	3	-2.1891	-2.3886	-1.7247	-2.4338	-0.0112	-2.0070	-2.8194	-2.4719	-0.7401	-1.7071
LM1	uc	2	-1.9566	-2.6190	-2.0158	-2.9259	0.8001	-1.7090	-2.8081	-2.6121	-1.8336	-1.7240
LM1	uc	1	-2.8721	-2.8266	-2.8390	-2.2654	-0.9230	-2.4054	-3.5750	-2.5322	-1.9775	-1.8517
LM1	c	0	-1.8449	-1.8013	-1.6581	-2.8093	-1.3411	-2.8956	-5.0428 ***	-2.5619	-1.5062	-1.3775
LM1	c	3	-2.2401	-1.7963	-0.3861	-1.3908	2.2703	-0.1763	-0.2655	-1.1119	-0.5080	-0.7755
LM1	c	2	-2.1875	-2.5437	-0.7812	-0.4367	2.0640	-0.2655	-1.4585	0.1124	-1.9337	0.3618
LM1	c	1	-2.4507	-3.1569 ***	-1.1176	-0.5292	1.4859	-0.6497	-2.1188	-0.3136	-2.0381	0.1380
LM1	c	0	-3.7768 ***	-2.7042 *	-0.6171	-0.4234	1.4832	-0.5858	-3.4809 ***	-0.0506	-2.7414 *	0.3827
LM1	nlnc	3	1.4553	1.2794	2.0264	2.0417	2.8274	1.4195	0.5000	2.1909	2.1636	2.3906
LM1	nlnc	2	1.8973	1.7492	2.7068	2.1622	6.2002	2.6143	0.3518	3.5676	1.8757	2.6894
LM1	nlnc	1	1.5697	2.3275	2.9422	3.4743	5.1061	3.5666	0.1381	4.0173	2.2647	3.2794
LM1	nlnc	0	7.2940	7.6021	7.8173	2.8884	14.7583	6.9926	-0.2827	9.0569	6.9740	8.9613
DL(M1)	uc	3	-1.4470	-1.8313	-1.3175	-1.9075	-1.2184	-1.8208	-3.3195	-2.5523	-3.4881	-2.0902
DL(M1)	uc	2	-2.7743	-2.5192	-1.8617	-1.8869	-2.4945	-2.5833	-4.0118 **	-2.6363	-3.5568	-2.4141
DL(M1)	uc	1	-3.2861	-3.6977 ***	-3.2796	-2.4179	-6.1998 ***	-4.5015 ***	-5.1908 ***	-4.0133 **	-3.2852	-2.9256
DL(M1)	c	0	-3.1537	-5.0143 ***	-3.7119 **	-5.9925 ***	-5.1899 ***	-4.4069 ***	-7.8083 ***	-6.8853 ***	-3.6468 ***	-3.6413 **
DL(M1)	c	3	-1.6291	-1.8009	-1.8050	-2.6256	-0.8100	-2.0004	-3.4481	-2.9536	-2.1355	-2.0569
DL(M1)	c	2	-2.2201	-2.1015	-2.8515	-2.2512	-1.3677	-2.8678	-4.1181 ***	-3.3884 ***	-2.7070 *	-2.9649 *
DL(M1)	c	1	-2.8483 *	-2.8493 *	-3.3779 **	-2.8036	-5.4137 ***	-4.6396 ***	-5.3246 ***	-4.1180 ***	-3.2814 **	-3.8113 ***
DL(M1)	c	0	-2.4481	-3.8154 ***	-3.7210 **	-6.1814 ***	-4.7039 ***	-5.5094 ***	-7.9981 ***	-8.4042 ***	-6.7090 *	-2.9649 *
DL(M1)	nlnc	3	3.8622	-1.3114	-0.5332	-0.7166	0.3648	-0.7652	0.3671	0.2140	-0.9027	-0.4050
DL(M1)	nlnc	2	-1.1085	-1.3552	-1.1170	-0.6434	0.0963	-0.7246	-1.4329 ***	-0.3532	-1.8641	-0.7380
DL(M1)	nlnc	1	-1.3690	-1.3807	-1.3291	-1.2482	-0.3411	-1.2422	-5.3884 ***	-1.1386	-1.4281	-0.874
DL(M1)	nlnc	0	-1.0177	-1.4603	-1.5110	-3.9328 ***	-0.9232	-0.2049 **	-8.1353 ***	-1.4632	-1.7122 *	-1.3301
LM2	uc	3	-3.4219	-1.7187	-2.2518	-1.6976	-1.0014	-1.7771	-3.6131	-2.8157	-0.5277	-3.2876
LM2	uc	2	-3.4195	-1.4729	-2.8022	-1.4328	-1.5055	-2.0226	-3.5302	-2.7555	-0.6954	-4.1010 **
LM2	uc	1	-3.0869	-2.1877	-2.3001	-0.5756	-2.3488	-3.1153	-4.3475 **	-2.0634	-1.3436	-3.6586 **
LM2	uc	0	-2.8300	-0.8410	-1.4346	-1.0246	-2.6136	-1.7581	-1.9670	1.1428	-0.9971	-2.3187
LM2	c	3	-1.6886	-1.5665	0.0914	1.1173	1.1057	0.3882	-0.5245	-1.2045	-2.4982	-0.3170
LM2	c	2	-2.0138	-2.2348	-1.7294	0.9136	0.2194	-0.0322	-0.0594	-0.5555	-2.8394 *	0.5894
LM2	c	1	-1.7781	-3.0105 ***	-1.9909	1.1239	0.4300	0.1889	-1.0401	-0.5018	-2.4137	-1.0072
LM2	c	0	-3.0285	-4.2123 ***	-2.1297	1.1371	0.4105	0.4848	-0.8151	-0.1240	-3.5339 **	-0.7487
LM2	nlnc	3	3.1516	0.6885	1.4435	1.8410	2.4198	2.0544	2.7485	1.8647	1.2663	1.2625
LM2	nlnc	2	1.8804	1.2303	1.8074	2.2126	2.7542	2.5036	3.0886	1.5117	1.9523	1.1801
LM2	nlnc	1	1.6164	1.0038	2.1694	4.2571	3.9041	2.2843	2.5903	2.1454	1.9471	1.9471
LM2	nlnc	0	10.0336	11.0394	11.5521	5.8851	21.4884	11.9821	11.5129	8.8370	12.6843	15.0431
DL(M2)	uc	3	-2.6258	-1.9058	-1.2953	-1.4791	-2.5818	-2.5178	-4.4854 **	-2.8689	-2.6103	-3.1125
DL(M2)	uc	2	-3.1802	-1.7805	-0.8722	-1.8310	-3.3303	-3.1102	-3.2450	-2.1536	-3.3728	-3.4554
DL(M2)	uc	1	-3.8581	-2.8002	-2.8582	-2.2608	-4.8387 ***	-4.0168 **	-3.3832	-1.7868	-4.4407 ***	-2.8189
DL(M2)	uc	0	-3.2802	-3.3578	-3.4720	-5.2632 ***	-5.2829 ***	-3.0754	-3.2362	-2.4982	-3.8058 **	-3.6556 **
DL(M2)	c	3	-2.8716	-0.9527	-1.4596	-1.5377	-2.4834	-2.2964	-4.8185 ***	-2.6489	-1.4001	-3.2468 **
DL(M2)	c	2	-2.7408	-1.3092	-1.6755	-1.2780	-3.2649 ***	-3.1818 **	-3.3013 *	-2.0695	-2.0444	-3.5537 **
DL(M2)	c	1	-3.0180 **	-2.0414	-2.4488	-2.0500	-0.5748 ***	-4.1261 ***	-3.5837 ***	-3.7000 ***	-2.8986 *	-3.8378 **
DL(M2)	c	0	-2.8278 *	-1.9556	-2.9585	-5.0638 ***	-5.3734 ***	-3.1242 **	-3.1789 ***	-2.5530	-2.8986 *	-3.8378 **
DL(M2)	nlnc	3	1.3021	-0.7705	-0.5893	-0.0408	-0.0032	-0.0449	-0.8100	-0.5383	-1.0277	-0.8198
DL(M2)	nlnc	2	-1.2545	-1.1469	-1.0011	-0.2477	-0.3336	-0.5020	-0.8454	0.3025	-1.0523	-0.7888
DL(M2)	nlnc	1	-1.1015	-1.0368	-0.8009	-0.4833	-0.1288	-0.5318	-1.2686	-0.5379	-1.1421	-0.8010
DL(M2)	nlnc	0	-1.1077	-0.6065	-0.8286	-2.3377 **	-0.5373	-0.6133	-0.8406	-0.8345	-1.0960	-0.6990
LGDP	uc	3	-1.8182	-2.4768	-1.8836	-2.6638	-0.4076	-1.9590	-2.0005	-2.7550	-1.3573	-1.8324
LGDP	uc	2	-2.3411	-2.6272	-2.0857	-1.9451	-0.6815	-2.3472	-2.9433	-3.0857	-2.1075	-1.0803
LGDP	uc	1	-2.7405	-2.3610	-2.3938	-1.3968	-1.2637	-2.5855	-3.6213	-2.2516	-2.9795	-1.7133
LGDP	uc	0	-0.0809	-1.8996	-1.7176	-0.9814	-2.1405	-1.6104	-2.8001	-1.7335	-2.5726	-1.0259
LGDP	c	3	-0.2148	-0.1007	-0.3938	-1.5176	1.9546	-1.4336	0.1366	0.1893	-0.8353	1.3220
LGDP	c	2	-1.4238	-0.7851	-0.1198	-1.3738	2.5675	-2.1740	-0.2593	0.2036	-1.0752	0.6558
LGDP	c	1	-1.5851	-0.4907	-0.3559	-1.0686	1.7240	-1.3350	-0.1727	0.8016	-1.7886	1.8116
LGDP	c	0	-1.9667	-0.9929	-0.3740	-0.9951	1.3239	-2.5202	-1.1059	-0.3333	-3.3349	2.3129
LGDP	nlnc	3	2.0036	2.4152	2.2451	1.1750	2.7532	1.3008	2.9998	2.2431	3.4717	3.2706
LGDP	nlnc	2	2.7066	2.6378	2.7910	1.4795	3.4915	1.7523	3.8535	2.0068	3.4717	3.2706
LGDP	nlnc	1	2.8568	3.7139	3.2531	1.7488	4.4907	1.3783	2.6571	3.5681	3.3559	3.0177
LGDP	nlnc	0	14.7384	12.3687	11.3535	2.7868	5.1733	4.0123	11.8857	12.4033	11.8522	14.6665
DL(LGDP)	uc	3	-1.7429	-2.4489	-2.0423	-1.8568	-2.0020	-2.5475	-2.9278	-2.2251	-4.1261 ***	-2.5353
DL(LGDP)	uc	2	-1.8332	-2.5718	-1.1962	-1.6706	-3.3673	-2.2122	-2.9585	-2.0680	-3.7885 **	-2.5562
DL(LGDP)	uc	1	-3.3459	-3.1780	-2.9007	-2.1880	-6.2736 ***	-3.0411	-4.0404 **	-1.8707	-4.0817 **	-3.2216
DL(LGDP)	uc	0	-3.5629	-4.0912 ***	-3.5008	-3.3510	-6.4321 ***	-2.4178	-2.8108	-3.5736	-4.0078 **	-3.0868
DL(LGDP)	c	3	-2.1196	-2.5308	-2.1911	-1.6967	-1.3521	-2.2033	-3.0626 **	-2.3306	-3.1547	-2.4739
DL(LGDP)	c	2	-2.2779	-2.6840 *	-2.3560	-1.5830	-2.6002	-2.2579	-3.0778	-2.2048	-3.8213 ***	-2.0435
DL(LGDP)	c	1	-3.1132 **	-3.1797 ***	-3.0118	-2.1226	-3.7581	-2.7376	-4.2814 ***	-1.9581	-4.0158	-3.1047 **
DL(LGDP)	c	0	-3.2642 **	-4.1656 ***	-3.5844 ***	-3.3752 ***	-5.7031 ***	-2.3026	-2.9844 *	-3.8008 ***	-3.9144 ***	-2.9430
DL(LGDP)	nlnc	3	-0.8441	-0.8210	-0.8092	-1.1118	0.1775	-1.4153	-0.5020	0.0461	-0.3616	0.0145
DL(LGDP)	nlnc	2	-1.0777	-0.8040	-0.7826	-1.0458	-0.2608	-1.7839 *	-0.8443	-0.1604	-1.1971	-0.4387
DL(LGDP)	nlnc	1	-0.8072	-0.8832	-0.8773	-1.4818	-1.3212	-1.8196	-1.2433	-0.1347	-1.2925	-0.4177
DL(LGDP)	nlnc	0	-0.8550	-1.1865	-1.1008	-2.7311 ***	-2.6244 **	-1.7437	-1.1147	-1.1671	-1.4262	-0.8126
TGDP	uc	3	-1.8182	-2.4768	-1.8836	-2.6638	-0.4076	-1.9590	-2.0005	-2.7550	-1.3573	-1.8324
TGDP	uc	2	-2.3411	-2.6272	-2.0857	-1.9451	-0.6815	-2.3472	-2.9433	-3.0857	-2.1075	-1.0803
TGDP	uc	1	-2.7405	-2.3610	-2.3938	-1.3968	-1.2637	-2.5855	-3.6213	-2.2516	-2.9795	-1.7133
TGDP	uc	0	-0.0803	-1.8996	-1.7176	-0.9814	-2.1405	-1.6104	-2.8001	-1.7335	-2.5726	-1.0259
TGDP	c	3	-1.6803	-2.5471	-2.1335	-2.8627 *	-0.5688	-1.7675	-2.0610	-2.6293	-1.4783	-2.1093

Appendix E
SEQUENTIAL UNIT ROOT TESTS
(ANNUAL DATA)

		Indonesia	Korea 1/	Malaysia 2/	Myanmar	Nepal 3/	Philippines 4/	Singapore	Sri Lanka	ROC, Taipei 5/	Thailand
TGDP	c	2	-1.725	-2.070	-2.118	-1.0525	-2.1383	-2.1641	-3.0431	-2.1983	-1.2930
TGDP	c	1	-2.4289	-2.4537	-2.3224	-1.4768	-1.3428	-2.5718	-2.2763	-3.0581	-1.8895
TGDP	c	0	-2.0280	-2.0561	-1.7348	-1.0314	-2.2187	-1.9087	-1.7711	-2.6802	-1.1847
TGDP	n/m/c		-1.7817	-2.6378	-2.1928	-2.8082	-0.8209	-1.8044	-2.1122	-2.7109	-2.1358
TGDP	n/m/c	2	-1.7454	-2.7416	-2.1131	-2.1305	-1.0942	-2.1137	-2.1775	-3.318	-2.2570
TGDP	n/m/c	1	-2.4108	-2.5130	-2.3751	-1.5195	-1.3720	-2.5981	-2.6697	-2.3413	-3.1056
TGDP	n/m/c	0	-2.0415	-2.1016	-1.7925	-1.0617	-2.2463	-1.8229	-2.7836	-1.8151	-2.7150
DTGDP	1/c	3	-1.7429	-2.4489	-2.1429	-1.8588	-2.0020	-2.5475	-2.9278	-2.2291	-2.5833
DTGDP	1/c	2	-1.8332	-2.5716	-2.1992	-1.8786	-3.3673	-2.2122	-2.8565	-2.0680	-3.7865
DTGDP	1/c	1	-3.3459	-3.1780	-2.9037	-2.1880	-5.2736	-3.0411	-4.0404	-1.8707	-4.0917
DTGDP	1/c	0	-3.5829	-4.0912	-3.5008	-3.3510	-6.4321	-2.4178	-2.8108	-3.5736	-4.0078
DTGDP	n/m/c	3	-2.1196	-2.5308	-2.1811	-1.6967	-1.3521	-2.2033	-3.0626	-2.3306	-3.1547
DTGDP	n/m/c	2	-2.2779	-2.6840	-2.3560	-1.5830	-2.6002	-2.2579	-3.2078	-2.2048	-3.8213
DTGDP	n/m/c	1	-3.1132	-3.1797	-3.0118	-2.1226	-3.7580	-2.7376	-2.9114	-1.9681	-4.0158
DTGDP	n/m/c	0	-3.2642	-4.1656	-3.5844	-3.3752	-5.7031	-3.3026	-2.9844	-3.8008	-3.9144
DTGDP	n/m/c	2	-2.2185	-2.6237	-2.2641	-1.7735	-1.3384	-2.2688	-3.1592	-2.4756	-3.2594
DTGDP	n/m/c	1	-2.4225	-2.7851	-2.4311	-1.6556	-2.6378	-2.3533	-3.3201	-2.3046	-3.9014
DTGDP	n/m/c	0	-3.2591	-3.0539	-2.2126	-3.8816	-2.7969	-4.3939	-2.0435	-4.1273	-3.1561
DTGDP	n/m/c	0	-3.3120	-4.2634	-3.6399	-3.4579	-5.8545	-2.3513	-3.0484	-3.8928	-4.0693
LEX	1/c	3	-2.2335	-1.3812	-1.8603	-1.8455	-2.0559	-0.8017	-1.6785	-2.1059	-1.8302
LEX	1/c	2	-2.3084	-1.2526	-3.1888	-0.9929	0.0398	-2.3710	-2.1049	-1.5151	-2.0184
LEX	1/c	1	-2.2907	-1.6362	-3.5634	-1.8239	0.1173	-2.4185	-2.6006	-1.4817	-2.0216
LEX	1/c	0	-1.9301	-1.3252	-2.3779	-1.2627	0.2699	-1.4217	-1.6029	-1.9481	-1.3182
LEX	n/m/c	3	-2.0048	-1.7897	-2.8504	-0.3517	2.4812	-1.0746	-2.4851	-3.0384	-1.3692
LEX	n/m/c	2	-2.1743	-1.4713	-2.2240	-1.5978	1.7094	-0.8454	-2.3943	-3.5057	-1.6707
LEX	n/m/c	1	-0.0265	-1.7345	-3.1485	-2.3085	2.3797	-0.6280	-0.9883	-0.6513	-0.8357
LEX	n/m/c	0	-0.1296	-2.2884	-3.3974	-1.9839	3.8848	-0.1877	-0.5269	-0.4204	-0.1229
LEX	n/m/c	3	2.0213	1.0771	0.2235	0.3955	1.4889	1.2876	-1.8811	1.3845	-0.8915
LEX	n/m/c	2	2.3746	1.1739	-0.3550	0.1745	1.8206	1.1025	-1.8889	2.0262	-1.0714
LEX	n/m/c	1	2.3945	1.1780	-0.8475	0.3517	2.4812	1.0746	-2.4851	-3.0384	-1.3692
LEX	n/m/c	0	3.6855	2.3722	-0.8491	0.4608	5.2969	2.9319	-3.7048	-3.5057	-1.6707
D(LEX)	1/c	3	-0.8212	-2.7361	-2.9889	-3.7868	-3.0706	-1.9537	-2.3167	-2.5695	-2.6717
D(LEX)	1/c	2	-2.4293	-2.6058	-4.2542	-3.4046	-2.1922	-2.1803	-3.9648	-2.4752	-2.2809
D(LEX)	1/c	1	-3.3332	-3.1317	-3.6209	-3.6730	-2.4626	-2.2814	-3.2524	-2.4441	-3.2820
D(LEX)	1/c	0	-3.8668	-3.4158	-3.7513	-4.2688	-4.0447	-2.6507	-3.4032	-3.3516	-2.9373
D(LEX)	n/m/c	3	-1.9302	-2.0536	-2.3557	-2.0865	-2.1473	-2.4812	-2.1781	-2.3043	-2.4512
D(LEX)	n/m/c	2	-5.5282	-2.2587	-4.2564	-2.2241	-0.8744	-3.3229	-2.3638	-2.1815	-2.1546
D(LEX)	n/m/c	1	-3.3325	-3.0068	-3.3214	-3.3626	-1.2512	-2.3855	-2.9451	-3.2394	-2.4801
D(LEX)	n/m/c	0	-3.9980	-3.0088	-3.3283	-3.8344	-2.6054	-2.6767	-3.4612	-3.4612	-2.2668
D(LEX)	n/m/c	3	-0.6104	-1.6962	-2.4606	-2.0682	-0.1100	-1.4461	-1.1655	-0.8547	-2.1091
D(LEX)	n/m/c	2	-1.3611	-1.9233	-4.4722	-2.1968	-1.7036	-2.9578	-1.0008	-2.0202	-1.9723
D(LEX)	n/m/c	1	-2.1030	-2.7285	-3.4293	-3.4523	-0.1293	-1.9384	-2.1229	-1.5660	-2.2493
D(LEX)	n/m/c	0	-2.8782	-2.9745	-3.3880	-3.8945	-1.4653	-2.3167	-2.4345	-3.3227	-2.7818
D12M	1/c	3	-1.7500	-2.6306	-1.5048	-2.6520	-2.1404	-2.1234	-2.3478	-2.4720	-1.7849
D12M	1/c	2	-2.2709	-2.1328	-1.8482	-2.1572	-2.8814	-2.4703	-1.6350	-3.3422	-2.5395
D12M	1/c	1	-2.6122	-1.8171	-1.8889	-2.2934	-3.3450	-3.0130	-1.4902	-3.0935	-2.8670
D12M	1/c	0	-2.0888	-2.3405	-1.4245	-2.4968	-2.7362	-2.2894	-1.3748	-2.3383	-1.9884
D12M	n/m/c	3	-1.5754	-1.2295	-1.6356	-3.5143	-1.8503	-1.1314	-2.5048	-1.2893	-1.9177
D12M	n/m/c	2	-2.0383	-1.0622	-1.9607	-2.7714	-2.1454	-1.2108	-1.8906	-1.6943	-2.5958
D12M	n/m/c	1	-2.4598	-2.8630	-2.0059	-2.5722	-2.8823	-1.9663	-1.7067	-2.0157	-2.7737
D12M	n/m/c	0	-2.0574	-2.0780	-1.5624	-2.7567	-2.4768	-1.4330	-1.5552	-1.6832	-2.0885
D12M	n/m/c	3	-0.4778	-0.7935	-0.2502	-0.4225	-0.1736	-0.9687	-0.1633	-0.7787	0.1752
D12M	n/m/c	2	-0.8415	-0.9251	-0.3886	-0.4128	-0.5293	-0.7522	-0.0986	-0.3112	-0.1123
D12M	n/m/c	1	-1.2027	-1.3896	-0.4432	-0.2058	-0.7795	-0.8910	-0.1688	-0.6133	-0.2815
D12M	n/m/c	0	-1.2001	-1.6877	-0.3792	-0.2267	-0.8608	-0.8835	-0.2732	-0.6695	-0.1964
DD12M	1/c	3	-1.1872	-2.6785	-2.9799	-3.0111	-3.6019	-3.0861	-2.1218	-3.8048	-3.1470
DD12M	1/c	2	-2.2012	-2.7486	-3.3322	-3.6529	-3.8944	-3.1142	-1.9566	-3.3957	-3.8814
DD12M	1/c	1	-2.7045	-3.1584	-2.9932	-4.4448	-4.1211	-4.1599	-2.9405	-3.5269	-3.4259
DD12M	1/c	0	-3.7354	-3.1624	-3.7022	-4.9846	-4.6751	-3.8848	-4.2896	-4.0620	-3.6074
DD12M	n/m/c	3	-1.5815	-2.7723	-2.5937	-2.0295	-3.6938	-3.2761	-1.8415	-3.9772	-3.1668
DD12M	n/m/c	2	-2.6558	-2.8405	-2.9409	-2.8854	-3.9648	-3.2104	-1.7812	-3.5186	-3.8621
DD12M	n/m/c	1	-2.9042	-3.3626	-2.8158	-4.0782	-4.2019	-4.1287	-2.8312	-3.5482	-3.4675
DD12M	n/m/c	0	-3.7627	-3.2072	-3.5732	-4.8196	-4.7654	-3.9477	-4.2607	-4.1244	-3.6904
DD12M	n/m/c	3	-1.6303	-2.6888	-2.6898	-1.9635	-3.7543	-3.1179	-1.7338	-3.8840	-3.1840
DD12M	n/m/c	2	-2.7436	-2.8771	-3.0261	-2.9141	-4.0588	-3.1792	-1.7032	-3.5581	-3.9194
DD12M	n/m/c	1	-2.9511	-3.4445	-2.9011	-4.0408	-4.3096	-4.1928	-2.7402	-3.6308	-3.5415
DD12M	n/m/c	0	-3.7825	-3.1832	-3.6598	-4.9541	-4.6774	-4.0176	-4.1969	-4.2114	-3.7710
D6M	1/c	3	-1.8441	-3.1938	-2.7027	-1.4012	-3.3644	-2.0971	-2.3606	-2.2697	-2.0710
D6M	1/c	2	-2.3789	-2.3413	-2.9483	-1.6347	-3.8558	-2.2619	-1.7463	-1.1897	-2.1537
D6M	1/c	1	-2.6496	-2.8676	-2.3327	-1.7181	-5.1845	-2.9662	-1.5184	-3.5955	-3.2958
D6M	1/c	0	-2.2086	-1.6833	-2.0237	-2.6744	-2.5587	-2.2454	-1.4697	-2.6004	-2.5252
D6M	n/m/c	3	-1.2989	-1.0073	-2.8102	0.1328	-2.7062	-1.5159	-2.3768	-2.4454	-1.8537
D6M	n/m/c	2	-1.6375	-0.6966	-3.3124	-0.1693	-3.3082	-1.4184	-1.8598	-3.3336	-2.1096
D6M	n/m/c	1	-2.0384	-1.8533	-2.4505	-0.3387	-4.7499	-2.3354	-1.6188	-2.9687	-2.3768
D6M	n/m/c	0	-1.8804	-1.2749	-2.1291	-0.1022	-2.8553	-1.7408	-1.5098	-2.4255	-2.0680
D6M	n/m/c	3	-0.2581	-0.7203	-0.5108	-1.5281	-0.0414	-0.8927	-0.1030	-0.5055	-0.1865
D6M	n/m/c	2	-0.6096	-0.7180	-0.5822	-1.3611	-0.3149	-0.6540	-0.1038	-0.3922	-0.0691
D6M	n/m/c	1	-0.9628	-1.2499	-0.5636	-1.4713	-0.6849	-0.8506	-0.2540	-0.5405	-0.1201

Appendix E

SEQUENTIAL UNIT ROOT TESTS
(ANNUAL DATA)

		Indonesia	Korea 1/	Malaysia 2/	Myanmar	Nepal 3/	Philippines 4/	Singapore	Sri Lanka	ROC, Taipei 5/	Thailand
DM	nt/nc	-0.9489	-4876	0.5696	0.9410	-0.5852	0.8183	0.3003	-0.4584	-0.1080	
D(DM)	uc	3	-1.4322	-2.3310	-3.4026 ***	-2.1900	-4.3443 ***	2.8713	-2.1794	-4.6394 ***	-3.8936 **
D(DM)	uc	2	-2.6100	-2.4339	-2.5954	-3.0407	-4.1810 ***	-2.8654	-1.9566	-3.6771 ***	-4.4612 **
D(DM)	uc	1	-3.2790	-4.5219 ***	-2.6804	-3.2338	-4.7335 ***	-4.2640 ***	-2.7877	-3.5539	-3.7469 **
D(DM)	uc	0	-4.2625 **	-2.9870	-4.2272 ***	5.3219 ***	-3.8400 ***	-3.7097	-4.4448 ***	-3.8616	-4.1596 **
D(DM)	c	3	-1.8382	-2.5193	-3.6360	-1.8790	-4.5016	-3.0430 ***	-1.9428	-3.0603 ***	-3.8617 **
D(DM)	c	2	-2.8508	-2.4075	-2.7335 ***	-2.8694 *	-4.2734 ***	-3.0165 ***	-1.8468	-3.7729 ***	-4.4677 **
D(DM)	c	1	-3.3023	-4.5736 ***	-2.7911 ***	-3.2183 **	-4.8144 ***	-3.4122 ***	-3.7470 **	-3.5620 **	-3.7957 **
D(DM)	c	0	-4.2659	-3.0609 **	-4.3899 ***	-5.2894 ***	-3.7010	-3.8146 ***	-4.4551 ***	-4.0117 ***	-4.2930 ***
D(DM)	nt/nc	3	-1.8870	-2.3568 **	-3.6360	-1.4867	-4.5680 ***	-3.0211 ***	-1.8448 *	-3.5172 ***	-3.5819 **
D(DM)	nt/nc	2	-2.9384 ***	-2.4508 **	-2.7535	-2.3104 **	-4.3887 ***	-3.0341 ***	-1.7898	-3.8762 ***	-4.3708 ***
D(DM)	nt/nc	1	-3.4094	-4.6821 ***	-2.7961	-2.7493 ***	-4.9391 ***	-4.4143 ***	-2.6813 ***	-3.6565 ***	-3.9368 ***
D(DM)	nt/nc	0	-4.3514 ***	-3.0631 ***	-4.3891	-4.8656 ***	-3.7881 ***	-3.9013	-4.3828 ***	-4.1970 ***	-4.3548 ***
LGDPD	uc	3	1.2958	3.1440	-1.7054	-0.8719	-2.8226	-2.3124	-3.4014	-1.9870	-0.7033
LGDPD	uc	2	-1.6103	-2.0619	-1.9497	-1.5883	-2.6921	-2.1960	-1.4101	-2.2052	-2.5180
LGDPD	uc	1	-1.5709	-1.8985	-1.6547	-0.8882	-3.6180 *	-2.8129	-30.8122 ***	-1.9995	-2.6081
LGDPD	uc	0	-0.8060	-0.5533	-1.2018	0.2950	-3.3597	-2.0757	-4.6083 ***	-1.7139	-1.6295
LGDPD	c	3	-3.6553 ***	-4.4142 ***	-1.8795	-1.1252	-0.3179	-0.7427	-1.4162	-1.6398	-2.0691
LGDPD	c	2	-3.8427 ***	-2.8121 **	-3.4442 ***	0.1950	0.6152	-0.9823	-0.3978	-0.9381	-3.4201 **
LGDPD	c	1	-2.8727	-2.8587	-2.0815	0.4578	0.1312	-0.7090	-12.9452 **	-0.5972	-3.5057 ***
LGDPD	c	0	-2.3668	-4.9235 ***	-1.5753	1.9425	0.4856	-0.7077	-2.9345 *	-0.0131	-3.4968 **
LGDPD	nt/nc	3	1.0427	0.2478	1.2309	1.5055	3.9378	1.7491	1.5728	1.5260	1.7868
LGDPD	nt/nc	2	1.2972	0.2473	2.4876	1.3830	4.2641	2.5745	3.6892	1.5783	1.3856
LGDPD	nt/nc	1	1.4930	0.3000	2.4147	1.9914	4.1388	2.5436	1.5088	2.1896	1.6028
LGDPD	nt/nc	0	4.8479	5.5812	3.6241	5.1361	5.9304	6.1081	-0.0932	6.8127	3.9087
DL(GDPD)	uc	3	-2.6951	-1.2928	-1.6049	-2.3242	-3.4356	-3.0403	-2.7018	-2.0658	-3.4493
DL(GDPD)	uc	2	-4.2673 ***	-2.6363	-2.3977	-2.1475	-4.5712 ***	-3.8610	-2.2561	-3.7371	-3.8610 **
DL(GDPD)	uc	1	-4.8283 ***	-2.3623	-3.0338 ***	-1.6732	-4.5807 ***	-4.1114 ***	-25.7066 ***	-2.5680	-3.6881 **
DL(GDPD)	uc	0	-4.2277 **	-2.5390	-4.4482 ***	-2.4503	-4.8954 ***	-3.8836 **	-15.3152 ***	-3.2073	-4.0654 **
DL(GDPD)	c	3	-2.0220	-1.4490	-1.8868	-1.3639	-3.3857 ***	-3.1605 **	-2.1827	-1.4386	-2.6504
DL(GDPD)	c	2	-2.2420	-1.1456	-1.9438	-1.6317	-4.7417 ***	-2.8831 *	-2.2339	-2.4098	-3.8094 ***
DL(GDPD)	c	1	-2.8099	-1.4822	-3.6887 ***	-1.4523	-4.6311 ***	-0.0892	-31.0889 ***	-2.6022	-2.5805
DL(GDPD)	c	0	-3.1171	-2.8072	-4.0384 ***	-2.2701	-5.0002 ***	-3.9309 ***	-3.3269 **	-2.9354 *	-2.8542 **
DL(GDPD)	nt/nc	3	-1.9871	-2.1028 **	-1.4237	-0.8600	-0.6825	-1.2322	-1.6284	-0.8653	-1.0301
DL(GDPD)	nt/nc	2	-1.3448	-0.9257	-1.3780	-0.9854	-0.3193	-1.0537	-1.4278	-0.7704	-3.5033 ***
DL(GDPD)	nt/nc	1	-1.3139	-1.0452	-2.0055 **	-0.6510	-1.3628	-1.4460	-25.2345 ***	-0.6959	-1.9681 **
DL(GDPD)	nt/nc	0	-1.5317	-0.8638	-2.0055 ***	-1.2306	-1.9648 **	-1.8895 *	-12.1404 ***	-1.2701	-2.0845 **
LCPI	uc	3	-4.4124	-2.5136	-2.4282	-0.7742	-0.6706	-1.8954	-1.3897	-2.4841	-3.0071
LCPI	uc	2	-3.5562 ***	-1.1847	-2.7043	-1.6474	-0.9508	-2.0668	-5.0805 ***	-2.7479	-2.0650
LCPI	uc	1	-2.5392	-1.4697	-2.4027	-1.3699	-1.7127	-2.8557	-3.2852	-2.3131	-1.7831
LCPI	uc	0	-0.9248	-0.6170	-1.2221	0.1985	-2.1228	-2.2251	-1.7640	-2.1821	-1.2833
LCPI	c	3	-2.8458	-3.8433 ***	-2.1274	1.2943	1.3439	0.9639	0.6230	0.8113	-4.1355 ***
LCPI	c	2	-5.5255 ***	-2.7449	-3.3266 **	0.2843	1.3490	-1.1887	-5.6339 ***	0.4574	-3.1077 ***
LCPI	c	1	-2.8105	-1.8322	-2.2834	0.2953	0.7786	-0.7481	-2.7378 **	0.5508	-2.2978
LCPI	c	0	-2.5278	-2.9129	-2.1265	1.8462	1.4984	-1.0640	-2.5342	1.4477	-2.0872
LCPI	nt/nc	3	1.0422	0.7585	1.4822	1.8120	3.4520	1.6634	2.2035	2.8044	1.4030
LCPI	nt/nc	2	1.5638	1.9404	2.4240	1.8135	4.5232	2.5490	2.3426	2.4489	1.7950
LCPI	nt/nc	1	1.3242	1.1648	2.0646	1.8860	4.2033	2.5710	1.5461	3.0700	1.9022
LCPI	nt/nc	0	5.9325	5.4959	5.8940	6.1121	6.3329	5.9989	3.3099	9.1670	3.2555
DL(LCPI)	uc	3	-3.5465	-1.6243	-2.5836	-1.8235	-6.1543 ***	-3.3328	-4.2089 **	-2.3883	-3.0695
DL(LCPI)	uc	2	-2.8176	-3.3653	-2.5599	-2.0656	-3.3588	-3.1409	-3.4723	-2.7820	-3.8198 **
DL(LCPI)	uc	1	-5.8722 ***	-3.2164	-4.5302 ***	-1.6880	-4.5654 ***	-4.4946 ***	-5.6526 ***	-2.6441	-4.0050 **
DL(LCPI)	uc	0	-3.4751	-2.5561	-3.9727	-2.0238	-4.3783 ***	-4.1239 **	-3.3031	-3.4021	-4.1640 **
DL(LCPI)	c	3	-3.8262 **	-1.6514	-3.4602 **	-1.3457	-2.9424 *	-3.4220 **	-3.6636	-2.0732	-3.0889 **
DL(LCPI)	c	2	-1.9272	-1.6424	-2.0972	-1.7559	-2.9710	-3.0602 **	-4.9336 **	-2.5734	-2.3497
DL(LCPI)	c	1	-3.0370	-2.3871	-3.3021 **	-1.5520	-4.2135	-4.3781 ***	-3.8655 ***	-2.6111	-3.0863 **
DL(LCPI)	c	0	-2.5434	-2.1878	-2.8472	-1.9125	-4.3089 ***	-4.1819 ***	-2.8868 *	-3.3593 **	-3.6643 **
DL(LCPI)	nt/nc	3	-2.9098	-1.6435	-2.5099	-0.6032	-0.5000	-1.2529	-2.1742 **	0.4189	-3.2625 **
DL(LCPI)	nt/nc	2	-1.4268	-0.7511	-1.2744	-0.8973	-0.2356	-1.0782	-4.4837 ***	-0.8735	-1.4966
DL(LCPI)	nt/nc	1	-1.1439	-1.3341	-1.5366	-0.4708	0.8079	-1.4975	-2.6025 **	-0.7056	-2.0306 **
DL(LCPI)	nt/nc	0	-1.0841	-1.3779	-1.4912	0.7191	-1.1620	-2.0560 **	-2.1677 **	-1.1323	-2.8902 **
LWPI	uc	3	0.1892	-2.1281	-1.1821	-1.4923	-2.2467	-2.1627	-2.1827	-2.0878	-1.7308
LWPI	uc	2	-1.1221	-1.3158	-1.7224	-1.3701	-1.8865	-1.6050	-1.5150	-2.1888	-2.5254
LWPI	uc	1	-1.7224	-1.4770	-1.9173	-1.8269	-1.9259	-1.7593	-1.2271	-1.7593	-1.2271
LWPI	uc	0	-1.0925	-0.5730	-1.4621	-1.2271	-1.2271	-1.7593	-1.2271	-1.7593	-1.2271
LWPI	c	3	-2.2769	-4.4668 ***	-1.4788	-2.4108	-1.2423	-3.1089 **	-3.1089 **	-3.1089 **	-3.1089 **
LWPI	c	2	-3.2090	-2.7474 *	-1.7162	-2.1908	-1.4185	-3.9488 ***	-3.9488 ***	-3.9488 ***	-3.9488 ***
LWPI	c	1	-3.3423	-2.7090 *	-1.3482	-2.4052	-1.1437	-3.0941 ***	-3.0941 ***	-3.0941 ***	-3.0941 ***
LWPI	c	0	-3.3362	-3.2542	-1.4389	-1.7708	-0.7671	-2.6555	-2.6555	-2.6555	-2.6555
LWPI	nt/nc	3	1.2304	0.7528	1.0509	0.0054	1.1744	0.7744	1.1744	0.7744	1.1744
LWPI	nt/nc	2	1.3076	0.8944	1.7823	0.0933	2.5958	1.1445	1.1445	1.1445	1.1445
LWPI	nt/nc	1	1.4273	0.8693	1.8312	0.3138	2.4125	1.1043	1.1043	1.1043	1.1043
LWPI	nt/nc	0	4.1214	3.4026	4.3317	0.4082	4.3221	1.8534	1.8534	1.8534	1.8534
DL(LWPI)	uc	3	-3.6082	-1.9752	-2.4424	-2.1455	-2.7872	-2.2677	-1.8521	-3.1455	-3.0685
DL(LWPI)	uc	2	-3.6716	-1.9886 **	-2.7872	-2.2677	-2.7872	-2.2677	-2.7872	-2.2677	-2.2677
DL(LWPI)	uc	1	-4.4312 **	-3.2804	-4.0494 **	-2.7671	-4.0690 **	-3.8097 **	-4.2565 **	-4.3483 **	-4.3483 **
DL(LWPI)	uc	0	-4.6436 ***	-3.2768	-4.0256 **	-3.7153 **	-3.8097 **	-3.8097 **	-3.8097 **	-3.8097 **	-3.8097 **
DL(LWPI)	c	3	-1.5049	-1.9003	-2.3763	-1.4430	-1.7508	-3.4915 ***	-3.4915 ***	-3.4915 ***	-3.4915 ***

Appendix E

SEQUENTIAL UNIT ROOT TESTS
(ANNUAL DATA)

		Indonesia	Korea 1/	Malaysia 2/	Myanmar	Nepal 3/	Philippines 4/	Singapore 1	Sri Lanka	ROC, Taipei 5/	Thailand
D(LWPI)	c	2	-2.6025	-1.7732			-2.3975	-1.7356	-1.8874	-2.3781	-2.1865
D(LWPI)	c	1	-2.8063	-2.1162			-3.6508 **	-2.2763	-3.9194 ***	-2.8212 *	-3.0026 *
D(LWPI)	c	0	-3.1531 **	-2.2097			-3.8526 ***	-3.0921 **	-3.8022 **	-3.1332 **	-2.6184
D(LWPI)	nt/nc	3	1.2364	-2.3124 **			-1.5482	-1.5430	-0.8235	-3.7763 ***	-2.5301 **
D(LWPI)	nt/nc	2	-2.1810 **	-1.2768			-1.2218	-1.8321	-0.8800	-2.2545 **	-1.8311 *
D(LWPI)	nt/nc	1	-1.8426 *	-1.6563 *			-1.6992 *	-2.3589 **	-1.8423 *	-2.5454 **	-2.0067 **
D(LWPI)	nt/nc	0	-1.8811 *	-1.7578 *			-2.2703 **	-3.1456 ***	-2.0694 **	-2.8068 ***	-1.7890 *
LME	vc	3		-2.7038							
LME	vc	2		-1.8264							
LME	vc	1		-1.2673							
LME	vc	0		-1.1354							
LME	c	3		-2.1083							
LME	c	2		-1.6395							
LME	c	1		-1.8436							
LME	c	0		-1.6526							
LME	nt/nc	3		0.2459							
LME	nt/nc	2		0.6524							
LME	nt/nc	1		0.9313							
LME	nt/nc	0		5.3709							
D(LME)	vc	3		-1.8994 *							
D(LME)	vc	2		-2.2285 *							
D(LME)	vc	1		-2.4432							
D(LME)	vc	0		-4.8384 ***							
D(LME)	c	3		-1.4527							
D(LME)	c	2		-1.6004							
D(LME)	c	1		-2.0561							
D(LME)	c	0		-4.3973 ***							
D(LME)	nt/nc	3		-0.7820							
D(LME)	nt/nc	2		-0.6227							
D(LME)	nt/nc	1		-0.8868							
D(LME)	nt/nc	0		-1.7347							

1/ PPI=WPI
2/ D12M=ALS
2/ 3/ 5/ D6M=D3M
4/ D12M=TBAM
*** 1% significance
** 5% significance
* 10% significance
vc Trend and Constant
c Constant
nt/nc No Trend and No Constant

All variables except (interest rates and output gap) are in log
D(.) Difference once
LM1=Money Supply M1
LM2=Money Supply M2
LGDPRL= Real GDP
TGDPRL= Differential between actual and trend Real GDP
LEX=Exchange rate per US Dollar
D12M=12-month deposit rates
D6M=6-month deposit rates
D3M=3-month deposit rates
TBAM=Treasury Bill Rates At Maturity
ALS=Average Lending Rates
LGDPDL= GDP Deflator
LCPI=Consumer Price Index
LPI=Producer Price Index
LWPI=Wholesale Price Index
LME=Average wage rate

Appendix F

SEQUENTIAL UNIT ROOT TESTS (QUARTERLY DATA)

Variable	Type	lags	Indonesia ADF	Korea ADF	Malaysia 1/ ADF	Philippines 2/ ADF	singapore 3/ ADF
LM1	t/c	3	-2.373	-2.018	0.1139	-2.97	-2.2564
LM1	t/c	2	-2.563	-2.141	0.7887	-2.512	-1.966
LM1	t/c	1	-1.881	-2.238	1.5675	-2.696	-2.1826
LM1	t/c	0	-2.004	-3.018	1.5858	-2.412	-2.3122
LM1	c	3	-0.599	-0.073	1.7626	0.7014	-0.4588
LM1	c	2	-0.023	-0.105	2.1697	0.3944	-0.4795
LM1	c	1	0.1072	-0.261	2.6904	0.6328	-0.8791
LM1	c	0	0.1985	-0.176	2.7776	0.1565	-0.7796
LM1	nt/nc	3	2.2523	3.7565	2.1506	3.5729	3.4867
LM1	nt/nc	2	2.4663	4.0847	3.0623	3.9598	4.79439
LM1	nt/nc	1	4.1123	4.7236	5.5753	4.6862	7.04318
LM1	nt/nc	0	5.3654	3.8444	10.068	5.3463	8.39932
D(LM1)	t/c	3	-2.589	-5.046 ***	-2.288	-4.381 ***	-4.3789 ***
D(LM1)	t/c	2	-2.527	-5.028 ***	-2.724	-4.736 ***	-4.196 ***
D(LM1)	t/c	1	-3.193	-6.256 ***	-3.841 **	-5.523 ***	-6.0109 ***
D(LM1)	t/c	0	-6.175 ***	-10.18 ***	-7.356 ***	-8.565 ***	-10.239 ***
D(LM1)	c	3	-2.661 *	-5.054 ***	-1.702	-4.28 ***	-4.4105 ***
D(LM1)	c	2	-2.672 *	-5.073 ***	-2.158	-4.609 ***	-4.2198 ***
D(LM1)	c	1	-3.213 **	-6.311 ***	-3.257 **	-5.506 ***	-6.043 ***
D(LM1)	c	0	-6.24 ***	-10.27 ***	-6.736 ***	-8.512 ***	-10.274 ***
D(LM1)	nt/nc	3	-1.335	-2.73 ***	-0.496	-2.166 **	-2.121 **
D(LM1)	nt/nc	2	-1.274	-3.012 ***	-0.851	-2.72 ***	-2.0912 **
D(LM1)	nt/nc	1	-1.914 *	-4.209 ***	-1.492	-3.434 ***	-3.1134 ***
D(LM1)	nt/nc	0	-3.923 ***	-7.74 ***	-3.492 ***	-6.411 ***	-5.6811 ***
LM2	t/c	3	-2.065	-2.361	-2.121	-1.79	-2.4603
LM2	t/c	2	-1.907	-2.559	-2.235	-1.997	-2.0058
LM2	t/c	1	-1.819	-2.453	-2.583	-2.13	-1.9062
LM2	t/c	0	-2.454	-2.341	-4.043 **	-2.159	-1.4646
LM2	c	3	0.075	-0.595	-0.894	0.7534	-0.3662
LM2	c	2	0.3437	-0.907	-0.947	0.5576	-0.2597
LM2	c	1	0.5824	-1.059	-1.026	0.6444	-0.3588
LM2	c	0	0.3208	-1.005	-0.633	0.5326	-0.334
LM2	nt/nc	3	2.7951	3.5213	4.3838	4.9745	3.22556
LM2	nt/nc	2	4.0142	4.2681	4.9368	5.2012	4.38187
LM2	nt/nc	1	7.3374	6.4585	4.9233	6.5942	5.41662
LM2	nt/nc	0	8.1548	15.375	2.9346	11.139	12.4301
D(LM2)	t/c	3	-2.934	-3.257	-4.829 ***	-3.926 ***	-2.7284
D(LM2)	t/c	2	-2.902	-3.953 **	-6.028 ***	-5.188 ***	-3.6662 **
D(LM2)	t/c	1	-4.299 ***	-4.909 ***	-8.148 ***	-5.602 ***	-5.1578 ***
D(LM2)	t/c	0	-9.11 ***	-7.605 ***	-13.12 ***	-7.929 ***	-6.7708 ***
D(LM2)	c	3	-2.937 *	-3.364 **	-4.835 ***	-3.864 ***	-2.7543 *
D(LM2)	c	2	-2.958 **	-3.981 ***	-6.037 ***	-5.152 ***	-3.6876 ***
D(LM2)	c	1	-4.322 ***	-4.872 ***	-8.174 ***	-5.594 ***	-5.192 ***
D(LM2)	c	0	-9.137 ***	-7.563 ***	-13.22 ***	-7.922 ***	-6.8125 ***
D(LM2)	nt/nc	3	-0.763	-1.068	-2.549 **	-0.888	-1.1492
D(LM2)	nt/nc	2	-0.768	-1.13	-3.512 ***	-1.364	-1.456
D(LM2)	nt/nc	1	-1.357	-1.362	-5.453 ***	-1.797 *	-2.3254 **
D(LM2)	nt/nc	0	-3.557 ***	-2.373 **	-10.44 ***	-3.41 ***	-3.3683 ***
LDGR	t/c	3	-1.385	0.1183	-2.109	-1.146	-2.1122
LGR	t/c	2	-1.721	-1.914	-2.237	-1.376	-1.7961
LGR	t/c	1	-2.453	-2.304	-2.378	-1.888	-1.7182
LGR	t/c	0	-4.395 ***	-4.638 ***	-3.079	-2.277	-2.0274
LGR	c	3	1.2768	-1.403	0.7256	-0.016	-0.0474
LGR	c	2	0.9362	-0.919	0.6697	-0.289	0.02621
LGR	c	1	0.8584	-0.869	0.411	-1.009	-0.111
LGR	c	0	-0.568	-0.964	-0.265	-1.258	-0.1013
LGR	nt/nc	3	4.8028	10.511	3.2063	1.2303	3.81326
LGR	nt/nc	2	5.0492	4.9312	3.1566	1.0884	5.09674
LGR	nt/nc	1	4.697	5.3685	2.8962	0.9828	7.27348
LGR	nt/nc	0	3.4782	3.2055	2.1172	0.7647	8.72225
D(LGR)	t/c	3	-5.543 ***	-4.244 ***	-4.989 ***	-2.61	-3.2049
D(LGR)	t/c	2	-5.738 ***	-13.87 ***	-6.011 ***	-6.408 ***	-4.349 ***
D(LGR)	t/c	1	-6.9 ***	-7.531 ***	-7.771 ***	-8.011 ***	-6.1418 ***
D(LGR)	t/c	0	-10.82 ***	-13.87 ***	-11.8 ***	-8.89 ***	-10.282 ***

Appendix F

SEQUENTIAL UNIT ROOT TESTS (QUARTERLY DATA)

Variable	Type	lags	Indonesia ADF	Korea ADF	Malaysia 1/ ADF	Philippines 2/ ADF	singapore 3/ ADF
D(LGR)	c	3	-4.521 ***	-3.945 ***	-4.811 ***	-2.461	-3.2218 **
D(LGR)	c	2	-5.484 ***	-13.67 ***	-5.851 ***	-6.246 ***	-4.3766 ***
D(LGR)	c	1	-6.803 ***	-7.528 ***	-7.642 ***	-7.927 ***	-6.1792 ***
D(LGR)	c	0	-10.82 ***	-13.92 ***	-11.76 ***	-8.924 ***	-10.357 ***
D(LGR)	nt/nc	3	-1.681 *	-0.868	-3.489 ***	-2.388 **	-1.349
D(LGR)	nt/nc	2	-2.143 **	-4.672 ***	-4.614 ***	-6.094 ***	-1.9319 *
D(LGR)	nt/nc	1	-3.539 ***	-4.692 ***	-6.548 ***	-7.839 ***	-3.0023 ***
D(LGR)	nt/nc	0	-7.821 ***	-10.47 ***	-10.81 ***	-8.871 ***	-5.66 ***
TGR	t/c	3	-1.385	0.1183	-2.109	-1.146	-2.1122
TGR	t/c	2	-1.721	-1.914	-2.237	-1.376	-1.7961
TGR	t/c	1	-2.453	-2.304	-2.378	-1.888	-1.7182
TGR	t/c	0	-4.395 ***	-4.638 ***	-3.079	-2.277	-2.0274
TGR	c	3	-1.561	-0.134	-2.052	-1.211	-2.1328
TGR	c	2	-1.88	-2.023	-2.225	-1.435	-1.8182
TGR	c	1	-2.641 *	-2.383	-2.399	-1.927	-1.7306
TGR	c	0	-4.434 ***	-4.709 ***	-3.108 **	-2.311	-2.0421
TGR	nt/nc	3	-1.577	-0.227	-2.046 **	-1.225	-2.1544 **
TGR	nt/nc	2	-1.908 *	-2.074 **	-2.227 **	-1.45	-1.8369 *
TGR	nt/nc	1	-2.677 ***	-2.429 **	-2.411 **	-1.952 **	-1.7483 *
TGR	nt/nc	0	-4.505 ***	-4.757 ***	-3.132 ***	-2.333 **	-2.0575 **
D(TGR)	t/c	3	-5.543 ***	-4.244 ***	-4.989 ***	-2.61	-3.2049
D(TGR)	t/c	2	-5.736 ***	-13.87 ***	-6.011 ***	-6.408 ***	-4.349 ***
D(TGR)	t/c	1	-6.9 ***	-7.531 ***	-7.771 ***	-8.011 ***	-6.1418 ***
D(TGR)	t/c	0	-10.82 ***	-13.87 ***	-11.8 ***	-8.89 ***	-10.282 ***
D(TGR)	c	3	-4.521 ***	-3.945 ***	-4.811 ***	-2.461	-3.2218 **
D(TGR)	c	2	-5.484 ***	-13.67 ***	-5.851 ***	-6.246 ***	-4.3766 ***
D(TGR)	c	1	-6.803 ***	-7.528 ***	-7.642 ***	-7.927 ***	-6.1792 ***
D(TGR)	c	0	-10.82 ***	-13.92 ***	-11.76 ***	-8.924 ***	-10.357 ***
D(TGR)	nt/nc	3	-4.568 ***	-3.99 ***	-4.851 ***	-2.484 **	-3.2326 ***
D(TGR)	nt/nc	2	-5.573 ***	-13.65 ***	-5.894 ***	-6.304 ***	-4.3916 ***
D(TGR)	nt/nc	1	-6.905 ***	-7.568 ***	-7.696 ***	-7.999 ***	-6.2068 ***
D(TGR)	nt/nc	0	-10.99 ***	-14.02 ***	-11.85 ***	-8.994 ***	-10.396 ***
LEX	t/c	3	-1.491	-1.89	-1.265	-1.216	-0.5347
LEX	t/c	2	-1.561	-2.563	-2.306	-0.691	-0.7473
LEX	t/c	1	-1.462	-2.373	-3.089	-0.669	-1.664
LEX	t/c	0	-3.465 *	-2.906	-2.312	0.1065	-1.3819
LEX	c	3	-1.482	-1.891	-1.182	-2.092	1.04865
LEX	c	2	-1.439	-2.64 *	-1.209	-1.982	0.96698
LEX	c	1	-1.018	-2.475	-1.417	-1.921	1.04793
LEX	c	0	-2.872 *	-3.575 ***	-1.223	-2.278	1.28837
LEX	nt/nc	3	1.8882	-0.048	0.9908	0.5082	-2.7545 ***
LEX	nt/nc	2	1.9934	0.1735	0.5612	1.0765	-2.6425 ***
LEX	nt/nc	1	2.0726	0.2944	0.1919	1.2	-1.8054
LEX	nt/nc	0	2.3876	2.1122	0.3864	2.8279	-2.1333 **
D(LEX)	t/c	3	-3.611 **	-2.289	-4.642 ***	-3.045	-5.0041 ***
D(LEX)	t/c	2	-3.832 **	-2.805	-6.636 ***	-2.643	-5.977 ***
D(LEX)	t/c	1	-4.712 ***	-2.447	-6.159 ***	-3.917 **	-7.1297 ***
D(LEX)	t/c	0	-8.199 ***	-2.903	-6.587 ***	-4.623 ***	-8.1504 ***
D(LEX)	c	3	-3.354 **	-2.304	-4.641 ***	-2.394	-4.8081 ***
D(LEX)	c	2	-3.672 ***	-3.005 **	-6.686 ***	-2.141	-5.7812 ***
D(LEX)	c	1	-4.604 ***	-2.43	-6.235 ***	-3.444 **	-6.9742 ***
D(LEX)	c	0	-8.432 ***	-2.868 *	-6.64 ***	-4.217 ***	-7.7698 ***
D(LEX)	nt/nc	3	-2.557 **	-2.379 **	-4.524 ***	-2.107 **	-3.6385 ***
D(LEX)	nt/nc	2	-2.988 ***	-3.178 ***	-6.588 ***	-1.996 **	-4.7156 ***
D(LEX)	nt/nc	1	-3.947 ***	-2.497 **	-6.228 ***	-3.118 ***	-6.0956 ***
D(LEX)	nt/nc	0	-7.89 ***	-2.916 ***	-6.684 ***	-3.887 ***	-7.3514 ***
DR	t/c	3	-5.37 ***	-4.221 ***	-2.204	-2.908	-3.3053 *
DR	t/c	2	-3.688 **	-3.439	-2.279	-2.491	-1.8073
DR	t/c	1	-3.201	-2.988	-2.414	-2.477	-1.7634
DR	t/c	0	-2.083	-2.687	-1.439	-2.021	-1.7048
DR	c	3	-4.504 ***	-4.711 ***	-1.99	-2.983 **	-2.4947
DR	c	2	-3.55 **	-3.898 ***	-2.051	-2.565	-1.2556
DR	c	1	-3.148 **	-3.409 **	-2.227	-2.549	-1.3997
DR	c	0	-2.586	-3.074 **	-1.176	-2.089	-1.5048

Appendix F

SEQUENTIAL UNIT ROOT TESTS (QUARTERLY DATA)

Variable	Type	lags	Indonesia	Korea	Malaysia 1/	Philippines 2/	singapore 3/
			ADF	ADF	ADF	ADF	ADF
DR	nt/nc	3	0.0569	-2.169 **	-0.686	-0.955	-0.7824
DR	nt/nc	2	0.0648	-2.113 **	-0.623	-0.871	-0.6453
DR	nt/nc	1	-0.026	-2.056 **	-0.714	-0.914	-0.8332
DR	nt/nc	0	0.3869	-2.015 **	-0.474	-0.81	-1.0428
D(DR)	t/c	3	-2.984	-2.737	-3.399 *	-4.461 ***	-3.6444 **
D(DR)	t/c	2	-3.341	-4.761 ***	-3.791 **	-3.736 **	-3.1174
D(DR)	t/c	1	-3.912 **	-5.697 ***	-4.4 ***	-5.031 ***	-6.7642 ***
D(DR)	t/c	0	-4.419 ***	-7.846 ***	-4.673 ***	-6.53 ***	-8.819 ***
D(DR)	c	3	-2.821	-2.704	-3.338 **	-4.409 ***	-3.6485 ***
D(DR)	c	2	-2.986 **	-4.354 ***	-3.759 ***	-3.705 ***	-3.0886 **
D(DR)	c	1	-3.634 ***	-5.391 ***	-4.342 ***	-5.009 ***	-6.77 ***
D(DR)	c	0	-4.218 ***	-7.627 ***	-4.627 ***	-6.527 ***	-8.87 ***
D(DR)	nt/nc	3	-2.878 ***	-2.707 ***	-3.37 ***	-4.454 ***	-3.6759 ***
D(DR)	nt/nc	2	-2.917 ***	-4.159 ***	-3.793 ***	-3.741 ***	-3.1339 ***
D(DR)	nt/nc	1	-3.582 ***	-5.225 ***	-4.378 ***	-5.055 ***	-6.8214 ***
D(DR)	nt/nc	0	-4.197 ***	-7.496 ***	-4.663 ***	-6.584 ***	-8.9217 ***
LGD	t/c	3	-2.738	-1.426	-2.181	-2.346	-1.5333
LGD	t/c	2	-2.366	-1.88	-1.924	-2.992	-1.7942
LGD	t/c	1	-3.255	-2.118	-2.03	-2.176	-1.5208
LGD	t/c	0	-3.191	-2.759	-1.961	-0.883	-0.8484
LGD	c	3	0.2292	-0.337	-1.601	-1.351	-1.0767
LGD	c	2	0.129	-0.762	-1.486	-1.147	-0.9709
LGD	c	1	0.0133	-0.614	-2.043	-1.288	-1.0908
LGD	c	0	-0.67	-1.257	-2.662 *	-1.875	-0.5379
LGD	nt/nc	3	2.1434	1.1226	2.126	1.8799	2.82118
LGD	nt/nc	2	2.7835	0.8607	2.4402	1.3807	2.46001
LGD	nt/nc	1	2.3327	0.958	3.8374	2.1026	3.32842
LGD	nt/nc	0	2.3764	0.7224	9.0801	7.3206	6.22845
D(LGD)	t/c	3	-4.652 ***	-3.271	-2.502	-4.016 **	-3.0013
D(LGD)	t/c	2	-4.019 **	-5.62 ***	-3.018	-3.094	-4.1031 ***
D(LGD)	t/c	1	-6.223 ***	-6.699 ***	-3.517 **	-2.445	-3.7237 **
D(LGD)	t/c	0	-6.718 ***	-8.025 ***	-5.625 ***	-3.545 **	-5.4409 ***
D(LGD)	c	3	-4.587 **	-3.376 **	-2.156	-3.806 ***	-2.9049 **
D(LGD)	c	2	-4.036 ***	-5.706 ***	-2.827 *	-2.957 **	-4.0736 ***
D(LGD)	c	1	-6.286 ***	-6.738 ***	-3.369 **	-2.381	-3.7185 ***
D(LGD)	c	0	-6.813 ***	-8.104 ***	-5.349 ***	-3.444 **	-5.4381 ***
D(LGD)	nt/nc	3	-2.27 **	-2.366 **	-1.133	-2.331 **	-1.7079 *
D(LGD)	nt/nc	2	-2.379 **	-3.36 ***	-1.712 *	-1.978 **	-2.7534 ***
D(LGD)	nt/nc	1	-4.151 ***	-4.358 ***	-2.166 **	-1.766 *	-2.6558 **
D(LGD)	nt/nc	0	-5.48 ***	-6.17 ***	-3.241 ***	-2.425 **	-4.0043 ***

1/ LGR=LPR *** 1% significance All variables except(interest rates & output gap) are in log
TGR=TPR ** 5% significance D(.) Difference once
2/ LDR=LNR * 10% significance LM1=Money Supply M1
TDR=TNR t/c=Trend and Constant LM2=Money Supply M2
DR=TBILL c=Constant LGR= Real GDP
DR=TBILL nt/nc=No Trend & No Constant TGR=(Actual-trend Real GDP)
1/2/3/ LGD=LCPI LNR= Real GNP
TNR=(Actual-trend Real GNP)
LPR= Production Index
TPR=(Actual and trend Production Index)
LEX=Exchange rate per US Dollar
DR= Deposit rates
TBILL=Treasury Bill Rates:
LGD= GDP Deflator
LCPI=Consumer Price Index

Sample Size:
Indonesia: 1983.1-1992.4
Korea: 1980.1-1994.4
Malaysia: 1978.1-1994.3
Philippines: 1979.4-1994.4
Singapore: 1975.1-1994.4

Chapter 8

INFLATION IN INDONESIA: ITS CAUSES AND MANAGEMENT

by

Dody Budi Waluyo

Etika Rosanti

I. General Indonesia Macroeconomic Setting (1960-1995)

Achieving sustainable development has become the main thrust of Indonesian policy in the last 35 years. The country's achievements are by most standards quite impressive. The combination of hard working population with dynamic business communities and sound economic policies have been instrumental in enabling the people of Indonesia to substantially increase their standard of living, reducing dramatically the threat of starvation, poverty and social unrest. Thirty years ago, Indonesia was one of the poorest countries in the world, with a per capita income of only US\$70. Over this past quarter century the country has been growing at an average of almost 7 per cent a year — a growth performance that ranks among the ten fastest in the world and on par with that of other dynamic East Asian countries. Rising at an average rate of about 4.5 per cent a year, Indonesia's per capita income has now reached over US\$900, still low but it has grown almost ten-fold over this period. The rise in average incomes has been secured side by side with improvements in the welfare of most of the population. In 1970, around 70 million people, or 60 per cent of the population, lived in absolute poverty. By 1990, the number of the poor had dropped to about 27 million, or 15 percent of the population. Farmers have boosted their productivity enough to feed a growing population and produce a rising surplus for exports. In 1965, the average daily calorie intake was only about 80 per cent of the minimum requirement; today it is 120 per cent. Improved health care and nutrition have added more than 20 years to the life span of the average Indonesian. Literacy rates have increased, infant mortality rates have fallen sharply, and the proportion of the population served by safe drinking water has nearly tripled. These are improvements in some social indicators as examples of Indonesian achievements in development in a broader sense.

Another remarkable performance has been in the transformation from an agricultural economy toward a more industrialized economy. As a result of a series of substantial structural reforms, since the early 1980's the economy has rapidly grown to become more diversified and less dependent on oil, with a greatly expanded role for the private sector in the economy. Exports, in constant dollars, have grown by over 13 per cent a year since 1965. More importantly, the base of exports which was dominated by primary products, including oil and agricultural products, has increasingly shifted towards manufacturing products. In the last few years Indonesia has become internationally competitive in the export of a variety of manufactured goods, so that today manufactured exports contribute nearly 50 per cent of total export earnings.

1.1 The Need for Macroeconomic Stability

Macroeconomic stability has been one of the hallmarks of the Indonesian economy over the past 26 years. Without stable macroeconomic foundation, there is little hope that Indonesia can sustain the process of development. One key aspect of macroeconomic stability is a low and stable inflation rate. The experience in the past 26 years provided a strong case for this. Before the first Five-Year Development Plan (Repelita I) in 1969, Indonesia experienced a hyper inflation, reaching more than 600 per cent in 1966. Without containing first the inflation at that time, the development plan, however carefully it was designed, could not possibly be implemented successfully. Therefore, Indonesia introduced a balanced budget policy, requiring that the budget deficit cannot be financed by printing money. Since then, sound budgetary management combined with prudent monetary policy have successfully kept inflation under control. In the past decade, the inflation rate has been managed within a single-digit level. By vigorously controlling inflation rates, Indonesia has been able to maintain positive real interest rates that have stimulated savings and subsequently investments, and realistic exchange rates that have enhanced the competitiveness of our export commodities in the world markets.

Similarly, Indonesian macroeconomic policies have always been geared to promote a sustainable level of current account on the balance of payments. Over the years, the current account deficit has been maintained at manageable level. As a developing country, Indonesia depends on the inflow of capital from abroad, be it in foreign borrow-

ing or direct portfolio investments. However, Indonesia always insists upon a self-financing policy that the bulk of its financing needs must come from domestic sources, from its own savings. Foreign sources of finance will remain important but Indonesia restrains itself in acquiring commercial sources of financing by emphasizing on soft loans in its debt management strategy and by promoting the inflow of foreign investments. Indonesia has embarked on an all out campaign to boost exports by following an export-led growth strategy, especially starting from the mid-eighties on.

An important aspect of Indonesian macroeconomic policy is that a comfortable level of foreign exchange reserves, as a cushion against external shocks, has always been maintained. Indonesia has a free foreign exchange system, whereas foreign exchange is free to be held or traded. Indonesia adopts an open economy, and thus volatility in the world economy has significant impacts on the domestic economy. Therefore, Indonesia has to maintain an adequate level of foreign exchange reserves not only to safeguard the balance of payments position, but also to serve as cushion from the adverse speculation that may disrupt the foreign exchange markets. Currently, Indonesia foreign exchange reserves reached a comfortable level of US\$ 14.7 billion, equivalent to about 4.3 months of imports.

1.2 Structural Adjustments

One of the important factors in sustaining development over the past 26 years has been the ability of the government to promptly recognize and appropriately respond to rapid changes in economic environment, both domestically and internationally. Indonesia has moved from a centrally planned, command economy to a more flexible and decentralized, market-based economy. Indonesia keeps opening up the economy, with the view to tapping new opportunities in the world economy. Indonesia has started systematic efforts to transform agriculture-based, oil dependent economy towards a more industry-led and more diversified economy. Through a series of adjustment policies, Indonesia has attempted to turn challenges to new opportunities for our economic development. The first wave of adjustment measures was implemented in the late sixties and the early seventies. Before Indonesia began to embark upon Repelita I in 1969, the economic situation was in chaos: inflation rate was uncontrollable and economic institutions were not functioning. Therefore, Indonesia moved swiftly

to curb macroeconomic instability through the balanced budget and prudent monetary policy. Indonesia began to restore the functioning of various economic institutions through deregulation measures in the real sector. The stocks and distribution of primary goods were improved. Imports of raw materials and spare parts for high priority factories were opened. Conducive climate for business activities and investments was enhanced. Rehabilitation of infrastructures, particularly agricultural infrastructures, received the highest priority. The period from 1967 to 1968 was basically a stabilization and reconstruction period to prepare for the launching of the First Development Plan. After successfully consolidating the economy, the first development period continued to emphasize on agricultural sector to provide enough food and increase the welfare of most people.

During the 1970s, the Indonesian economic development accelerated by the sharp increases in oil prices. At that time, the economy was characterized by three factors: abundant foreign exchange, heavy dependence on oil, and the dominant role of the government. The strategy was to use oil revenues optimally to speed up the process of development. The government, through the budgetary mechanism, played a major role in channeling the oil revenues to stimulate economic growth and income distribution. To stimulate growth, the government selected various high priority economic sectors and infrastructure to be financed. The government also allocated some of the revenues to finance various welfare improvement programs, such as family planning, education, health care, and village improvement programs.

However, the sharp drop of oil prices in the early 1980s created a major blow to the country's dependent on oil. The shock was further worsened by a currency realignment that boosted the stock of debt and the debt service burden. Confronted with this series of severe adverse external shocks, the government responded promptly by "turning-around" the economy through the implementation of adjustments commonly known as "deregulation packages". This was the second wave of adjustment policies and coincided with the rediscovery of market mechanism, marked by economic liberalizations in so many countries. Indonesia's adjustment policies of the 1980s have been directed towards promoting the implementation of export-led development strategy and the flexibility of the domestic economy against the uncertain and very competitive world economy. Indonesia has been pursuing adjustment policies in all sectors, covering both macro, sectoral

as well as micro aspects. Indonesia opened up key economic sectors to competition, reduced licensing and simplified administration procedures, thus providing improved incentives to private sectors. Indonesia has introduced broad trade reforms — reducing non-tariff barriers, transforming non-tariff barriers to tariffs, and lowering tariffs — simplifying investment measures and opening service sectors. In addition, Indonesia has issued a series of financial reforms to boost the role of the financial sector in the economic development. And while Indonesia has focused on developing the manufacturing sector, Indonesia has continued to invest in the agricultural sector, which remains the backbone of the economy.

The outcome of the adjustment measures has been apparent in significantly increasing economic flexibility. In a few short years, non-oil export commodities have changed from a minority to a growing majority in total export, in terms of value and variety. Currently the non-oil export revenues make up more than 70 per cent of total foreign exchange earnings. At the same time, within the government budget, non-oil revenues surged from less than 30 per cent a decade ago to more than 70 per cent of the present total domestic revenues. Most of the non-oil revenues come from taxes, a sign of the firming financial independence of the country. The expansion of non-oil sectors of the economy also marks the growing prominence of the private sector. Most non-oil exports are produced by private domestic companies, joint ventures, or wholly owned foreign companies. It has been a synergy between a good economic climate provided by sound economic policies and active business communities who grabbed the new opportunities for enhancing their roles in the development process.

1.3 The Role of Financial Sector

Indonesia began the major reform in June 1983. The financial reforms in Indonesia have been carefully phased and only gradually implemented. Begun with interest rate liberalization in June 1983, it was followed by reforms of the institutional structure in October 1988, credit system in January 1990, prudential regulation in February 1991 and legal framework in March 1992. The thrust of the series of financial reforms is directed toward the achievement of higher efficiency in the mobilization and channeling of funds to various feasible investment projects.

Results can now be observed from the structural adjustments that have been implemented in the past several years. The number of commercial banks has almost doubled within 5 years, from only 124 banks in October 1988 to above 240 banks in 1995, with bank offices increasing from around 2500 to more than 5500 spreading throughout the country.

More importantly, the financial reforms have fostered a more effective functioning of the market mechanism for the banking system in the performing its function as a financial intermediary. The efforts toward deregulating the banking industry have led to increased competition among banks, encouraging greater efficiency. Banks are now more independent in terms of being able to set their own business strategies. Banks have become more market-oriented and this is reflected in the prices they establish for loans and deposits.

II. Review of Inflation Experiences in Indonesia

Indonesia has experienced persistently high inflation for a long time. The peak was reached in 1966 when it rose to 635.3 per cent as can be seen in Table 1. For the period between 1962 and 1967, the hyper-inflation that occurred was mainly due to a very large budget deficit financed by bank credits, which in turn caused an increase in the quantity of money. In addition, there was also a disastrous drought in late 1961 that caused an ambitious program aimed at self-sufficiency in rice to fail.

After 1966, as soon as the new government had consolidated its position, an economic stabilization program, which included a set of fiscal, monetary and foreign exchange policies, was launched. The first effort was to eliminate the budget deficits by introducing a "balanced budget" policy, i.e., to finance deficits by using foreign borrowings and grants and no longer by using bank financing. In addition, most donor countries affiliated with the Inter-Governmental Group on Indonesia (IGGI) agreed to provide new financial aid in order to assist the recovery and development of the Indonesian economy. A new foreign investment law was introduced in 1967 in order to attract more direct foreign capital investment. With this new regulation, the Indonesian economy became relatively open to foreign capital. Price controls, like subsidies, were eliminated gradually allowing market forces to play greater role and thus reducing government's intervention.

Government emphasized its efforts to increase custom duty collections, direct tax revenues and proceeds from excises and the sales tax.

The stabilization program of the new government was remarkably successful in slowing down the rate of inflation. From 635.3 per cent in 1966, the inflation rate decelerated to 112.2 per cent and 85.1 per cent in 1967 and 1968, respectively. Inflation further decreased sharply to 9.9 per cent and 8.9 per cent in 1969 and 1970 and dropped to only 2.5 per cent in 1971. In 1972 inflation rose again to 25.8 per cent, and further to 27.3 per cent and to 33.3 per cent in 1973 and 1974 respectively. Inflation in 1972 was mainly due to the drought which occurred in mid-1972, causing a severe failure of the second harvest time.

In the period 1973 and 1974, inflation in Indonesia was probably strongly influenced by world-wide inflation which began accelerating in mid-1972. Besides the international influence, the price of Indonesia's oil exports in 1972 and 1973 rose by 27 per cent and 61 per cent respectively, compared to that of previous year. Consequently, the foreign exchange resources available to the Indonesian economy increased, and this created high-powered money that further bidded up the domestic price level, and hence created inflation.

For the second time the government launched a stabilization program to attack inflation. A substantial expansion of direct subsidy payments was devoted to a wide range of consumer goods in order to stabilize prices. Credit expansion was reduced by setting ceilings for each individual bank and for regulation, the authorities set both the upper limit of the net domestic assets of the banking system, as in the past, and the maximum allowable expansion of net bank foreign assets. National buffer stocks were introduced for several essential commodities in order to insulate the domestic economy from world prices. As a result of these measures, the rate of inflation was brought down to 19.7 per cent and 14.2 per cent in 1975 and 1976 respectively. The inflation then decreased further to 11.8 per cent and to 6.7 per cent in 1977 and 1978.

The government applied devaluation of the Rupiah to improve the competitive position of the Indonesian economy in 1978. These measures were also aimed at encouraging more labor intensive activities by making imported goods relatively expensive and thus stimulating

Table 1
ECONOMIC GROWTH, INFLATION,
AND MONEY SUPPLY

(Percentage Change)

Year	Econ. Growth	Inflation	M1	M2
1960	—	37.7	39.0	—
1961	5.7	26.9	42.0	—
1962	1.8	174.0	99.0	—
1963	-2.2	118.7	95.0	—
1964	3.5	135.1	156.0	—
1965	1.1	594.3	280.0	—
1966	2.8	635.3	763.0	—
1967	1.4	112.2	131.5	138.7
1968	10.9	85.1	121.6	124.4
1969	6.8	9.9	61.4	93.6
1970	7.5	8.9	36.2	41.6
1971	7.0	2.5	28.1	41.9
1972	9.4	25.8	48.0	48.2
1973	11.3	27.3	40.9	42.1
1974	7.6	33.3	40.2	47.1
1975	5.0	19.7	33.3	36.2
1976	6.9	14.2	28.2	33.0
1977	8.8	11.8	25.2	19.0
1978	7.8	6.7	24.0	21.7
1979	6.3	21.8	35.8	36.9
1980	9.9	16.0	47.6	47.5
1981	7.9	7.1	29.8	26.3
1982	2.3	9.7	9.8	14.0
1983	4.2	11.5	6.3	32.4
1984	7.0	8.8	13.4	22.3
1985	2.5	4.3	17.7	29.1
1986	5.9	8.8	15.6	19.5
1987	4.9	8.9	8.6	22.5
1988	5.8	5.5	13.5	23.9
1989	7.5	6.0	39.8	39.8
1990	7.2	9.5	18.4	44.2
1991	6.9	9.5	10.6	17.1
1992	6.4	4.9	9.3	20.2
1993	7.3	9.8	27.3	22.0
1994	7.5	9.2	25.0	20.2
1995	8.1 ^{*/}	8.9	15.0	27.6

* / projection figure

Source: *Central Bureau of Statistics*, Bank Indonesia

development of export and import substitution industries. Nevertheless, inflation did increase in 1979 to 21.8 per cent following the devaluation. In 1980, the inflation was mostly accommodated by the growth of the money supply. In addition, an excellent harvest in 1980 helped in minimizing cost pressure on the supply side and thus contributed to a relatively moderate rate of inflation to 16.0 per cent and 7.1 per cent in 1980 and 1981, respectively.

However, in 1982, there was a continuing weakness in the petroleum market and thus Indonesia's balance of payments began to deteriorate. At the same time, government receipts from oil company taxes declined by 5 per cent in nominal terms in 1982/83 following the decline in oil sector earnings. Various actions had been taken by the Government to restrain the growth of expenditures, such as reductions in oil and food price subsidies, and it also adopted various policies to promote non-oil exports; however, a devaluation could not be avoided. In March 1983, the Government announced a devaluation of the Rupiah by 27.62 per cent. Following this measure, the authorities tried to minimize domestic inflationary effects, based on their past experience when improvement in the real exchange rate, brought about by the November 1978 devaluation, was lost through accelerating inflation. Monetary policy had remained very tight and the policy resulted in inflation of only 11.5 per cent in 1983. The rate of inflation throughout 1984 declined steadily. The rate of price increase was only 8.8 per cent in 1984 and dropped to 4.3 per cent in 1985 as the consequence of the slowdown in government spending and the relatively tight money policy.

In 1986, the steep drop in oil prices brought about heavy pressures on the balance of payments and a sharp reduction in government revenues. As a consequence of these pressures, Government undertook a 31 per cent Rupiah devaluation vis-a-vis the US dollar on September 1986 in order to avoid further deterioration in the balance of payments. In support of this measure, the Government also undertook a series of other fundamental policy measures namely October 1986 and January 1987 deregulation packages, which were mainly intended to encourage non-oil/gas exports and investment. Partly as a result of the series of policies taken by Government, inflation registered a tolerable rate of inflation of 8.8 per cent in 1986 and 8.9 per cent in 1987. The lower rate of inflation in 1988 (5.5 per cent) and in 1989 (6.0 per cent) was attributable to prudent monetary policies of the Government and adequate supplies of consumer goods.

On the other hand, domestic demand for goods and services increased rapidly in 1991 and substantially exceeded the expansion in domestic supply. This situation led to an acceleration of inflation reaching to 9.5 per cent both in 1990 and 1991. The strong domestic demand in the past few years resulted mainly from a surge in investment activities due to a more favorable investment climate following the adoption of a series of deregulation measures by the Government. In addition, the higher production cost following the increases in the domestic prices of fuel oils, transportation fares and cement in 1990 also contributed to the rise in the inflation rate.

Efforts to control the inflation rate during that year were carried out by enhancing coordination of monetary, fiscal and other policies. As regards monetary policy, the Government slowed down the growth of money supply by conducting open market operation through transactions in Bank Indonesia certificates (SBIs) and money market securities (SBPUs) and phasing out Bank Indonesia liquidity credit gradually in accordance with the Policy Package of January 1990. With respect to fiscal policy, since October 1990 Government imposed ceiling for each Treasury Office's deposits maintained with banks and to transfer all tax receipts promptly to Bank Indonesia. Through these policies, combined with improvement in aggregate supply, the inflation rate decelerated markedly to 4.9 per cent in 1992. Output of the agricultural sector improved due mainly to adequate rainfall, thereby dampening inflationary pressure from food prices, which account for a large share in the Consumer Price Index. Other factors contributing to the deceleration in the inflation rate included the absence of upward adjustments in the prices of goods and services controlled by the Government, such as oil-based fuels, electricity, and transportation fares.

However, the rate of inflation accelerated to 9.8 per cent in 1993. Much of this acceleration was accounted for by sharp increases during the first quarter of 1993 following the upward adjustment in the prices of oil-based fuel, transportation fares, electricity and floor price of rice. Furthermore, extensive flooding on the island of Java also contributed to higher food prices during that period. The increase in civil servant salaries and wage rates; a rise in the price of several construction related goods from April 1993 caused by buoyant activities in the construction and real estate sector; and the relatively easing monetary situation which tended to drive consumption also contributed to the higher rate of inflation. The rate of inflation in 1994, decreased slightly

to 9.2 per cent. This inflation was due mainly to the disturbance of supply side. The higher demand for goods and services also has contributed to the inflation. From the supply side, the inflation was closely related to a consequence of the rise of floor prices for paddy and fertilizer, disturbance of goods supply and distribution due to the flood in the early year and prolonged drought in the end of 1994, and slight shortage in the supply of rice due to late harvest time. This was reflected in the increase in the price of foodstuffs by 13.9 per cent. In addition, the electricity tariff adjustments in November 1994 caused significant increased in inflation. The higher demand for goods and services which coincided with Idul Fitri Day has also put upward pressure on consumer prices.

In 1995, the inflation rate reached 8.6 per cent, less than inflation in 1993 (9.8 per cent) and 1994 (9.2 per cent) but still above the inflation target in Repelita VI of 5 per cent. The high pressure of inflation during this year was due to high growth of domestic demand and several factors in supply side. The disturbance in production and distribution of foodstuffs especially rice, the increase in the prices of import goods in international market, and some psychological effects of the rise of wages and salaries rate were dominant factors in the supply side. From the categories of inflation, as in 1994, foodstuffs had been the major contributor to inflation in 1995, and it differed with the experience in 1993 where housing became the important contributor to inflation.

III. Model of Inflation: Methodological, Analytical Framework and Empirical Results

3.1 Inflation Model

Theoretically, factors which cause inflation may originate from the demand side (e.g., higher demand due to increasing income, seasonal factors as Idul Fitri, Christmas, New Year, etc.) as well as from the supply side (e.g., higher import prices, wage level, production costs etc.). According to Keynesian and Monetarist approaches, higher inflation is caused by higher demand in the economy. Nonetheless, monetarists emphasize that in the long run, the higher demand originate from money supply increasing at a faster rate than wished for by the public. On the other hand, according to structural approach, supply factors are more influential in determining the behavior of inflation as

ultimately, higher prices (including wage levels) will be translated as higher production costs resulting in higher price levels.

This model attempts to combine the monetarist and structural approaches by presenting the determinants of inflation from the demand side (demand pull) and the supply side (cost push). The inflation model is as follows:

$$p = f(m, g, k, gd, w, pm, e, pa, d) \quad \dots (1)$$

where: p = growth of domestic price (CPI)
 m = growth of money supply (M1 or M2)
 g = growth of potential GDP
 k = growth of capital stock
 gd = growth of government budget deficit
 w = growth of wages
 pm = growth of price of imported goods
 e = exchange rate (Rp/US\$) increase
 pa = growth of administered price
 d = natural disaster

The variables, m (money supply, either M1 or M2), g (potential GDP), k (capital stock), gd (government budget deficit) and w (wages of labor) are to represent factors from the demand side (demand pull). Theoretically, m should basically be in terms of excess supply/demand (difference between money supply and demand by society in real terms). The Monetary Approach to Balance of Payments theory states that in an open economy with free exchange rate system, the ability of the monetary authority to regulate money supply is limited. By adopting a managed floating exchange rate system, the monetary authority may still manage money supply ex-ante through the credit component of reserve money. For instance, if the monetary authority increases money supply (expanding credit), money market disequilibrium will occur ex-ante causing the public to react by spending the excess money supply on goods (and also foreign exchange) in the country. Therefore, this will affect inflation (and foreign exchange reserves) in the country.

Economics literature frequently presents the existence of a parallel relationship between inflation and economic growth (g variable), com-

monly known as the Phillips Curve. Viewing the Indonesian economy in the last five years, this seemed to have also occurred, although it was not always proportional as in the years 1993-1994. In 1993, the economy recorded growth of 7.3 per cent which rose to 7.5 per cent in 1994 although the inflation rate declined from 9.8 per cent to 9.2 per cent. The reason for using GDP potential instead of common GDP is to reflect the real economy capability that can be calculated using the level of investment and capital stock.

The k variable represents output gap, that is the extent of economic capacity and efficiency level of utilizing production capacity. In general, it may be said that increasing efficiency in the real sector (or increasing production capacity) will have positive impacts in reducing the inflation level. Based on several previous studies, the gd variable is also a factor which significantly influenced the inflation level. The relation between the national budget (APBN) and price changes is related to monetary injection or contraction produced by the APBN towards reserve money. Domestic budget deficit will produce monetary expansion while budget surplus will provide monetary contraction effects. The deficit relation was very significant during periods of oil boom. APBNs monetary expansion (or domestic deficit of APBN) has encouraged the growth of money supply above the capability of the economy to absorb it. Consumption of imported goods rose and performance of export goods (especially manufactured goods) recorded slow increase. This Dutch Disease phenomenon occurred in almost every oil boom period.

Labor wage increase (variable w), whether for government officers/ABRI or private employees, also affects price developments. This effect may originate from increasing purchasing power of the public as a result of higher wages or from psychological effects of the wage increase announcement itself. This was very much felt especially when the wage of civilian government officers/ABRI in March 1991 resulted in a high inflation rate in the following month (inflation rate for April 1991 was 1.89 per cent). Other than from the demand side, announcement of regional minimum wage (UMR) increase also caused cost push inflation by increasing production costs. Meanwhile, there were also temporary or seasonal factors from the demand side which influenced demand. Factors such as Idul Fitri celebrations have significant influence on demand surge particularly for food and clothing. Significant inflationary pressures especially near Idul Fitri were always related to rising food and clothing price.

From the supply side, there were factors which may be identified as causes of inflation from the supply side. These factors may originate from within the country or from overseas. Factors arising from within the country may be further categorized as originating from government policies or from natural disasters. From overseas, variable pm (import price) and e (exchange rate) are the most influential. The choice of these two variables reflects the transmission of imported inflation through price changes in world manufactured goods (price of imported goods) and as a result of changes in exchange rates (depreciation). Price increase of imported goods and the deterioration of rupiah value will directly affect the rate of price increase in the country. This was experienced recently when the Yen appreciated against several major world currencies (Yendaka) due to the unbalanced trade account of Japan and the United States. The Yen appreciation was matched by the price inelasticity of demand for imported goods in Indonesia (whether consumer goods, capital goods or raw materials) which directly pushed up prices of imported goods, particularly from Japan. Ultimately, this directly resulted in a higher domestic inflation level.

Meanwhile, from within the country, the most influential factors were administered prices (variable pa) and natural disasters (drought and flood). As it is known, in order to manage price so as to protect producers as well as consumers, the government has decided to regulate the price of selected goods and services. In general, these goods and services are basic necessities for the general public such as rice, oil-based fuel, electricity tariffs, transport tariffs and others. The government increased the price of selected goods/services periodically. So far, experience has indicated that there exists a relationship between increasing administered prices and high inflation in the months in which price increases were carried out. High inflation rate may be due to direct or indirect influence. Direct influence is from commodities included in administered prices which possess significant weight in the calculation of inflation, such as rice with 7.27 per cent and city transport with 3.97 per cent. Indirect influence is influence caused by rising production costs of goods and services which also used those commodities as inputs; for instance, higher rice price will result in higher prices of other food. As an example, in January 1993, the government increased the price of oil-based fuel, HPS cement ("official" cement price), electricity tariff and transport tariff. As a result, in the first three months of 1993, the inflation rate reached 6.44 per cent.

Besides government policies, high inflation rate may also originate from natural factors (d variable) such as flood and drought. The occurrence of natural disasters such as flood will result in failed rice harvest or upset distribution as transportation lines are disrupted causing the price of goods and services in selected areas to increase.

From the above explanations, it may be observed that not all price increases originate from rising aggregate demand. Some of the causal factors are beyond the range of the monetary authority. Therefore, in view of the limited availability of annual data, only several factors or variables which may be collected are chosen for computation of the regression model. Some of the problems are the collection of labor wage data and relatively short time series for administered price data. Consequently, the regression model is simplified to

$$p = f(m, g, k, gd, pm, pb, e) \quad \dots (2)$$

where pb = growth of rice price (as a proxy for administered prices)

3.2 Methodological and Analytical Framework

In this research, annual data from 1970-1995 are used whereby these data have been transformed into the form of growth rates (or some into the logarithm form) in order to explain the effect of the change in one variable towards the change in another variable. The equation of the model was then estimated with ordinary least square (OLS) using the Error Correction Model and Cointegration approach.

Through the Error Correction Model and Cointegration approach, long term equilibrium condition in the inflation model was obtained from the prediction of variables in the form of levels (growth level). After which, the residual value which was obtained from the prediction was used in the estimation of the error-correction model. The Error Correction Model (ECM) specifies the short term dynamic condition. The estimation of ECM was based on the Two-Step Cointegration approach. The first stage of this approach consisted of analyzing variables which possess close relation with inflation in the long term (or known to be cointegrated with inflation) while in the second stage, variables which influenced inflation in the short term are analyzed.

3.3 Cointegration Test of Non-stationary Variables

The basic assumption behind stable parameters in the inflation function is that the variables which influence inflation must be cointegrated in the long run. Stationarity means that in the long run a variable tends to fluctuate (up or down) around a certain value. In practice, most economic variables generally possess trends and are not likely to return to a fixed value.

Visually, this may be seen in Graph 1 for variable nominal exchange rate of Rupiah against US\$ (variable NER). The variable NER level continues to rise without showing any signs of returning to a fixed value. Therefore, the variable NER level is said to be non-stationary. In order that NER may become stationary, it may be transformed to its first difference. When NER becomes stationary in the first difference, NER is said to be stationary with integration degree one or I(1). On the other hand, if we take the growth of NER, that variable will show stationary condition at level stage guaranteeing that the first difference is also at stationery condition (see Graph 2). Tests to determine whether a variable is stationary or not may be conducted by various methods. The general method used is the Augmented Dickey Fuller Test.

Therefore, with reference to the study by Engle and Granger, before concluding the relationship of the variables to be studied, the relationship between the stationary variables must first be tested with the cointegration test. When two or more variables possess in the long run a linear relationship, then they are said to be cointegrated.

3.4 The Error Correction Model (ECM) Approach

The ECM approach enables the use of non-stationary variables in the inflation function, whether in the form of level or first differences. Furthermore, the ECM approach make it easier to differentiate between short term and long term inflation function. Operationally, the specification of the inflation model by the ECM approach consists of two steps. In the first step, the inflation function is at long run equilibrium, or reflecting cointegration equation, that is:

$$p_t = \alpha + \beta y_t + \vartheta z_t + u_t \quad \dots (3)$$

Where, p is the inflation level, y and z are variables which describe changes in p , and u is long run stochastic residual/disturbance. In the condition where p , y and z are cointegrated, u is stationary.

Intuitively, this may be explained as follows. The systematic nature of p may be wholly explained by independent variables which explain the change in p and therefore unexplained fluctuations of p are random elements. Due to its random nature, on the average, these random elements have 0 value in the long run. Statistically, this is specified as: u is distributed normally with mean equal to 0.

The second step is the dynamic error correction equation. This equation reflects the short term inflation model where actual inflation is not always as expected by the public in the long run so that in the short run, the public will always adjust to the expected inflation in the long run.

Evaluation of ECM is done through the procedure of evaluating the long term inflation model (equation 3) and calculating its residual. Evaluation of short term inflation model is then done by including the residual value (lag one period), which was evaluated in the first stage, into the short term model (equation 4).

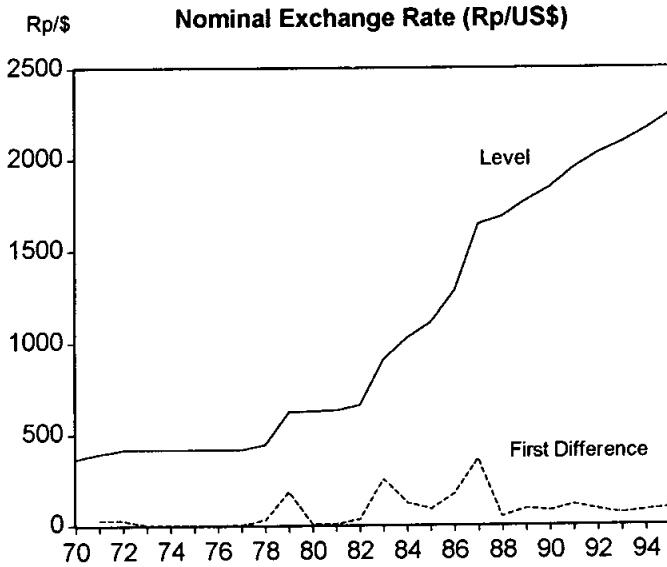
$$\Delta p_t = \alpha + \beta \Delta y_{t-s} + \theta z_{t-s} + \phi U_{t-1} + \sum_t \dots (4)$$

Where Δ is first different operator, U_{t-1} represents inflation behaviour in the long run, and $\sum_t$ represent disturbances in the short term, ϕ shows error correction coefficient that explains the adjustment process for long term inflation.

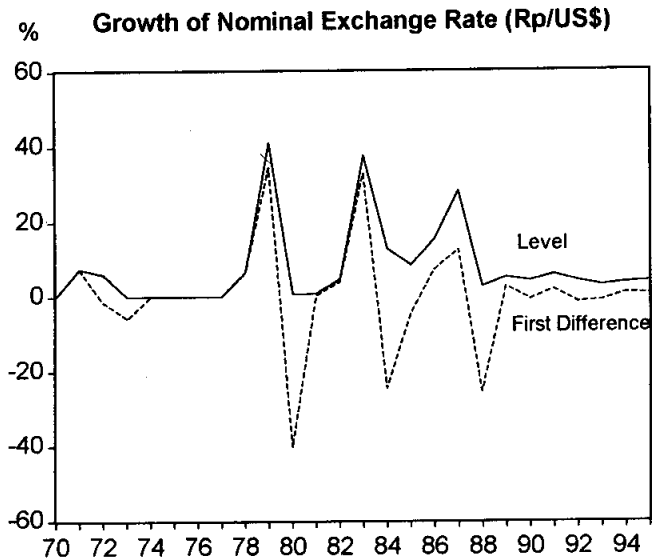
4.5 Empirical Results

In this research, stationarity tests using the Augmented Dickey-Fuller test are performed to find out whether variables in the equation system have a unit root. Test results (see Table 2) show the presence of unit root at level for several variables such as CPI (Consumer Price Index), M1 (narrow money), PDBRPP (GDP potential), CAPS (capital stock), WPIM (import wholesale price index) and NER (nominal exchange rate). The presence of unit root indicates the non-stationarity condition of the above variables. Meanwhile, other variables such as

Graph 1



Graph 2



M2 (broad money), PDBRP (GDP), APBNB (budget balance), WPIMP (import wholesale price index, percentage change), NERP (nominal exchange rate, percentage change), PR (price rice, nominal) and PRP (price rice, percentage change) reject the presence of unit root hypothesis; or in other words, these variables possess the condition of stationarity. First-difference level tests show that all the observation variables are stationary (see Table 3).

The next step is to test whether there is a close linear relationship between the variables in the long term. Cointegration tests are done using the Johansen Cointegration Procedure. Test results (see Table 4) show that there is cointegration only among variables CPIP, M2, CAPS and PRP. This shows that these variables are in an equilibrium condition that keeps them in proportion to each other in the long run. Meanwhile, there are no statistically significant relationships when combined with other variables. As such, the assessment of inflation is next done through the ECM approach. As explained above, the inflation model specification consists of two parts. The first part, in line with the results of cointegration tests, shows the long-term equilibrium function of inflation (cointegration equation), while the second part indicates the short-term equilibrium function of inflation (dynamic error correction equation). If the short term equation uses the first differences (Δ), then the long term equation is stated in levels (all variables in Δ becomes equal to 0 in the long term).

In general, the above assessment shows rather satisfactory results (see Table 5). Almost all independent variables have statistically significant effects on inflation. The ability of independent variables to explain inflation is about 60 per cent (R^2) for the long-term equation and almost 90 per cent for the short-term equation. From various experiments, the broad money (M2) variable is more accurately used as the explanatory variable of inflation compared to the narrow money (M1) variable in view of its greater influence as indicated by its parameter.

The inflation analysis must be differentiated based on the long term and the short term in order to know its characteristics. Research results of this inflation model indicate that the error correction coefficient (variable U_{t-1}) of the inflation model is statistically significant. This shows that Indonesian inflation exhibits dynamic behavior, whereby the economy continues to make short-term inflation adjustments toward the desired inflation level in the long term.

Table 2
STATIONARY TEST RESULT (ADF TEST)
(in level)

Variables	Dickey – Fuller t – statistics			Augmented Dickey – Fuller t – statistics (level)	Status
	1%	5%	10%		
CPIP	-3.7204	-2.9850	-2.6318	-2.6195	non – stationary
M1	-3.7204	-2.9850	-2.6318	2.5698	non – stationary
M2	-3.7204	-2.9850	-2.6318	-3.0217	stationary
PDBRP	-3.7204	-2.9850	-2.6318	-3.4890	stationary
PDBRPP	-3.7204	-2.9850	-2.6318	-1.2658	non – stationary
CAPS	-3.7204	-2.9850	-2.6318	-2.2638	non – stationary
APBNB	-3.7204	-2.9850	-2.6318	-3.6143	stationary
WPIM	-3.7204	-2.9850	-2.6318	-1.3290	non – stationary
WPIMP	-3.7204	-2.9850	-2.6318	-4.7761	stationary
NER	-3.7204	-2.9850	-2.6318	2.7585	non – stationary
NERP	-3.7204	-2.9850	-2.6318	-4.4241	stationary
PR	-3.7204	-2.9850	-2.6318	-2.7585	non – stationary
PRP	-3.7343	-2.9907	-2.6348	-4.1101	stationary

Where :

- CPIP = Consumer Price Index , Percentage Change (%)
- M1 = Growth of Narrow Money (%)
- M2 = Growth of Broad Money (%)
- PDBRP = Growth of GDP Real (%)
- PDBRPP = Growth of GDP Potential (%)
- CAPS = Growth of Capital Stock (%)
- APBNB = Government Budget Deficit/Surplus, Nominal (Rp billion)
- WPIM = Import Wholesale Price Index
- WPIMP = Import Wholesale Price Index , Percentage Change (%)
- NER = Nominal Exchange Rate (Rp/\$)
- NERP = Normal Exchange Rate , Percentage Change (%)
- PAGIP = Administered Price , Percentage Change (%)
- PR = Price Rice , Nominal (Rp)
- PRP = Price Rice , Percentage Change (%)

Table 3
STATIONARY TEST RESULT (ADF TEST)
(in First Differences)

Variables	Dickey – Fuller t– statistics			Augmented Dickey – Fuller t– statistics (1st different)	Status
	1%	5%	10%		
D(CPIP)	–3.7343	–2.9907	–2.6348	–5.7907	stationary
D(M1)	–3.7343	–2.9907	–2.6348	–4.9941	stationary
D(M2)	–3.7343	–2.9907	–2.6348	–5.5913	stationary
D(PDBRP)	–3.7343	–2.9907	–2.6348	–6.0257	stationary
D(PDBRPP)	–3.7343	–2.9907	–2.6348	–4.2796	stationary
D(CAPS)	–3.7343	–2.9907	–2.6348	–5.9420	stationary
D(APBNB)	–3.7343	–2.9907	–2.6348	–5.6391	stationary
D(WPIM)	–3.7497	–2.9969	–2.6381	–4.5996	stationary
D(WPIMP)	–3.7343	–2.9907	–2.6348	–6.3926	stationary
D(NER)	–3.7343	–2.9907	–2.6348	–3.6427	stationary
D(NERP)	–3.7343	–2.9907	–2.6348	–6.9910	stationary
D(PAGIP)	–6.7615	–4.0691	–3.2066	–3.4596	stationary
D(PR)	–3.7343	–2.9907	–2.6348	–2.7457	stationary
D(PRP)	–3.7497	–2.9969	–2.6381	–6.0008	stationary

IV. Analysis of the Causes of Inflation

As explained above, inflation usually originates from two sources: demand side and supply side. The former is known as demand-pull inflation, the result of expanding overall demand for goods and services at a rate that exceeds its supply. This discrepancy between supply and demand is largely the consequence of money supply growing at a faster rate than the economy's production capacity. This situation leads to rising prices. From the supply side, on the other hand, inflation occurs when a rise in production costs exceeds the productivity rate (cost-push inflation). Another type of inflation is caused by several supply shock factors, such as adjustment of administered prices, supply shocks owing to temporary or seasonal factors, and natural disasters as well as rising prices of internationally traded goods.

Long-term and short-term inflation characteristics are basically different. This analysis on inflation will henceforth be separated based on its time frame.

4.1 In the Long Term

4.1.1 Demand Side

From the demand side, growth in money supply and slow growth in capital stock are the main factors that encouraged inflation in the long term. The slow growth in capital stock in particular was the dominant factor causing inflation, at least during the observation period (1970-1995).

A Rapid Growth in Money Supply that Affects Domestic Demand

An increase in money supply higher than money demand can disturb the equilibrium in money markets that is followed by increasing consumption to spend the idle money. This condition can cause upward pressure on prices. The Indonesian experience showed that so far the contribution of money supply toward inflation is relatively low as indicated by the relatively small elasticity of inflation toward money supply. Parameter of around 0.2 indicates that there is an increase in inflation of around 0.2 per cent for every 1 per cent increase of M2 (see Table 5).

Table 4

CO-INTEGRATION TEST RESULT
(Johansen Cointegration Test)

Series :	CPIP	M2	CAPS	PRP
Sample :	1970	1995		
Likelihood Ratio	5 percent Critical Value	1 percent Critical Value	Number of Cointegrating Equations	
61.51	47.21	54.56	1	
32.58	29.68	35.65	2	
Normalized Cointegrating Coefficients :				
CPIP	M2	CAPS	PRP	C
1.000	3.687	-0.015	-5.544	-54.888

Table 5

REGRESSION TEST RESULT

Independent	Variable	Cointegration Equation (Long term Equation) CPIP	Dynamic Error Correction Equation (Short term Equation) CPIP
Constant α	Coeff. (t-stat)	7.610 (1.465)	-0374 (-0.725)
M2	Coeff. (t-stat)	0.263 (2.617)	
CAPS	Coeff. (t-stat)	-0.931 (-2.057)	
PRP	Coeff. (t-stat)	0.195 (1.964)	
M2 (t-2)	Coeff. (t-stat)		0.104 (2.141)
CAPS (t-6)	Coeff. (t-stat)		-0.684 (-2.243)
PRP (t-5)	Coeff. (t-stat)		0.094 (2.232)
U1 (t-1)	Coeff. (t-stat)		-0.086 (-2.672)
APBNBP	Coeff. (t-stat)		0.005 (2.216)
WPIMP (t-1)	Coeff. (t-stat)		0.072 (1.432)
NERP	Coeff. (t-stat)		0.073 (1.978)
	$\bar{R}^2$	0.603	0.891
	DW	2.638	2.000
	SER	0.540	0.005

Where :

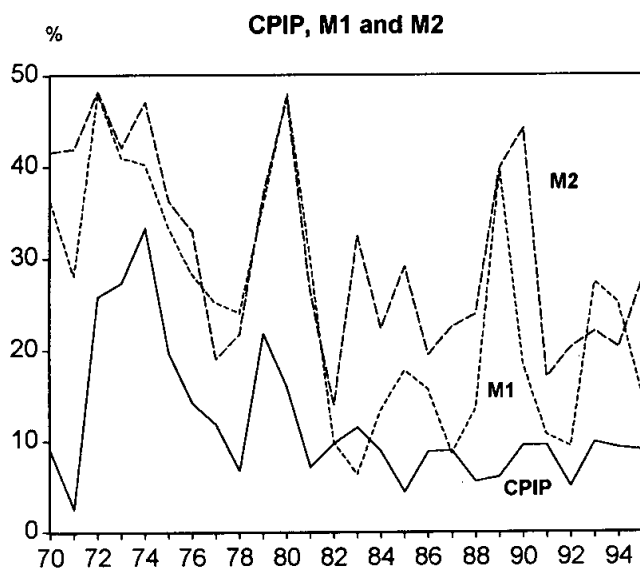
CPIP	Consumer Price Index, percentage change
M2	Growth of Broad Money
CAPS	Capital Stock, percentage change
PRP	Price of Rice, percentage change
U1	Residual of Long Term (Cointegration) equation
WPIMP	Import Wholesale Price Index
APBNBP	Government Budget Deficit/Surplus, percentage change
NERP	Nominal Exchange Rate, percentage change
	Represents first difference
t-s	Represents time lag

Actually, the low parameter level of money supply is debatable considering that the weight composition and type of commodities in the calculation of inflation possibly may no longer be relevant in the present condition (regarding weight composition and commodity items, refer to appendix 2). In view of the consumption pattern of the population in large cities presently, who relatively consume more luxury goods than necessity goods, it is difficult to believe that the increase in aggregate money supply which is largely absorbed by this group of population, in line with their increasing prosperity, has only slight effects on the rising national inflation. Because prices of luxury goods rose rather rapidly, despite their relatively small weight (and possibly has not been covered in the calculation of the basket of goods) in calculations of inflation (since necessity goods dominate the calculation of inflation figures), thus rising prices of this group of goods (which is indirectly stimulated by M2) do not get recorded in the national inflation figure. The relationship between inflation and money supply (M1 and M2) may be seen in graph 3.

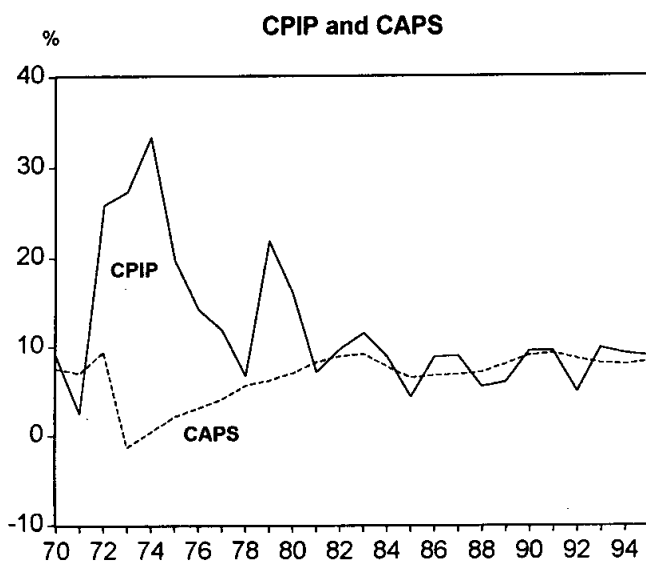
A Relatively Low Domestic Capital Stock

Capital stocks reflect the growth of capital goods investment in the economy that will in turn increase national production activity and broaden economic scale. Rising national capital stock will stimulate rising national production, so that the high public demand is no longer automatically correlated with rising prices (see graph 4). In the 25-year observation period, slow-rising capital stock was the dominant factor causing inflation (around coefficient of 0.9, see Table 5). The relatively slow growth of capital stock so far amidst high domestic demand growth rate resulted in the inability of national production to balance the demand. In the end, this would stimulate rising prices of goods. However, developments in the last 5 years were characterized by high levels of investment activities in the country especially in the form of foreign direct investment and domestic investment. Although there is a time lag between investment approvals and the effective production level (2-5 years, on average), in the long term, however, rapid investment activities (meaning an increase in capital stock) will have positive effects on stabilizing domestic price levels.

Graph 3



Graph 4



4.1.2 Supply Side

Government Policy on Prices of Administered Goods (especially the Price of Rice)

As explained before, the prices of several goods are controlled by the government. At least 18 items are covered and these items, especially rice, gasoline, electricity, and other foodstuffs, are essential products that affect the people's lives. Changes in these prices have direct and indirect effects on the CPI through the prices of other goods. The price adjustments of administered goods are usually followed by rising inflation.

Another large portion of administered prices originate from rice. The price of rice is mostly influenced by production, distribution of rice, and the selling price of fertilizer and rice set by the government. Unfavorable weather conditions such as flood and prolonged drought are the other major factors that influence the price and distribution of rice. Furthermore, the above conditions will affect the general price level (see graph 5). From this observation, the coefficient of rice price is around 0.2 (Table 5), more or less the same as the contribution of aggregate money.

Regarding the unfavorable weather conditions, one example was in 1972 when inflation was a result of a severe failure in the second harvest. That year, other parts of the world also experienced similar food shortages, and therefore, could not help to augment Indonesia's imports. This finally caused the sharp increase in the price of rice in September 1972, which in turn affected prices of other goods and finally, the general price level.

4.2 In the Short Term

4.2.1 Demand Side

In the short term, demand-pull inflation is influenced by money supply, capital stock and government budget. As in the long term, capital stock is the most dominant contributor toward inflation, although its effects are only felt after a time lag.

Growth of Broad Money (M2)

In the short term, the elasticity of inflation with respect to money supply is 0.1, meaning that the effect of a 1 per cent increase in money supply on inflation is 0.1 per cent, lower than its long term effects (0.2 per cent, see Table 5). Another interesting result is that, in the short term, adjustments in the money market of Indonesia, as a result of rising money supply, do not occur immediately but gradually through a time lag. As seen in Table 5, this adjustment process occurs after 2 periods whereby it is only after 2 years that the effect of a 1 per cent increase in money supply will increase inflation by 0.1 per cent. Probably this shows that excess money supply will not be immediately used to purchase goods, but only after some time, when the holder of the money feels confident of a stable economic situation. Only then will the excess money increase domestic demand, affecting inflation after a time lag.

Growth of Capital Stock

In the short term, although capital stock is the largest contributor toward inflation, its effect is only felt after 6 periods. As previously explained, this was partly due to the presence of a time lag between investment approvals (meaning an increase in capital stock) and the level of effective production (2-5 years, on average), so that its effects on a declining inflation rate occur after a time lag of 6 periods.

Government Budget Deficit

Demand-pull inflation in Indonesia is also frequently caused by budgetary deficit pressures. However, its effect in the short term is relatively small, only around 0.1 per cent. Nonetheless, budget deficit in the 1950s to early 1980s provided substantial contribution toward inflation in those years.

During 1962-1967, the main source of inflationary pressures was the budgetary deficit. Deficits in that period were mainly caused by heavy military expenditure for the liberation of West Irian from the Dutch (1959-1962) and a confrontation policy against Malaysia (1963-1965). The government used bank credit to finance its budget deficits, which in turn caused an increase in money supply. The first and second oil price increase in 1973-1974 and 1980, respectively, caused

a rapid growth of money supply which further contributed to the higher inflation rate.

4.3 Supply Side

In the short term, the effects of administered prices and imported inflation are the factors stimulating rising inflation in the country.

4.3.1 Prices of Administered Goods

Rice price is the proxy for data of administered prices. In the short term, the effect of a 1 per cent increase in government selling price of rice is about 0.1 per cent toward inflation, slightly lower than its effect in the long run.

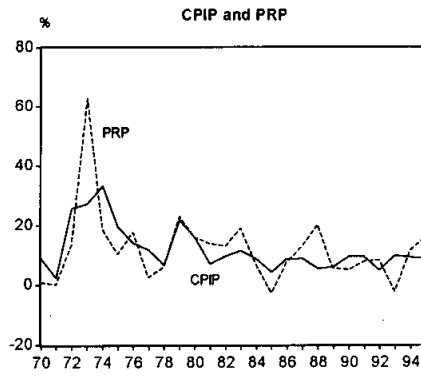
4.3.2 Import Prices and Exchange Rate

Together, the two variables reflect imported inflation. The depreciation of nominal rupiah exchange rate against foreign currencies can affect the prices of imported goods or local products with import content. The devaluation of rupiah against US dollars applied by the government in 1978, 1983 and 1986 influenced the inflation rate at that time. The devaluation made imported commodities relatively expensive. The immediate effects of changes in the exchange rate may be seen in the absence of time lag effects on inflation (see Table 5). Furthermore, rising prices of imported goods caused by their higher prices in the international market directly resulted in rising domestic production costs and in turn, higher prices of goods in general. The relationship between the inflation level and prices of imported goods and the exchange rate may be seen from graphs 6 and 7.

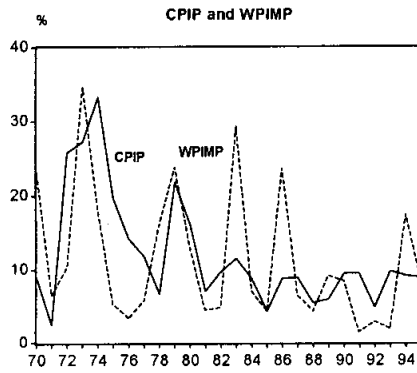
V. Towards a More Effective Management of Inflation in Indonesia

The inflation disease is apparently not new. In the past, where economic activities were not so wide and complicated as today, efforts to cope with the inflation disease could be relatively easily done. Inflation then was mostly stimulated by cost push factors resulting from the demand for higher wages. Therefore, direct control through controlling directly price hikes and the wages of laborers could be easily implemented. Today, this is hardly sufficient as a measure. Factors

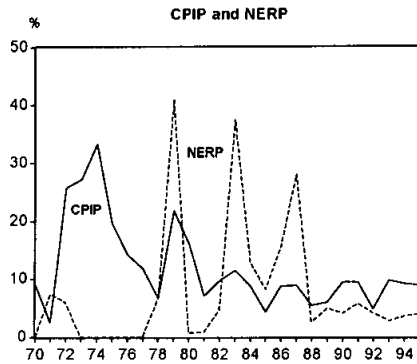
Graph 5



Graph 6



Graph 7



causing inflation are many. The monetary factors are another source of inflation, besides cost-push factors. If a country adopts an open economic system, there is influence from external factors (usually called imported inflation).

So far, the Indonesian Government apparently continues to believe that the ideal inflation rate target is five per cent annually. Though, in reality today it is very difficult to meet that target, it is still used as a medium to long term target.

The inflation policy is the final aim of macro economic policy, meaning that the indicator of a successful macro economy is the successful control of inflation. Perhaps it is due to this point that the inflation rate of 5 percent has become a target. Since the sources of inflation could be from several factors, therefore, the management of inflation must also come from different areas. Theoretically speaking, the management of domestic inflation needs coordinated policies in the fiscal, monetary and real sectors. It can be said that existing evident sources and experiences can be used as a means to control inflation with controlling the macro economic policy as the final target.

5.1 Fiscal Policies

From past experiences, elements of inflation from the fiscal sector are conventionally found in the government budget. These elements are mainly the salaries of civil servants and members of the Indonesian Armed Forces (ABRI). It has been realized that every increase in their salaries is always followed by an increase in the inflation rate. Increasing the salaries of civil servants and ABRI members to an "appropriate" standard of living level has become a concern of the government. However, by looking at its impact on the inflation rate, the government must take into consideration several ways to offset the expansion. It can be done, for example, by lowering other budget expenditures especially development expenditure items and through rescheduling several government projects. The second source is price hikes of oil-based fuel. Past experience indicates that there is a close connection between the increase in the price of oil-based fuel and the high inflation rate. It is undeniable that every increase in the price of oil-based fuel is followed in the same year by a substantial rise in the inflation rate.

The third source is not related directly to the government budget but it is still caused by government intervention. The source is mostly created by strategic commodities with government controlled marketing, such as rice, cement and electricity. In this context, to avoid costs to citizens through less consumption of these goods due to higher prices, the government should consider increasing subsidies on these goods. Increasing prices followed by increasing subsidies will allow prices to stay at the current level or even increase but at least still at an affordable level.

5.2 Monetary Policies

Over the past year, there has been a sharp increase in demand for investment as well as non-productive (consumptive) funds. The need for financing keeps increasing and this tightens domestic liquidity which in turn may push interest rates upward at a time when there is a wide gap between the availability of investment funds and that of public savings. The monetary authorities have yet to see a healthy banking industry in the country given that so far many banks are still trapped in problem loans, inefficiency and other problems. The financial sector recently is burdened by external factors such as the US Federal Reserve's interest rate hike moves and the impact of the yen's appreciation on Indonesian imports and foreign debts.

An unfavorable condition is the dependence of bank interest rate on inflation, and this relationship cannot be disrupted. The only possible measure to take is by minimizing the impact of inflation on the interest rate. The high inflation rate causes the holding of Rupiahs to involve a high degree of risk. The bank lending rate is high. At present, the government is confronted with a dilemma. On the one hand it needs to retain high interest rates in order to lower inflation; but, on the other hand, it needs to bring the rates down to encourage investment and expansion.

For the reasons above, several alternatives may be recommended; firstly, to encourage public savings through taxation policy while searching for internal financing alternatives to balance foreign currency shocks, such as the Japanese currency appreciation. Domestic investment funds could be generated for example, from non-bank ventures including the capital market. Secondly, bank credit increases are normally associated with the rapid growth of domestic demand and since

theoretically, this will finally push up general prices, monetary authorities need to control the expansion of bank credit. The credit must be channeled only to selected projects that have positive impacts on the economy and little pressure on domestic prices. The monetary authorities currently conduct moral suasion actively in order to influence the expansion of bank credit. The problem with moral suasion is that banks do not treat this instrument seriously since they know it is not a direct monetary policy and insignificant penalties are imposed for every ignorance.

5.3 Real Sector Policies

In reality, inflation is not only caused by monetary problems. People who still think inflation can be controlled through monetary instruments only are mistaken. Indonesian inflation can be retained at a five percent target if the government demonstrates its willingness to remove distortions in the real sector. This should include policies to deregulate the market to ensure better distribution of goods including rice and cement, reduction of price disruptions, reduction of import duties and realization of more investment projects that are already approved. The last relates to efforts to expand the national industrial capacity as currently several industries have been facing full capacity.

Distribution would be a lot more efficient if done under a healthy market mechanism - free of interference from vested interest groups. For this to take place, however, one pre-requisite is the dismantling of protectionist walls and fairer distribution of business opportunities.

VI. Summary and Conclusion

1. Macroeconomic stability has been one of the hallmarks of the Indonesian economy over the past 26 years. Without stable macroeconomic foundation, there is little hope that Indonesia can sustain the process of development. One key aspect of macroeconomic stability is a low, stable and tolerable inflation rate.
2. Indonesia has experienced continuous high inflation for a long time. The peak was reached in 1966 when it rose to 635 per cent. After 1966, as soon as the new Government had consolidated its position, an economic stabilization program, known as

- deregulation packages, which include a set of fiscal, monetary and foreign exchange policies, was launched. Since then, the inflation rate can be pushed dramatically to ideal single digit rates.
3. The inflation model has been developed using the Error Correction and Cointegration approach. This includes the long term model and short term model. Basically, the model tried to combine the monetarist approach and structural approach by explaining all the inflation determinants, both demand side and supply side.
 4. Inflation is usually originating from two sources : demand side and supply side. From the demand side, growth of money supply and sluggish capital stock are the main factors that encouraged inflation in the long term. In the short term, demand-pull inflation is influenced by money supply, capital stock and government budget. From the supply side, the price adjustments of administered goods are the source of inflation in the long term and in the short term the effects of administered prices and imported inflation are the factors stimulating inflation.
 5. The inflation policy is the final direction of the macro economic policy, meaning that the indicator of the success of the macro economy is the success in controlling inflation. Since the sources of inflation could arrive from several factors, therefore, the management of inflation must come also from different areas of responsibility.
 6. In the fiscal side, it is ludicrous to note that after setting a five percent annual inflation goal for the medium term, the government became the locomotive for increasing inflation since it raised administered goods prices (especially rice, fuel and cement) and salaries of civil servant and Indonesian Armed Forces members regularly. What the government needs is to reduce the risk of domestic budget deficit through rescheduling every government project that potentially has inflation pressures.
 7. In the monetary side, the government is confronted with a dilemma. On the one hand, it needs to retain high interest rates in order to reach 5 percent target (or prevent inflation from soaring above 10 percent). On the other hand, it needs to bring the rates down in order to encourage investment and expansion. In such a

situation, the monetary authorities are likely to take very prudent steps to ensure that inflation will remain checked but at the same time investment and expansion plans will not be disrupted too drastically.

8. In the real sector side, if the Government demonstrates its willingness to remove distortions in the real sector, dismantling of protectionist walls, and fairer distribution of bussiness, the inflation can be retained at a five percent.

INDONESIA'S CONSUMER PRICE INDEX

Inflation in the narrow sense is the rise of average (aggregate) price level of goods and services mostly consumed by the population. High inflation means declining ability or purchasing power of the population to obtain these goods and services. This situation will not only be a loss to the population group with fixed wages and small laborers, but also has negative impacts for the producer or entrepreneur. In addition, investment prospects particularly for foreign investment in various sectors of economic activities will be hampered.

Inflation is the percentage change of the consumer price index at any one time compared to the consumer price index at the previous time. The Consumer Price Index (CPI) is the relative comparison of the price of a commodity basket at any one time with the price of those commodities at a selected time which is used as the base year.

The Instruments of Indonesia's CPI

The CPI consists of several data and information, such as:

1. Information on the commodity basket which consists of an amount of goods and services generally consumed by the population in a city/province for a selected period. Those goods and services are arranged by subgroups, and the subgroups are arranged according to groups. Indonesia's commodity basket consists of 4 groups (foodstuffs, housing, clothing, and miscellaneous) and 26 subgroups. The commodity basket was obtained from the results of a survey specially conducted for this purpose. The latest survey was the Cost of Living Survey (SBH) conducted in 1989 (refer Table 1).
2. A Weighted Diagram of goods and services included in the commodity basket above shows the consumption weight/value of each of the goods and services towards the consumption value of the subgroup or towards the consumption value of the related group or towards the consumption value of all the goods and services in the commodity basket. The weight of each commodity is stated in decimal factors per ten thousand. The latest Weighted Diagram was calculated based on the results of the 1989 Cost of Living Survey (refer Table 2).

The cost of living survey's main purpose is to obtain the average consumption rate of households for one year, as well as the consumption structure, the size of the portion of food, housing and others as well as any other commodities which are predominantly consumed by households. Of the many commodities consumed by households, normally it is only dominant commodities whose prices are considered necessary to be further monitored, that is, commodities which made up large portions of household consumption. Consequently, these commodities are representative of all the commodities consumed by the population. All these commodities are commonly known as the commodity basket, which currently total around 200-225 type of goods and services in each 27 cities. The commodity basket of a SBH which represents all the commodities consumed by the household may not be replaced by other commodities until the following SBH is done.

3. The base year, that is, the period of time when the size of consumption value is considered real and is stated as equal to 100. The base year used to calculate the current inflation is 1989, the time when the 1989 SBH was launched.
4. Price data that is collected on a regular basis according to selected periods and continuously for each type of goods and services included in the commodity basket. The price data collection frequency to date is weekly, monthly, quarterly or each semester, depending on the nature of the goods and services.

Provinces for the Collection of Consumer Price Data

Collection of Consumer Price data or data of retail price of goods and services consumed by the population is conducted in city areas only, in view that most of the population in cities have fixed income and are categorized into low and medium income group.

Currently, collection of Consumer Price (CP) data is implemented in almost all the cities in Indonesia, and is generally conducted in markets which are considered to be large in that city. Since 1990 to the present time, collection of consumer price data covers 27 Capital city provinces. The weight of each city in the calculation of National CPI can be seen in Table 3.

Table 1

**GROUPING OF CONSUMER PRICE COMMODITY
IN GROUPS AND SUBGROUPS**

Group	Subgroup
1. Foodstuffs crops crops & its products	1. Rice and cereals, Root 2. Meat and its products 3. Fresh fish 4. Preserved fish 5. Eggs, milk and its products 6. Vegetables 7. Beans and nuts 8. Fruits 9. Spices 10. Fat and oil 11. Non-alcoholic drinks 12. Finished food and other food
2. Housing	13. Cost of accommodation 14. Fuel, light and water 15. Household equipment 16. Household care
3. Clothing	17. Men's apparel 18. Women's apparel 19. Children's apparel 20. Personal products and other apparel
4. Miscellaneous	21. Health 22. Physical Treatment 23. Education 24. Recreation and sport 25. Transportation 26. Tobacco & alcoholic drinks

Table 2

THE WEIGHTS OF CPI BY MAJOR CATEGORIES

No.	Categories	Weights (%)
1.	Foodstuffs	34.66
2.	Housing	27.85
3.	Clothing	11.32
4.	Miscellaneous	26.17

Table 3

WEIGHT OF EACH CITY IN THE CALCULATION OF CPI

No	Cities	Weight (%)
1.	Banda Aceh	0.58
2.	Medan	6.71
3.	Padang	2.13
4.	Pekanbaru	1.45
5.	Jambi	1.23
6.	Palembang	4.35
7.	Bengkulu	0.67
8.	Bandar Lampung	1.89
9.	Jakarta	37.00
10.	Bandung	9.06
11.	Semarang	4.53
12.	Yogyakarta	2.34
13.	Surabaya	11.38
14.	Denpasar	1.74
15.	Mataram	1.47
16.	Kupang	0.56
17.	Dili	0.17
18.	Pontianak	1.48
19.	Palangkaraya	0.47
20.	Banjarmasin	2.00
21.	Samarinda	1.46
22.	Manado	1.28
23.	Palu	0.68
24.	Ujung Pandang	3.58
25.	Kendari	0.39
26.	Ambon	0.84
27.	Jayapura	0.56
TOTAL		100.00

Administered Vs Non-administered Prices

In Indonesia inflationary repercussions from supply shock are in many instances lowered because a large portion of the prices in the CPI are controlled. Nevertheless, there are inflationary repercussions from droughts and floods and from the adjustment of these controlled prices. By stripping out these components, a more precise measure of underlying inflation may emerge.

The purpose of dividing the CPI into these two indices (administered and non-administered) is to examine underlying inflation. There are 14 items for which prices are administered and account for more than 26 per cent of the CPI in weighted terms. This index is not unusual since this can be interpreted as a key ingredient of the government's social policy. Any society wants to provide its citizens with the basic necessities at affordable prices. In the case of Indonesia, the most important of these items are rice (7.3 per cent), gasoline (3.0 per cent), electricity tariffs (2.6 per cent) and kerosene (2.1 per cent). A complete listing of administered price items and their weights is available below.

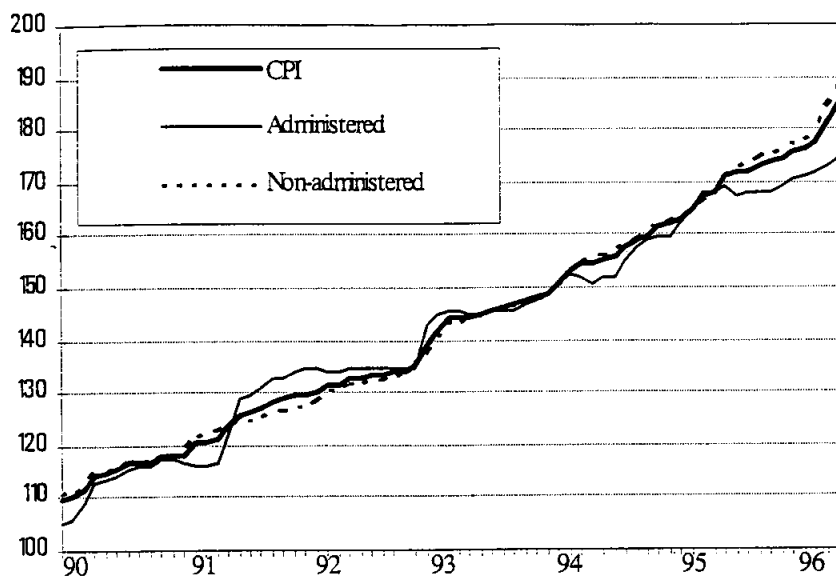
Table 4

ADMINISTERED ITEMS AND WEIGHTS

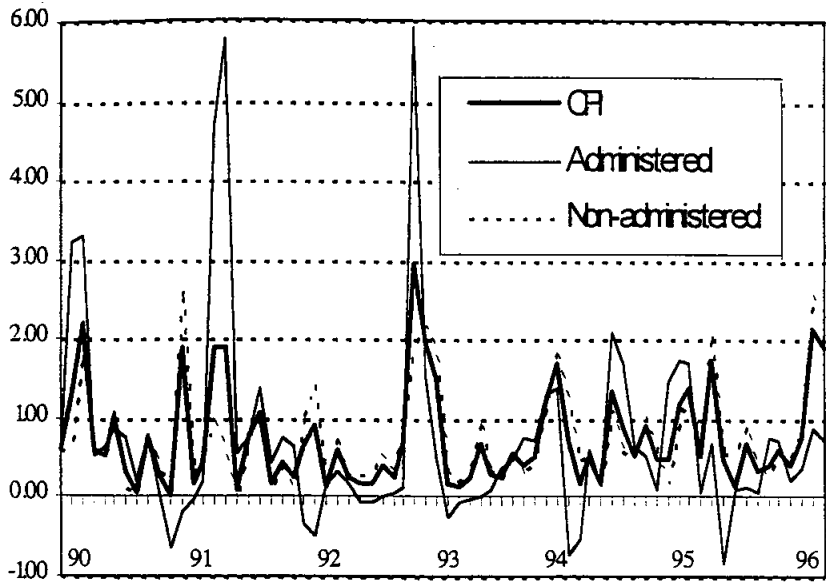
No.	Items	Weights (%)
1.	Rice	4.36
2.	Local transportation fares	3.97
3.	Fuel	2.71
4.	Electricity tariffs	2.59
5.	Kerosene	1.69
6.	Corn/Palm oil	1.62
7.	Sugar	1.33
8.	Cement	1.25
9.	Inter cities bus fares	1.16
10.	Hospital tariffs	1.09
11.	Drinking water tariffs	0.96
12.	Telephone tariffs	0.71
13.	Plane fares	0.63
14.	Elpiji Gas	0.62
15.	Taxi fares	0.58
16.	Train fares	0.47
17.	Flour	0.44
18.	Salt	0.38
TOTAL		26.34

What is gained by dividing the CPI this way? The information contained in graph 1 and 2 provide an answer. Graph 1 depicts the index level for the CPI, administered and non-administered prices. The pattern of increases in administered prices resembles a step function. These steps occurred when administered prices increases were announced and implemented by the Government. These prices are not directly affected by economic variables in a functional form although decisions to raise price on these items presumably are made following a careful examination of relevant economic variables. Graph 2 presents another way of looking at the administered vs non-administered price indices. The trend of CPI rate is closer to the trend of non-administered rate.

Graph 1
CPI vs Administered vs Non-administered



Graph 2
CPI vs Administered vs Non-administered



DATA

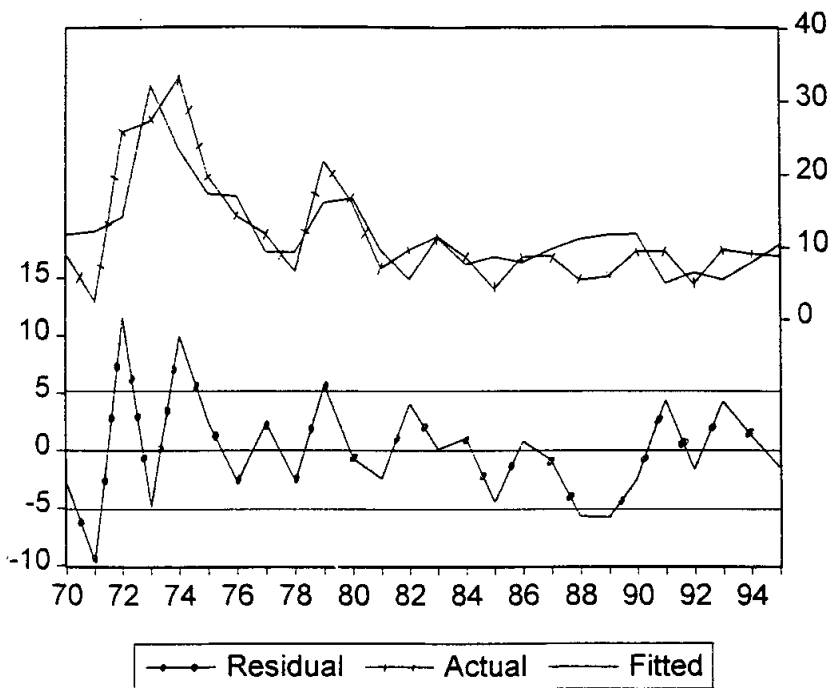
Year	CPIP	WPI	WPIP	PR	PRP	PAGIP	WPIM	WPIMP	NER	NERP
1970	8.90		29.83	45.25				23.10	365.00	0.00
1971	2.50	40.51	8.36	45.34	0.20		49.98	6.49	392.00	7.40
1972	25.80	46.02	18.36	51.50	13.59		54.72	10.25	415.00	5.87
1973	27.30	63.60	42.74	83.84	62.80		69.80	34.64	415.00	0.00
1974	33.30	94.09	22.69	99.51	18.69		91.98	17.91	415.00	0.00
1975	19.70	100.00	7.62	109.90	10.44		100.00	5.31	415.00	0.00
1976	14.20	110.80	10.36	129.33	17.66		103.76	3.35	415.00	0.00
1977	11.80	122.25	9.57	132.79	2.68		108.26	5.77	415.00	0.00
1978	6.70	133.82	22.60	140.97	6.16		117.93	16.21	442.00	6.51
1979	21.80	195.48	37.02	173.50	23.08		154.39	23.82	623.00	40.95
1980	16.00	254.47	16.51	201.09	15.90		177.79	12.73	627.00	0.64
1981	7.10	282.49	8.15	228.74	13.75		191.56	4.49	632.00	0.80
1982	9.70	301.94	7.03	258.70	13.10		201.12	4.90	661.00	4.59
1983	11.50	100.00	20.91	307.84	18.99		100.00	29.31	909.00	37.52
1984	8.80	111.00	6.27	328.89	6.84		113.00	7.06	1026.00	12.87
1985	4.30	116.00	3.75	320.29	-2.61		119.00	4.39	1111.00	8.28
1986	8.80	116.00	11.47	344.70	7.62		129.00	23.63	1283.00	15.48
1987	8.90	142.00	11.63	389.76	13.07		158.00	6.49	1644.00	28.14
1988	5.50	150.00	1.40	467.86	20.04		163.00	4.32	1686.00	2.55
1989	6.00	162.00	10.93	494.09	5.61		178.00	9.18	1770.00	4.98
1990	9.50	178.00	16.17	518.87	5.02	10.09	191.00	8.41	1843.00	4.12
1991	9.50	187.00	-0.36	559.93	7.91	13.77	201.00	1.51	1950.00	5.81
1992	4.90	197.00	3.09	606.25	8.27	1.32	208.00	2.94	2030.00	4.10
1993	9.80	204.00	2.49	592.03	-2.35	10.06	212.00	1.90	2087.00	2.81
1994	9.20	215.00	15.33	661.46	11.73	8.69	215.00	17.38	2161.00	3.55
1995	8.90	239.00	10.93	768.95	16.25	5.70	230.00	8.36	2247.00	3.98

Year	M1	M2	PDBRP	PDBRPP	CAPS	APBNB	DEP3R	MKR	INVR
1970	36.20	41.60	7.50	7.40	7.50	-96.50		15.00	12.00
1971	28.10	41.90	7.00	8.41	7.00	-87.00	22.70	15.00	12.00
1972	48.00	48.20	9.40	8.57	9.42	-116.70	18.20	15.00	12.00
1973	40.90	42.10	11.30	8.09	-1.34	-158.00	15.00	15.00	12.00
1974	40.20	47.10	7.60	8.05	0.38	-183.80	20.70	15.00	13.50
1975	33.30	36.20	5.00	7.91	2.07	-461.70	21.70	15.00	13.50
1976	28.20	33.00	6.90	7.22	3.01	-711.20	21.80	15.00	13.50
1977	25.20	19.00	8.80	6.94	4.03	-617.30	16.60	15.00	13.50
1978	24.00	21.70	7.80	7.92	5.57	-735.40	14.20	12.00	12.40
1979	35.80	36.90	6.30	8.13	6.13	-764.00	14.10	12.00	12.00
1980	47.60	47.50	9.90	6.83	6.99	-1102.00	14.20	12.00	12.40
1981	29.80	26.30	7.90	6.10	8.21	0.00	14.60	12.00	12.40
1982	9.80	14.00	2.20	6.24	8.87	-2154.20	14.70	12.00	12.40
1983	6.30	32.40	4.20	4.76	9.11	-577.70	14.70	216.00	18.90
1984	13.40	22.30	7.00	4.35	7.63	841.00	16.00	22.60	18.20
1985	17.70	29.10	2.50	4.88	6.44	-3046.30	18.00	22.90	18.00
1986	15.60	19.50	5.90	5.20	6.72	-2126.70	15.40	21.43	18.41
1987	8.60	22.50	4.90	5.30	6.81	-3146.80	16.80	21.68	18.67
1988	13.50	23.90	5.80	6.26	7.09	-3376.60	17.70	22.09	19.30
1989	39.80	39.80	7.50	6.47	7.95	-2361.60	18.60	21.87	19.58
1990	18.40	44.16	7.20	6.78	8.96	3076.00	17.30	20.83	18.90
1991	10.60	17.10	6.90	7.42	9.18	267.40	23.30	25.53	21.35
1992	9.30	20.20	6.40	6.96	8.57	-1429.70	20.40	24.03	19.24
1993	27.30	22.00	7.30	6.37	8.02	2445.00	15.20	20.22	17.35
1994	25.00	20.20	7.30	7.81	7.84	3899.00	12.50	17.03	15.05
1995	15.00	27.60	7.60	8.20	8.20	-1038.00	16.70	18.02	15.70

CPIP	=	Consumer Price Index, Percentage Change
WPI	=	Whole Sale Price Index
WPIP	=	Whole Sale Price Index, Percentage Change
PR	=	Price Rice (Rp)
PRP	=	Price Rice, Percentage Change
PAGIP	=	Administered Price, Percentage Change
WPIM	=	Import Wholesale Price Index
WPIMP	=	Import Wholesale Price Index, Percentage Change
NER	=	Nominal Exchange Rate (Rp/US\$)
NERP	=	Nominal Exchange Rate , Percentage Change
M1	=	Growth of M1 (%)
M2	=	Growth of M2 (%)
PDBRP	=	Growth of GDP (%)
PDBRPP	=	Growth of GDP Potential (%)
CAPS	=	Growth of Capital Stock (%)
APBNB	=	Government Budget Deficit/Surplus (Rp billion)
DEPR	=	3 month Deposit Rate (%)
MKR	=	Working Capital Rate (%)
INVR	=	Investment Rate (%)

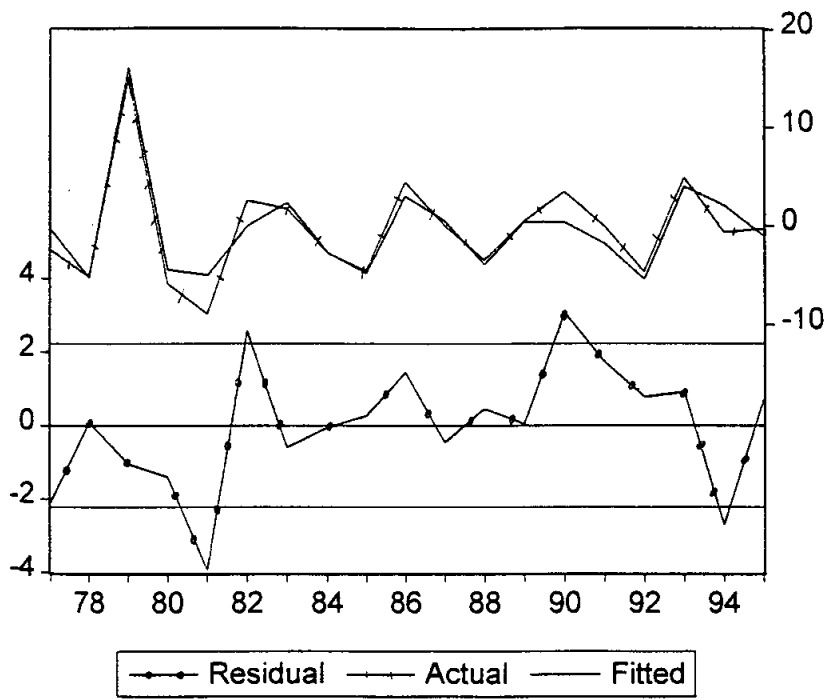
Cointegration Equation

Test Result



Dynamic Error Correction Equation

Test Result



Chapter 9

INFLATION IN KOREA: ITS CAUSES AND MANAGEMENT

by

Seung-hwan Kim

I. Review of Inflation Experiences

After liberation in 1945, Korea experienced severe inflation due to supply shortages of manufactured goods from the disruption of productive capacity. During the Korean War, it also suffered wartime inflation due to the continuous monetary expansion to finance military expenditure. After the war, the Korean economy still had difficulty in escaping from the chronic inflation because of the financial support for industrial reconstruction, and in the early stage of economic development in the 1960s, high inflation persisted in the course of the remarkably rapid economic growth. Especially from the mid-1970s to the early 1980s, the annual rate of inflation recorded a high level of about 20 per cent owing to the oil shock. From the early 1980s, however, inflation largely subsided and prices showed remarkable stability, increasing only by 3.6 per cent per annum from 1982 to 1986. This price stability was attributable to the fact that inflationary pressure was largely alleviated, as a determined stabilization policy was implemented. The M2 growth rate eased to 17 per cent per annum as against 27 per cent per annum during the preceding 1979-81 period; the rate of wage increases was lowered from 24 per cent to 11 per cent per annum. In addition, price of imported goods increased by just 1 per cent thanks to the stability of international raw material prices such as oil. However, during the years 1987-94, consumer price inflation rose again to the 6.4 per cent per annum level due to the more rapid monetary growth and wage hikes in the late 1980s.

In this paper, we will examine price movements from the 1960s to the 1990s by dividing the time into the following four periods in view of their distinctive economic conditions and behavior of price movements; the 1962-72 period with rapid economic growth and high inflation, the 1973-81 period with low economic growth and high inflation due to the two oil shocks, the 1982-86 period with high economic growth and low inflation thanks to the price stability of international raw materials, and the 1987-94 period with stable economic growth and moderate price stability.

1.1 Price Movements in 1962-72

The government launched the first Five-Year Economic Development Plan in 1962, with the aim of expanding productive capacity and increasing the exports by means of building up key industries and infrastructure. As a result, the Korean economy established a foundation for modernization through quantitative expansion and qualitative development, registering rapid growth of 7.9 per cent on an annual average basis during the years 1962-66.

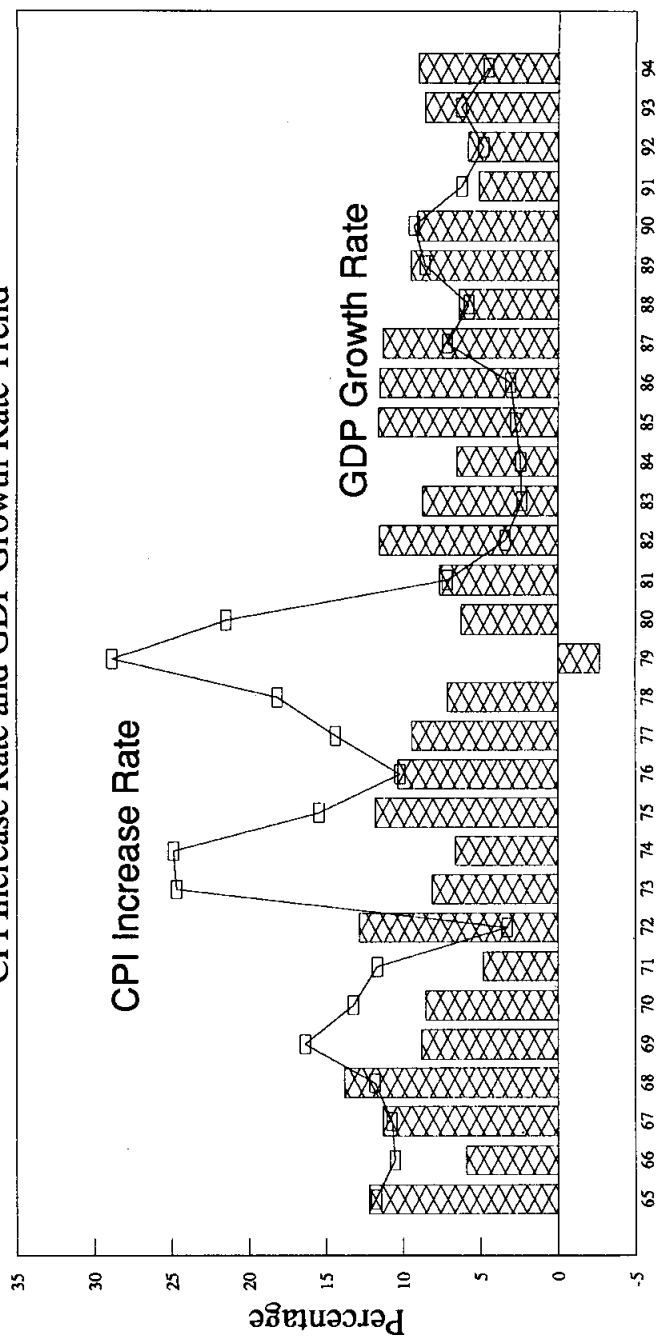
In the early stage of economic development, however, because of the shortage of domestic savings, the government financed the immense investment needed for its growth-oriented economic policy by means of borrowings from the central bank and the inducement of foreign capital. As a result, signs of inflationary pressures began to emerge. The sharp decrease in grant from the U.S., the imbalance between supply and demand for agricultural products owing to crop failures in 1962-63, and the leap in the price of imported goods due to the large devaluation of the Korean currency by 50 per cent in 1961 all combined to push inflation higher.

In view of the high inflation in the early stage of economic development, the government pursued a strong retrenchment policy embracing fiscal, credit and foreign exchange policy. As a result, the inflation rate during the years 1965-72 showed more stable movements than in the early 1960s, though the Korean economy achieved a higher real growth rate of about 8.9 per cent per annum. Also, the easy availability of domestically manufactured and imported goods, thanks to the expansion of productive capacity and improved foreign exchange situation, contributed to price stability.

1.2 Price Movements in 1973-81

During this period, the Korean economy was confronted with the phenomena typical of stagflation in the form of high inflation and low economic growth, with a 17.9 per cent inflation rate per annum due to the two oil shocks and a 7.7 per cent GDP growth rate per annum. Notably, during the oil-shock years of 1974 and 1980, the structural weakness of the Korean economy's heavy external dependency was revealed. Consumer price inflation soared to 24.7 per cent in 1974 and 28.8 per cent in 1980.

Chart 1
CPI Increase Rate and GDP Growth Rate Trend



During the first oil-shock period of 1973-75, consumer price inflation averaged 17.6 per cent per annum. The characteristics of price movements during these years were the increase in domestic price caused by external factors such as the surge in international raw material prices, and the unstable movements of domestic agricultural products prices. As major international raw materials prices regained stability after the end of 1974, the upward trend of manufactured goods prices began to ease after 1975. However, agricultural product prices rose relatively more rapidly, because the demand for foodstuffs such as meat and fruit increased massively in parallel with the increase in national income that accompanied the economic growth, whereas their production was insufficient on account of the relatively low growth of the agriculture sector under the industrialization-first orientation of the government's economic policies.

During the second oil-shock period of 1979-80, consumer prices exhibited a sharp increase owing to the continuous increase in international raw material prices, poor crops and political and social unrest such as that surrounding the assassination of president Park. After 1981, however, the rapid inflation began to subside, as international raw material prices, especially for crude oil, showed stable movements and the price of agricultural products fell thanks to good harvests.

1.3 Price Movements in 1982-86

During the years 1982-86 following the second oil crisis, the Korean economy maintained a remarkable degree of price stability, with consumer prices rising by only 3.6 per cent on an annual average. During this period, as a whole, the economic environment both at home and abroad contributed to consolidating the foundation for price stability. On the one hand, cost-push pressure was alleviated due to the decline in international prices of major imported raw materials, low international interest rates and low increases in unit labor cost, etc. On the other hand, the determined implementation of stabilization policy embracing financial and fiscal management also helped bring the desired results.

From 1982, the import price of oil maintained a downward trend, dropping sharply from 34.1 dollars per barrel in 1981 to 14.2 dollars per barrel in 1986, owing to excess supply in the international oil market. The prices of other imported goods also shifted to a down-

ward trend. Wages in manufacturing industry maintained single-digit increase rates during the years 1984-86, after continuing a downward trend from 20.1 per cent in 1981. In addition, both international and domestic interest rates continued on a declining trend, with three-month LIBOR dropping from 16.9 per cent in 1981 to 13.3 per cent in 1982, to 6.9 per cent in 1986, and with yields of three-year corporate bonds dropping from 30.1 per cent in 1980 to 12.8 per cent in 1986. Meanwhile, on the aggregate demand side, the growth rate of M2 declined from 28.1 per cent in 1982 to 10.7 per cent in 1984, which supported the basis for price stability. As mentioned above, during this period, the Korean economy was able to sustain price stability thanks to favorable economic conditions both at home and abroad. Although the depreciation of the Korean won against the U.S. dollar acted as a cost-push factor, this was offset mostly by the decline in the prices of the major internationally traded raw materials.

1.4 Price Movements in 1987-94

Until the middle of the 1980s, the Korean economy achieved remarkable stability in parallel with high growth. After 1987, however, the basis of price stability began to be eroded owing to various forms of inflationary pressure. An outbreak of strikes in the new atmosphere of democratization caused steep wage hikes, and the rapid increase in private consumption prompted by the rise in disposable incomes stimulated excess demand. The over-heating of construction activity and asset price inflation brought harmful effects such as bubble phenomena to the Korean economy. Monetary expansion through the foreign sector due to the balance of payment surplus also stimulated the advance of prices. Under the impact of these negative factors, prices held to a rising trend until 1991. The consumer price inflation rate was about 9 per cent per annum in both years 1990 and 1991.

From early 1992, the government reinforced its management of aggregate demand with a view to restoring economic stability. Tighter control was exercised over money supply and fiscal expenditure, and administrative controls were put in place to cool down the overheated construction boom. As a result of these policy measures, both private consumption and construction activities began to cool abruptly, and economic stability was largely restored. In addition to this, good agricultural harvests, stable movements in international raw material prices and the depression of the real estate market alleviated inflationary pressure. As a net result, prices showed stable movements during the 1992-94 period.

However, in 1994, prices exhibited somewhat unstable pattern, because the prices of agricultural products increased sharply owing to the bad harvests and service prices increased rapidly due to hikes in charges for public and personal services.

II. Methodological, Analytical Framework and Empirical Results

2.1 Methodology

In order to analyze the inflationary effects of inflation factors, we divide the inflation factors into two types, demand and cost factors, and use an error correction model(ECM), a type of structural model, to estimate the short-run price equation and a dynamic ordinary least squares(OLS) method to estimate the long-run price equation. In addition, vector autoregression(VAR) analysis is carried out to observe the dynamic response of inflation to the shock of each factor. Based upon the empirical results obtained, the causes of inflation are analyzed using the method of measuring the contribution of each factor to the movements of past domestic prices.

The first step in ECM is to conduct a cointegration test to examine the long-run equilibrium relation among non-stationary variables in level form. Next, ECM requires that a long-run equilibrium equation among the cointegrated variables in level form be estimated using OLS method, and that a short-run behavioral equation, which includes an error correction term, the lagged first differences of the variables in the long-run equation, be estimated¹. However, in case of estimating a

1. Although traditional econometrics analysis requires the use of stationary time series data, most macroeconomic variables have non-stationarity with strong long-run trend. It has been argued empirically and theoretically that a regression using non-stationary series data can lead to spurious results. In other words, the high correlation found among those variables may not represent the true economic relationship but only common trends in the variables. Therefore, it is asserted that individual time series must be converted to stationary series by filtering the data with differencing though this may result in a loss of valuable long-run information which the original data series have. Recently, the concept of cointegration has been developed by researchers including Granger, Engle, and Johansen as a solution to this problem. According to their studies, if the error term from the regression between non-stationary variables is stationary, there exists a cointegration relation between them and, in this case, there is a way to solve the spurious regression problem. Notably, Engle and Granger (1987) show that if a set of non-stationary variables is cointegrated, then an error correction model in which the spurious regression problem is avoided can be built.

long-run and a short-run price equation using an error correction model, coefficient estimates of short-run equation are efficient estimators statistically whereas those of long-run equilibrium equation may not be efficient estimators. To solve this problem in this study, a long-run equilibrium equation is newly estimated using the dynamic OLS method².

A VAR model is said to be loosely defined as a system of equations in which no behavioral, definitional, or equilibrium relationships are specified among a given set of economic variables and in which all economic variables are considered as endogenous. This model is mainly used to examine the dynamic analysis of economic variables over time. In this paper, the impulse and response functions³ and decomposition of variance of forecast error⁴ technique are used to analyze the dynamic response of domestic prices to changes in inflation factors. Before estimating price equations using ECM and conducting VAR analysis, unit root tests are carried out to evaluate the stationarity of variables, and cointegration tests are also performed on the series with a unit root to examine the stationarity of a linear combination of the variables.

2.2 Analysis Using a Structural Model

2.2.1 Analytical Framework

In this section, we analyze the inflationary effects of individual factor changes using the ECM put forward by Engle and Granger (1987) and the dynamic OLS method introduced by Stock and Watson (1989).

Price may be changed by only one factor but is generally influenced by many factors including demand and supply factors, reflecting a given economic structure. Taking this point into consideration, we use a structural model which imposes constraints on variables and

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2. A more detailed explanation will be given below.
 3. Impulse and response function analysis is used to observe the dynamic response of each variable in the system to a particular shock.
 4. The decomposition of variance is used to find the relative importance of the variables in the model. It shows what percentage of the forecast error of a certain variable at different lengths of time into the future can be explained with the innovation of a certain variable in the model.

the form of equation⁵. Assuming that the price level is determined in an equilibrium state in which aggregate supply and aggregate demand of products is equal, we construct a price function of one equation type as follows.

$$P = \Gamma(M, S, G, EX)^6$$

where M: money supply, S: prices of production factors,
G: government consumption expenditure, EX: export

In order to estimate a real price equation based upon the above price function, we transform the price function into a log-linear function for convenience of estimation and make use of the consumer price index (CPI) as the dependent variable. As explanatory variables, unit value indexes of import (UVIM), and unit labor costs (ULC) are adopted among cost factors, and money supply(M) is adopted among demand factors. However, government consumption expenditure and exports are excluded for the convenience of the analysis.

In accordance with the explanation given above, the long-run and short-run consumer price equations, which are estimated by the two-stage method introduced by Engle and Granger (1987), are as follows:

$$\ln CPI_t = \alpha_0 + \alpha_1 \cdot \ln M_t + \alpha_2 \cdot \ln UVIM_t + \alpha_3 \cdot \ln ULC_t + EC_t \quad \dots (1)$$

$$\begin{aligned} \ln CPI_t = & \beta_0 + \sum_{i=1}^I \beta_{1i} \cdot \Delta \ln CPI_{t-i} + \sum_{i=1}^m \beta_{2i} \cdot \Delta \ln M_{t-i} + \sum_{i=1}^n \beta_{3i} \\ & \cdot \Delta \ln UVIM_{t-i} + \sum_{i=1}^p \beta_{4i} \cdot \Delta \ln ULC_{t-i} + \sum_{i=1}^q \beta_{5i} \cdot \Delta \ln Z_{t-i} \\ & + \beta_6 \cdot EC_{t-1} \quad \dots (2) \end{aligned}$$

Where CPI: consumer price index, M: money supply, UVIM: unit value indexes of import in terms of Korean currency, ULC: unit

5. Dornbusch and Fisher (1981), among others, present a structural model which includes unit labor costs, import prices, exchange rates and money supply as factors of domestic price movements.
6. Refer to the appendix for an account of the procedure for the induction of the equation.

labour costs, Z: vector of other variables that are not included in equation (1) and EC: error correction term, per cent : first differencing

Equation (1) represents the long-run equilibrium relationship between the variables in level form. On the other hand, equation (2) represents the short-run behavioral equation among first differenced variables with or without lags and the error correction term derived from the long-run equation (1).

However, estimated coefficients of variables in level form shown in long-run equation (1), as noted by Stock and Watson (1989), not only have a high possibility of being affected by small sample bias but also they do not follow normal distribution. Therefore, regular statistical inference using t-statistics on these estimates may involve some problem. In this paper, a newly estimated long-run equation using dynamic OLS suggested by Stock and Watson (1989)⁷ is drawn up as follows. The estimators of the cointegration vector by this method are regarded as efficient estimators because they are asymptotically consistent with the maximum likelihood estimator and endogeneity among independent variables is eliminated.

$$\ln CPI_t = \gamma_0 + \gamma_1 \cdot \ln M_t + \gamma_2 \cdot \ln UVIM + \gamma_3 \cdot \ln ULC_t \quad \dots (3)$$

In this study, we use quarterly data⁸, which are seasonally adjusted by the X11-ARIMA method, for the period 1970:1 to 1994:4. The series are the Consumer Price Index (CPI) with 1990 as the base year; broad money supply (M2); the unit value index of imports (UVIM) with 1990 as the base year, and unit labor costs (ULC), which are constructed by dividing manufacturing wages by the labor productivity index.

7. The dynamic OLS introduced by Stock and Watson (1989) is a method of repeating the process of eliminating independent variables with low levels of significance, after estimating the equation, adding current term, leads and lags of first differenced variables to the explanatory variables in order to get an efficient estimator of coefficient. In this process, all the first differenced variables are dropped before getting the final equation, because they are used for the purpose of estimating the efficient estimates.

8. The original time series data are attached in the appendix.

2.2.2 Empirical Results

Short-Run Model

In order to specify the price equations, it is necessary to conduct unit root tests which evaluate the stationarity of variables. When the variables are proven to be non-stationary, a cointegration test is required to examine the stationarity of a linear combination of the variables in level form. According to the results of unit root and cointegration tests, it is shown that all the variables are non-stationary, and that there exists a cointegration relation between CPI and the other three variables, which are M, UVIM, ULC⁹. Therefore, even though individual variables are non-stationary stationarity is achieved by taking a linear combination of the variables in level form, which implies that there is a long-run equilibrium relationship between these variables.

		CPI	M	UVIM	ULC
Log	DF	-0.20	-0.45	0.09	-1.14
	ADF (1)	-0.97	-1.02	-0.07	-1.54
	ADF (2)	-1.20	-0.90	-0.37	-1.74
	ADF (3)	-1.21	-1.10	-0.82	-1.86
	ADF (4)	-0.92	-1.00	-0.77	-2.29
LOG in First Diff.	DF	-4.67 **/	-4.17 **/	-8.70 **/	-6.04 **/
	ADF (1)	3.81	-3.49 */	-4.86 **/	-4.22 **/
	ADF (2)	-2.77	-2.69	-3.76	-2.94
	ADF (3)	-3.02	-2.38	-3.02	-2.86
	ADF (4)	-2.15	-2.12	-2.55	-3.12

Notes:

- 1) Regressed with constant and time trend.
- 2) */ and **/ are significant respectively at 2.5 per cent and 5 per cent levels.

According to the results of cointegration test, the ADF test statistic shows ADF (1) -4.58, ADF (2) -4.65, and ADF (3) -4.30. Therefore the null hypothesis that series are not cointegrated is rejected at the 10 per cent level of significance, which implies a long-term equilibrium relationship among their series. The critical value of the t-statistics (10 per cent level of significance) is 4.14 at sample size of 200.

9. Results of the Dickey-Fuller and the augmented Dickey-Fuller tests for unit roots are given in the table below. According to it, all series data are non-stationary at 5 per cent level of significance. First differenced variables, however, are stationary. This means that all series data are I (1).

Based on these results, the short-run behavioral price equation which is estimated using the two-step estimation procedure suggested by Engle and Granger (1987) is given below¹⁰. The explanatory variables in this equation include the lagged first differences of the variables in the long-run equation¹¹ and one lagged error correction term.

$$\begin{aligned} \ln CPI_t = & -0.002 + 0.43 \cdot \Delta \ln CPI_{t-1} + 0.20 \cdot \Delta \ln M_{t-5} + 0.08 \cdot \Delta \ln UVIM_{t-1} + \\ & (-0.48) \quad (5.74) \quad (2.58) \quad (2.41) \\ & 0.11 \cdot \Delta \ln ULC_{t-4} - 0.11 \cdot EC_{t-1} \\ & (3.31) \quad (-3.47) \end{aligned} \quad (2.41)$$

$$R^2/\bar{R}^2 = 69.59\%/67.80\% \quad DW = 2.27$$

where figures in parentheses represent t-values.

The estimated differenced variables of the short-run equation indicate the short-run, dynamic relationship between a dependent variable and the independent variables, and the estimated error correction term indicates the extent to which the actual price level diverges from its long-run equilibrium level. And the estimated coefficient of the error correction term indicates that 11 per cent of the deviation of the actual value from the equilibrium at the previous period is reflected in current consumer prices¹². Therefore, we may conclude that the consumer

10. The 'general-to-specific' approach proposed by Hendry (1989) has been used to determine the degree of lag of explanatory variables. This approach is to eliminate lagged variables with low significance one by one from a general dynamic model which includes every feasible lagged variable, until reaching a meaningful parsimonious model.

11. The estimated long-term equation using the ordinary least squares method suggested by Engle and Granger (1987) is as given below.

$$\begin{aligned} \ln CPI_t = & -3.09 + 0.24 \cdot \ln M_t + 0.27 \cdot \ln UVIM_t + 0.23 \cdot \ln ULC_t + EC_t \\ & (-19.96) (16.78) \quad (9.65) \quad (6.75) \end{aligned}$$

$$R^2/\bar{R}^2 = 99.58\%/99.57\%$$

where figures in parentheses represent the t-value.

12. Suppose α represents the speed of adjustment. Then the actual value of P at time t depends on the linear combination of the realized value of P at time $t-1$ and its long-term equilibrium value denoted by $\bar{P}$

$$P_t = \alpha(\bar{P} - P_{t-1})$$

$$P_t = (1-\alpha)P_{t-1} + \alpha\bar{P}$$

$$\text{where } 0 \leq \alpha \leq 1$$

In this case, as the value of α becomes smaller, the variable P becomes less flexible because of the increasing dependence upon its past value.

price level is fairly sticky because of the widespread expectations of inflation developed by the continued high inflation over many years.

Long-Run Model

On the other hand, in estimating the long-run equilibrium equation, using the OLS method suggested by Engle and Granger (1987), there may be problems of statistical inference as explained above. Therefore, using the dynamic OLS proposed by Stock and Watson (1989), the estimation result of the long-run equilibrium equation is as follows:

$$\ln \text{CPI}_t = -2.68 + 0.22 \cdot \ln M_t + 0.22 \cdot \ln \text{UVIM}_t + 0.28 \cdot \ln \text{ULC}_t$$

(-32.84)(22.63) (13.87) (13.30)

$R^2/\bar{R}^2 = 99.86\%/99.85\%$, where figures in parentheses represent t-values

All variables included in the above equation are estimated to be statistically significant and to have the anticipated sign. Based on these results, computing the long-run inflationary effects of individual inflation factor changes, it is found that in the case of a ULC increase of 1 per cent, CPI rises by 0.28 per cent. This means a wage increase in excess of labor productivity is directly connected to a CPI increase. In the case of a money supply increase of 1 per cent, CPI rises by 0.22 per cent. When there is a UVIM increase of 1 per cent, CPI also rises by 0.22 per cent. This can be easily understood considering that most raw materials including crude oil are imported to Korea.

2.2.3 Analysis Using a Vector Autoregression Model

Analytical Framework

Until now, we have empirically analyzed the inflationary effect of individual inflation factors using a long-run and a short-run price equation. Here we analyze the dynamic response of CPI to individual inflation factors using a VAR model. The estimation period is from 1970: 1 to 1994: 4 and the explanatory variables are also the same as that of the structural model, which includes M, UVIM, ULC, and CPI.

The ordering¹³ and lag length¹⁴ of variables are very important to the empirical analysis using a VAR model. In this study, the variables are ordered with M, UVIM, ULC, CPI in sequence and with the lag length of 4 quarters.

$$\ln X_t = C + \sum_{i=1}^4 A_i \cdot \ln X_{t-i} + U_t$$

where $X_t = [M, UVIM, ULC, CPI]$

C : constant vector

A_i : coefficient matrix

U_t : disturbance vector

Empirical Results

Impulse and Response Function

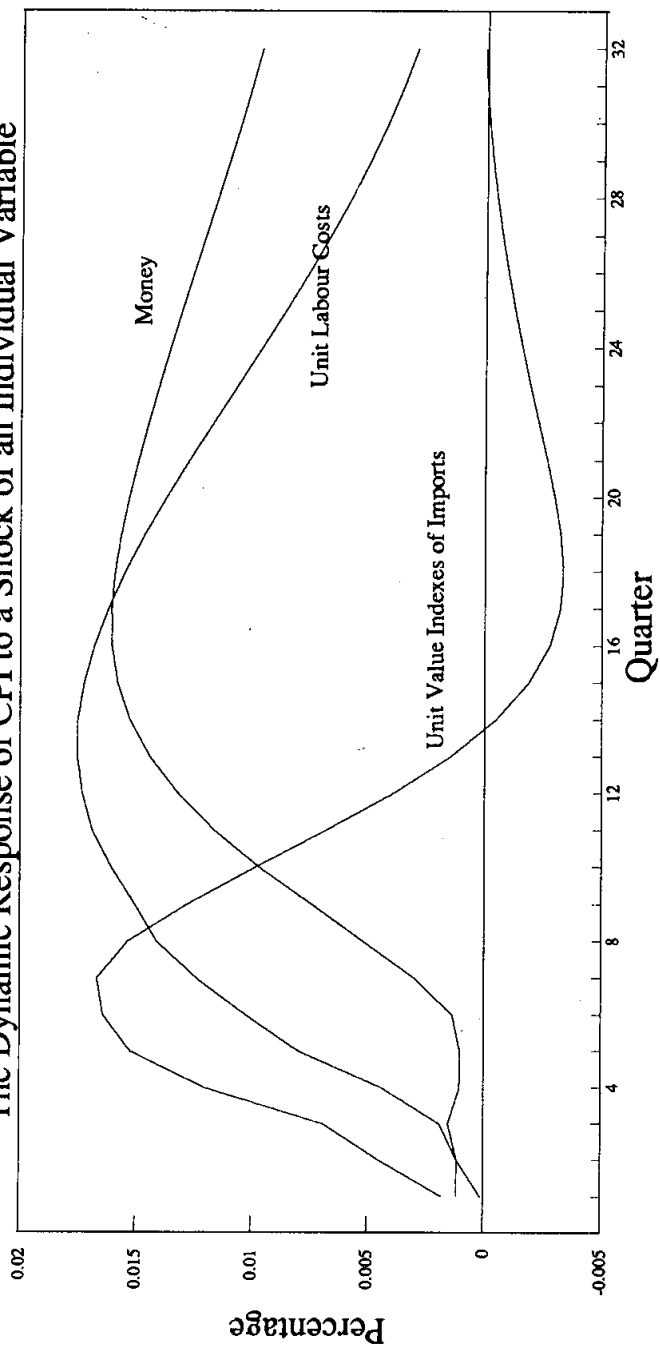
The results of impulse and response function analysis based upon the foregoing VAR model are shown in Chart 2, which shows the dynamic response of CPI to one standard deviation shock of individual inflation factors. As may be seen from Chart 2, if one standard deviation shock in UVIM takes place, CPI responds immediately and rises for the first 1-2 years before returning to normal slowly. The inflationary effect of a ULC increase shock appears from 3 quarters to 3-4 years and dwindles away gradually thereafter. The inflationary effect of one standard deviation shock of M shows up from one year to 4-5 years and decreases slowly over a long-term period.

Decomposition of Variance of Forecast Error

The results of variance decomposition, which shows the contribution of innovations in the explanatory variables to the variability of CPI,

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13. In a VAR model, analysis results may differ on the ordering of variables. In our case, the order used is money supply, unit value indexes of import, unit labor costs and prices, according to the degree of exogeneity.
 14. The lag length was chosen after performing a likelihood ratio test. The test statistic is $(T-C) [\log(\det \Sigma_r) - \log(\det \Sigma_u)]$ (where T is the number of observations, C is a correction term to improve small sample properties, and $\det \Sigma_r$ and $\det \Sigma_u$ are the restricted and unrestricted covariance matrices). It follows asymptotically a chi-square distribution with degrees of freedom equal to the number of restrictions.

Chart 2
The Dynamic Response of CPI to a Shock of an Individual Variable



are presented in Table 1. In this study, the contribution of innovation in the explanatory variables is expressed as a percentage. After the first 2 years, more than half of the forecast error variance of CPI is accounted for by UVIM changes, 24 per cent by ULC, and 22 per cent by M. However, the contribution of ULC changes to the variance of consumer prices increases to as much as 45 per cent and that of M increases to 30 per cent after the first 5 years, whereas that of UVIM decreases to 19 per cent. After the first 9 years, 40 per cent of the variance of CPI is accounted for by M changes, higher than the 39 per cent explained by ULC changes and the 14 per cent by UVIM changes.

Therefore, it may be concluded that cost factors of inflation influence CPI immediately and over a short-term period, while demand factors of inflation impact on CPI slowly and over a long-term period. The results of the impulse response function analysis discussed above also support this conclusion.

Table 1

**CONTRIBUTIONS OF INDIVIDUAL VARIABLES
TO CPI INCREASE**

(Per Cent)

	Quarter								
	4	8	12	16	20	24	28	32	36
M	0.7	1.8	11.9	22.8	29.4	33.5	36.4	38.5	40.0
UVIM	30.7	52.7	37.1	24.6	19.3	16.7	15.3	14.6	14.1
ULC	3.6	23.4	38.6	44.2	44.7	43.4	41.7	40.3	39.2
CPI	65.1	22.1	12.5	8.3	6.7	6.4	6.6	6.7	6.7

III. Analysis of the Causes of Inflation

Based upon the long-run equation estimated in the previous section, we analyze each factor's influence on the past movement of prices in Korea by period. The entire timeframe of the analysis for the years 1973-94 is divided into three different periods, i.e. the years 1973-81, 1982-86 and 1987-94, in view of the unique characteristics of their price movements. Contributions¹⁵ to the inflation rate¹⁶ by causal factors are calculated using the long-run equation estimated by the dynamic OLS method proposed by Stock and Watson (1989).

The causes of price movements, which were analyzed on the basis of the empirical results, are as follows. To begin, during the years 1973-81, consumer price inflation recorded a high level of 17.9 per cent per annum. Among the causal factors, the contribution of M amounted to 6.7 percentage points, accounting for 31 per cent of the overall inflation rate, and that of UVM was 5.3 percentage points, making up 29 per cent of the overall inflation rate under the influence of the increase in international raw material prices owing to the two oil shocks. The contribution of the unit labor cost was 6.7 percentage points, making up 38 per cent of total inflation rate.

During the five years of 1982-86, consumer prices in Korea, which had earlier maintained a rapid increasing trend, showed a more stable range of movements, increasing by 3.6 per cent per annum. This price stability was attributable to the fact that M2 growth rate dropped to 17.4 per cent per annum, much lower than in the previous period, and that most of the cost factors of inflation such as wages and import price changes showed declines or at worst only a slight increase. Viewing the contribution to inflation during this period, that of money supply recorded the highest level, and that of unit labor costs remained at a similar level to that of the previous period, but that of the unit value indexes of imports declined to around the 4 per cent level due to the price stability of international raw materials.

15. Contributions by factors are calculated by multiplying the causal factors' rate of increase per annum by the long-run price elasticity (the coefficients of the long-run equation).

16. Inflation rate is measured on a yearly average basis.

During the years 1987-94, CPI showed an upward trend again. Reviewing the causes of inflation, the contribution of money supply to inflation exhibited the largest figure of 63 per cent, whereas that of unit labor costs was 28 per cent, and that of the unit value indexes of imports recorded 4 per cent.

Table 2

**TREND OF RELATIVE
CONTRIBUTIONS TO INFLATION BY CAUSE**

(Per Cent)

	1973-1981	1982-1986	1987-1994	1973-1994
CPI increase rate (%)	17.9	3.6	6.4	10.5
Money supply (M2)	6.7 <30.8> (37.3)	3.8 <17.4> (105.3)	4.0 <18.6> (63.1)	5.1 <23.3> (48.3)
Unit value indexes of imports	5.3 <23.7> (29.3)	0.2 <0.7> (4.2)	0.3 <1.1> (4.0)	2.3 <10.3> (21.8)
Unit labor cost	6.7 <23.7> (37.5)	1.3 <4.4> (34.8)	1.8 <6.3> (28.0)	3.7 <13.0> (35.2)
Others and errors	-0.8 (-4.2)	-1.6 (-44.3)	0.3 (5.0)	-0.5 (-5.3)

Notes: 1) Figures in () are contribution ratios to inflation by causes, which represent its relative importance in the total inflation rate (%).

2) Figures in < > are yearly average rate of increase (%).

Considering the results of this analysis, even though transitory external impacts such as the oil shocks and wage increases accounted for a large part of the inflation for a certain period, the contribution of money supply to inflation registered as much as 48 per cent during the entire period of analysis, representing its overwhelming influence on inflation. By period, there were differences among the influences of the inflation factors and the various factors' capacity to influence inflation differed. Therefore, it may be concluded that transitory external impacts such as oil shocks and wage increases have an influence on inflation only in the short-run and that they dissipate in the long-run. In other words, inflation can not continue in the long-run without an increase in the money supply.

IV. Towards a More Effective Management of Inflation

The policy implications for inflation management derived from the analysis presented in the above chapters are set out below.

First, it is essential for the price stability to maintain a stable money supply, judging from the empirical results of this paper which show that money supply had the largest influence on inflation, except for one specific period, and that other inflation factors could not lead to continuous inflation without monetary accommodation.

Second, it is necessary to devise measures to alleviate the direct inflationary pressure caused by the cost factors of inflation, including wage increases and changes in import prices, which have an influence on inflation only in the short-run. Especially since wage increases in excess of labor productivity growth are one of the most important factors causing inflation, it is crucial to maintain wage stability and to raise labor productivity. In Korea, an increase in import prices is another key factor in causing inflation because Korea has an economic structure which relies heavily on the foreign sector. Therefore, it is desirable to establish a stable raw materials supply system and to improve the import structure. In the long run, it is necessary to mitigate the influence of an oil price increase on domestic inflation through efforts to save energy by improvement of the energy-intensive industrial structure. In addition, as the openness and the liberalization of the economy progress further, the endogeneity of the exchange rate will be stronger owing to the enhancement of the price mechanism in the foreign exchange market, which may generate a vicious circle involv-

ing the exchange rate and domestic prices. Therefore, counter-measures should also be devised to handle this. In addition to this, measures are called for to achieve exchange rate stability since volatility is increased owing to the enhancement of the price mechanism in the foreign exchange market.

Third, under the consideration that the coefficient of error correction term in the short term equation has a large figure, it seems that the Korean economy is characterised by sensitivity to an inflation shock. Therefore, policy emphasis should be placed on the eradication of the widespread expectations of inflation so as to create a healthier economic order.

V. Summary and Conclusion

In this study, Chapter I summarized the historical movements of consumer prices in Korea. Chapter II analyzed the influences of inflation factors and the dynamic response of consumer prices to a shock involving an inflation factor, using long-run and short-run price equations and a VAR model. Chapter III analyzed the historical movements of domestic prices, based on the analysis results of Chapter II. Chapter IV suggested some measures to cope with the inflation in Korea.

Summarizing the empirical results briefly, money supply, a demand factor, has played an important role in inflation in Korea both in the short-run and the long-run. The cost factors such as the oil shocks and unit labor cost increases had a great influence on inflation during specific periods. However, these external impacts on inflation remained transitory and were not prolonged. As pointed out in the VAR analysis, transitory external impacts, which are caused mainly by cost factors, can lead to a sharp increase in the price level in the short run, but they dissipate in the long run. Based upon this result, it may be concluded that inflation cannot continue without monetary accommodation. In addition, the large figure in the coefficient of the error correction term means that consumer price inflation in Korea is fairly sticky because of the widespread expectation of inflation developed over time by continued high inflation.

The policy implications for price stability derived from the above analysis are as follows. First, it is essential for the sake of price stability to maintain a stable money supply, under the consideration that infla-

tion factors cannot bring about continued inflation without monetary accomodation.

Second, measures need to be devised to cope with the inflation caused by cost factors such as import prices and wage increases because the inflation caused by these factors has a strong and immediate effect on inflation.

Third, as the Korean economy has a characteristic sensitivity to inflation shocks, emphasis should be placed on eliminating the wide-spread expectations of inflation to strengthen the economic order.

Process of Price Function Inducement

Assuming that aggregate output is a function which includes the price of commodities (the price) and the prices of production factors such as labor, raw materials and energy, the aggregate supply curve may be expressed in the form of (1).

$$Y_s = \psi(S, P) \quad \dots (1)$$

where Y_s : aggregate supply, S : prices of production factors,
 P : price of commodities and services

To derive the aggregate demand curve, the expenditure equation (IS curve) and the money market equilibrium equation (LM curve) are used as follows expressed in the form of (2) and (3).

$$Y_d = C + I + G + EX - IM \quad \dots (2)$$

$$M/P = L(Y_d, r) \quad \dots (3)$$

Y_d : aggregate demand, C : private consumption, I : investment,
 G : government consumption expenditures, EX : exports, IM : imports,

M : money, P : price of commodities and services, r : interest rate

Assuming that private consumption is a function of income and interest rate, that investment is a function of interest rate, that import is a function of income, and that government consumption expenditures and exports are exogenous, (2) may be expressed as follows:

$$Y_d = C(Y_d, r) + I(r) + G + EX - IM(Y_d) \quad \dots (2)'$$

Solving (2)' for interest rate and substituting (2)' into (3), then the aggregate demand curve can be derived as follow:

$$Y_d = \Phi(M/P, G, EX) \quad \dots (4)$$

Finally, making (4) equal to (1), which represents the equilibrium of aggregate output and aggregate demand, the price function is derived as follow:

$$P = \Gamma(M, S, G, EX) \quad \dots (5)$$

Outline of the Consumer Price Index

1. Overview of the Index

The CPI is a price index, designed to measure the average movements of the prices of the commodities and the charges for the services that are consumed to maintain the standard of living of households in urban area. The items of CPI exclude investment expenditures such as expenditures for land and house, because it is based on consumption expenditure alone to capture the average cost of living and consumer purchasing power by examining price movements at the final stage of consumers' purchases.

In Korea, the Economic Planning Board(now Ministry of Finance and Economy) began to measure the Consumer Price Index from 1965 and has revised the base year every five years to reflect new consumption patterns.

2. Method for Making Index

A. Items

The index items are selected according to their relative importance in consumption expenditure. To be selected, the items should account for more than 1/10,000 of total expenditure by consumers in 32 major cities including Seoul, and be considered representative of similar items, and it should also be possible to examine their prices continuously. There were 470 items included in 1995. Those items selected are grouped into 9 major items of expenditure, allowing indexes to be drawn up by item of expenditure.

Weight and Number of Item by Basic Group

Basic Group	Weight	Number of Items
All items	1000.0	470
Food	324.9	167
Excluding food	675.1	303
Housing	141.7	20
Fuel, light & water	45.3	9
Furniture & utensil	62.0	62
Clothing & footwear	88.4	53
Medical care	54.5	27
Education, culture & recreation	142.4	71
Transportation & communications	93.6	26
Other miscellaneous	47.2	35

B. Formula

The index is computed using the modified Laspeyres' formula, which is the weighted arithmetic mean of the fixed base year. The formulae of the index by item and of the index by item of expenditure are as follows.

$$\text{Index by item} = \frac{P_1}{P_0} \times 100$$

$$\text{Index by item of expenditure} = \frac{\sum \frac{P_1}{P_0} \times W_c}{\sum W_c} \times 100$$

P_0 : base price for each item
 P_1 : current price for each item
 W_c : weight of each item

Appendix 3

TIME SERIES DATA USED IN EMPIRICAL ANALYSIS

ENTRY	CPI	M2	ER	UP	WAGM	LPI
1970:1	11.7	719.8	305.8	28.8	12835	27.8
1970:2	12.0	740.2	308.8	27.5	13675	29.9
1970:3	12.1	793.6	312.4	27.1	14576	28.9
1970:4	12.6	854.1	315.2	28.2	15522	34.1
1971:1	13.5	927.3	319.5	29.6	15328	30.9
1971:2	13.5	973.4	327.0	28.0	16437	32.5
1971:3	13.9	998.1	370.8	27.4	17332	32.2
1971:4	14.0	1067.9	371.2	27.0	17732	33.5
1972:1	14.7	1118.3	379.5	30.2	17479	33.6
1972:2	15.4	1153.7	394.3	28.1	18303	36.1
1972:3	15.7	1256.6	399.1	28.3	18913	35.9
1972:4	15.5	1397.4	398.7	27.9	19673	36.9
1973:1	15.4	1538.8	398.9	33.2	20266	36.7
1973:2	15.6	1639.3	398.9	35.5	21297	36.9
1973:3	15.9	1759.1	398.4	38.1	22901	37.9
1973:4	16.3	1902.2	397.1	42.5	24734	39.8
1974:1	18.2	2033.9	398.2	55.3	25425	40.1
1974:2	19.4	2088.6	399.0	59.4	28785	40.4
1974:3	20.3	2171.1	399.0	60.5	31144	40.5
1974:4	20.8	2329.8	421.7	59.8	35493	41.1
1975:1	22.2	2517.2	484.0	68.8	32950	42.6
1975:2	24.0	2621.2	484.0	61.7	33817	41.3
1975:3	25.6	2812.0	484.0	57.8	40005	40.5
1975:4	26.6	3002.5	484.0	54.8	43851	40.9
1976:1	27.2	3227.1	484.0	61.2	44246	40.2
1976:2	28.1	3395.3	484.0	58.2	49411	41.2
1976:3	29.2	3641.6	484.0	58.9	54447	39.3
1976:4	29.1	3883.5	484.0	58.7	58192	37.9
1977:1	30.0	4286.5	484.0	63.4	58870	36.1
1977:2	30.9	4531.8	484.0	60.3	65569	41.2
1977:3	31.9	5024.6	484.0	59.9	72121	42.5
1977:4	32.2	5535.2	484.0	57.7	79084	41.3

Notes: CPI = consumer price index, M2 = money supply, ER = exchange rate,

UP = unit value index of imports, WAGM = wages in manufacturing,

LPI = labor productivity index

ENTRY	CPI	M2	ER	UP	WAGM	LPI
1978:1	33.9	6198.6	484.0	64.2	76104	40.6
1978:2	35.0	6413.4	484.0	61.6	88153	46.5
1978:3	36.5	6881.5	484.0	64.2	98488	47.8
1978:4	37.6	7492.7	484.0	64.6	108555	46.8
1979:1	39.2	8096.5	484.0	74.7	104289	45.3
1979:2	42.1	8232.3	484.0	74.5	114393	47.1
1979:3	43.2	8629.1	484.0	79.7	123684	47.1
1979:4	44.8	9264.2	484.0	83.8	136949	47.5
1980:1	49.8	10015.8	571.0	97.2	127708	45.3
1980:2	53.4	10439.8	594.1	92.3	141936	46.2
1980:3	55.8	10948.7	613.3	95.4	156681	47.6
1980:4	59.1	11652.1	651.3	92.6	161691	47.6
1981:1	62.2	12682.8	667.2	107.4	154927	47.8
1981:2	65.3	13212.7	681.0	99.8	169855	50.8
1981:3	68.5	14029.3	685.9	96.4	186652	53.0
1981:4	68.9	14934.6	690.1	95.7	193098	51.5
1982:1	69.5	15988.5	710.1	100.1	182017	50.1
1982:2	70.7	16769.8	728.3	92.1	192978	52.7
1982:3	71.6	18172.6	741.3	88.9	213561	52.3
1982:4	71.7	19370.1	744.7	85.9	220662	54.6
1983:1	73.1	19993.6	753.4	94.3	205943	53.4
1983:2	73.3	20459.7	769.5	85.7	220774	57.3
1983:3	73.4	21348.7	785.2	84.5	236680	59.0
1983:4	73.4	22218.0	794.8	84.8	243213	58.2
1984:1	74.5	22800.2	795.7	93.8	224961	59.0
1984:2	74.9	22742.2	798.2	88.3	236076	62.7
1984:3	75.2	23349.2	810.5	87.6	254616	64.3
1984:4	75.4	24152.9	819.5	83.7	266116	62.1
1985:1	75.9	24848.2	838.7	90.5	242861	62.8
1985:2	76.6	25295.2	867.0	85.5	258268	64.3
1985:3	77.2	26370.7	883.0	83.7	283265	65.5
1985:4	77.6	27547.0	891.4	79.9	295352	65.2
1986:1	78.6	28409.3	887.1	86.1	268186	66.4
1986:2	79.1	29622.0	887.0	78.2	286057	69.4
1986:3	79.3	31173.5	882.2	77.2	306987	70.0
1986:4	78.7	32379.8	869.5	76.4	316683	69.1

ENTRY	CPI	M2	ER	UP	WAGM	LPI
1987:1	79.3	33756.5	855.7	85.9	287688	70.0
1987:2	81.0	34755.9	827.8	84.3	306522	72.9
1987:3	82.1	36798.3	807.5	84.7	331274	73.6
1987:4	83.0	39167.5	799.2	85.6	388998	78.1
1988:1	85.2	40315.5	771.5	95.3	343335	80.7
1988:2	86.8	41125.4	735.6	93.4	369062	77.0
1988:3	87.9	43833.4	723.0	94.1	424694	84.4
1988:4	88.6	46297.7	695.8	94.6	436901	83.6
1989:1	90.0	48008.4	677.5	100.6	410320	80.7
1989:2	91.7	48885.6	666.9	102.0	471923	77.0
1989:3	92.8	51601.6	668.5	101.0	538500	84.4
1989:4	93.9	54676.8	673.0	92.2	550160	83.6
1990:1	96.8	59296.8	690.6	98.5	521263	95.6
1990:2	99.7	59809.8	710.3	97.4	554595	95.8
1990:3	101.2	61946.5	715.5	99.0	636096	101.6
1990:4	102.3	65251.3	715.0	104.4	655535	107.1
1991:1	106.3	70194.2	721.6	104.6	604632	108.3
1991:2	108.5	70855.7	725.3	99.0	655272	109.8
1991:3	110.6	73366.7	733.0	97.6	742128	115.6
1991:4	111.9	77679.4	753.0	99.4	764057	119.9
1992:1	113.9	82958.8	766.5	97.3	733488	121.9
1992:2	116.1	83994.9	783.4	97.4	749621	122.9
1992:3	117.3	86868.3	787.4	100.0	845014	127.1
1992:4	117.2	92144.9	785.4	98.8	870001	128.0
1993:1	119.1	96815.3	793.9	94.9	813985	132.5
1993:2	121.6	99497.7	799.5	96.0	838278	134.3
1993:3	122.5	104541.1	807.8	95.2	934518	135.3
1993:4	123.6	109460.1	808.9	92.8	956488	140.5
1994:1	126.9	112221.9	809.1	91.5	917624	142.4
1994:2	128.7	114870.2	807.3	93.9	973146	147.3
1994:3	130.9	120519.7	803.2	97.3	1073074	149.7
1994:4	130.8	126799.2	795.6	97.7	1125785	156.6

Chapter 10

INFLATION IN NEPAL: ITS CAUSES AND MANAGEMENT

by

Sushil R. Mathema

I. General Economic Setting in Nepal (1975/76-1993/94)

1.1 Economic Backdrop

Situated in South Asia, Nepal is one of the developing nations endowed with limited natural resource base and difficult geographical terrain. Characterised as a predominantly agricultural country, around 81 per cent of the population are engaged in agriculture and about 42 per cent of the national income is presently contributed through this sector. Between 1985 and 1990, the average annual economic growth rate was 4.8 per cent while the population growth during the same period was 2.1 per cent. Sluggish growth of agricultural and non-agricultural sectors coupled with narrow export base in the external trade front resulted in difficulty to attain a self-sustained economic growth.

Nepal started the development plan since 1956 and so far seven development plans have already been launched and the eighth five-year plan is currently underway. The first four development plans (1956/57 - 1974/75) concentrated on developing physical infrastructures. The fifth plan (1975/76 - 1979/80), however, placed greater emphasis on the direct productive sectors particularly agriculture.

The sixth plan and the seventh plans (1980 -1990) were conceived around the idea of fulfilling the minimum basic needs of the people. Various reform policies have been pursued in the ongoing eighth five-year plan and efforts are afoot to follow more open and liberal policies in the process of development. The foremost issue that has been prioritised in this plan has been the achievement of real GDP growth of 4 to 5 per cent as this rate of growth is supposed to establish a base for self-sustained development.

1.2 Macro-Economic Performance

1.2.1 Gross Domestic Product, Savings and Investment

A review of the growth performance of the Nepalese economy shows that GDP in real terms grew by 2.4 per cent per annum during 1975-1980. Higher annual growth rate at 5.0 per cent was observed during 1980-1985 while the successive seventh plan and the eighth plan periods recorded annual average growth rates of 4.8 per cent and 5.2 per cent respectively. The growth performance was, however, not uniformly distributed over the period on account of the fluctuations in output growth with the advent of adverse weather conditions at times. For instance, the negative growth of real GDP in 1982/83 is associated with the drought situation experienced during that year. Although the agricultural sector dominated its share in overall GDP in the past, its dominance has witnessed a declining trend during the current years. For example, the share of agricultural sector in national income in 1980/81 was 57.8 per cent which declined to 42.2 per cent in 1992/93. This is an indication of the fact that despite the employment of improved methods of technology in this sector, this sector could not perform well as anticipated. At the same time, the growing share of the manufacturing sector has been another factor attributable to such development.

During almost two decades (1975-1994), although overall positive growth is witnessed in investment and savings, sluggish growth in investment and negative growth in domestic savings at times has also indirectly affected the growth of GDP. The growth rate in gross domestic savings and investment during the period 1975 to 1980 registered 9.6 per cent and 12.6 per cent per annum respectively, while such growth rate during the period 1985-1990 was 7.3 per cent in the case of the former and 13.9 per cent in the case of the later, revealing the poor performance of both the sectors during these two periods. During 1980's domestic savings-GDP ratio (at current prices) showed a continuous declining trend. The savings-GDP ratio which stood at 10.9 per cent in 1980/81 declined to 9.6 per cent in 1990/91. The growth of investment-GDP ratio, although registering a modest increasing trend during the first half of 1980's, -an increase from 17.6 per cent in 1980/81 to 19.2 per cent in 1985/86, remained almost constant during the later half of the decade. Moreover, the trade and transit impasse with India in 1989/90 followed by the people's movement for the restoration

of multi-party democratic system within the country in 1990/91 affected the growth rate of total investment and saving performance. This has resulted in perpetual widening of saving - investment gap during the last decade. The savings-investment gap in 1992/93 is expected to remain at 9.7 per cent of GDP, ultimately to be financed by foreign capital investment.

1.2.2 Monetary Situation

An overview of the monetary situation during the period 1975-1994 reveals the fact that the growth of money supply somewhat accelerated in the second half of the period. Both narrow money and broad money growth rates registered an increasing trend during the current eight five year plan period. The narrow money (M1), which recorded an annual average growth of 16.4 per cent during the period 1975-1980 registered an annual average growth of 19.4 per cent during 1990-1994. The broad money (M2) also recorded an annual average growth of 21.9 per cent (1990-1994) over 20.8 per cent (1975-1980). Currently the main contributor of the growth in broad money is net foreign assets induced from inflow of foreign exchange followed by the increased bank financing of the budgetary deficit.

The government has, nonetheless, taken several steps to improve the banking and monetary sectors. The elimination of maintaining SLR at 22% of deposits in the government bonds and NRB bonds, lowering of refinancing rate by NRB, interest rate determination left to the market forces, rehabilitation of two large state-owned banks, promotion of joint-venture banking and development of capital markets with the introduction of finance companies in the financial market are some of the monetary and financial reform measures taken up by the present government. A considerable success has been restored in directing the resources of the banking sector from the public to the private sector.

1.2.3 External Trade Performance

Nepal's trade structure is characterised by limited export base and larger imports of basic consumer goods and essential commodities. As a result, there is a wide discrepancy between export and import ratio implying a huge, growing deficit in trade account. Although there has been a relative improvement in the growth of exports in recent years, the higher base of imports has always led to the chronic deficit in the

trade account. The figures show that annual average growth in exports which stood at 6.7 per cent for the period 1975-1980 improved remarkably to 52.8 per cent for the period 1991-1994. Similarly, annual average growth rate of imports for the above periods increased from 14.2 per cent to 30.6 per cent. But the export/GDP ratio for the period 1990-1994 stood relatively at a low level of 9.2 per cent as compared to the import/GDP ratio of 23.2 per cent during the same period.

Along with trade deficit, the BOP position of Nepal is also characterised by huge current account deficit. During 1970's net receipts from service and transfer sector occasionally restored deficit balance encountered in the merchandise trade sector. However, Nepal continued to experience the current account deficit since the beginning of 1980's. The annual average current account deficit during 1975-1980 was Rs. 279 million which increased to Rs.9581 million during 1990-1993. Likewise, the current account deficit to GDP ratio, on annual average basis, increased from just 0.2 per cent to 6.9 per cent at the interval of those two periods. In order to improve the trade account and current account position, Nepal in recent years initiated a major reform in trade and foreign exchange regime. Elimination of quantitative restrictions on the import, lowering of import duties, introduction of full convertibility in the current account, and simplification of administrative procedures have contributed to a major reorientation in the external sector. As an effect of the growing inflow of short term private and official capital, there remained a BOP surplus of Rs. 7803.8 million during 1993/94 with the foreign currency reserves increased to equivalent of more than Rs. 38 billion. In spite of the above favourable figures, Nepal needs to be cautious as far as the future obligation of its debt-servicing is concerned. The debt-service ratio has remarkably increased from annual average of 1.8 per cent during 1975-1980 to 13.2 per cent during 1990-1994. Nepal's external position is vulnerable given the inherent volatility of its export sector and the capital flow as reflected in the rising miscellaneous capital flows. Boosting the exports at least at an annual rate of 20 per cent in real terms has been felt necessary in the economy.

1.2.4 Fiscal Performance

In an effort to accelerate the pace of development, the government adopted expansionary financial policies in the early 1980's. Large fiscal deficits financed in part by the domestic bank borrowings has made

the budgetary performance rather expansionary as overall fiscal deficits increased from an average of 3.1 per cent of GDP during 1975-80 to 8.1 per cent of GDP during 1990-93. Such budgetary deficits were attributed to the increase in both the regular and development expenditures as a result of which the ratio of government expenditure to GDP rose from the five-year (1975-1980) annual average of 13.3 per cent to 18.5 per cent during (1990-1994). Despite many efforts to curtail government domestic borrowing, the borrowing to GDP ratio remained at an annual average rate of 2.1 per cent during 1990-1994 mainly due to the shortfall in revenue collections. Inconsistent with the objective of economic liberalization policy launched since 1992, the government has now adopted fiscal policies aimed at improving budget release process and reforms in taxation system such as broadening the tax base, simplifying the tax structure, improving the elasticity of the tax system and strengthening tax administration.

II. An Overview of Inflation Experience in Nepal

2.1 Introduction

It is universally understood that a higher rate of inflation brings distortions in the optimum allocation of resources as it is likely to induce inflationary expectations and encourage distortion in the savings and investment. Inflation in Nepal has remained the central concern of all the issues pertinent to its economic management. The past efforts of the government to bring stability in the price rise could not materialise as desired. In the span of the last two decades, the annual rate of inflation averaged at double digits during most of the years. It reached the record level of 21.0 per cent in 1991/92 becoming one of the major hurdles to the pursuit of stable and self-sustained economic growth of the nation.

2.2 Aggregate Price Movement During 1975-94

An analysis of the price movement during 1975-94 shows that the annual rate of price rise measured in terms of the Consumer Price Index (CPI)¹ averaged at 9.5 per cent. A review of the the price move-

1. The details of structure and method of computation are presented in the latter part of the chapter.

ment on five-year basis suggests that the annual average inflation has been moving up over time. For instance, it remained at a relatively low level of 5.3 per cent during 1975-80. It started firming up at a rate of 9.7 per cent during 1980-85 and 12.0 per cent during 1985-90. Besides, the four-year annual average inflation rate during the period 1990-94 registered 12.2 per cent, signifying the highest average inflation rate ever-recorded in the span of two decades. It is also interesting to note that the annual rate of inflation averaged at double digits between 1985-90. The analysis of the annual price movements revealed some unprecedented rise in inflation in the fiscal years 1977/78 (11.2 per cent), 1980/81 (13.4 per cent), 1981/82 (10.4 per cent), 1982/83 (14.2 per cent), 1985/86 (15.9 per cent), 1986/87 (14.2 per cent), 1987/88 (13.3 per cent), 1989/90 (11.0 per cent) and 1991/92 (21.0 per cent). This indicates that the country was having double-digit inflation for almost half of the period between 1975-94.

Various factors contributed to such an upsurge in the price movement in Nepal. The higher rate of inflation recorded in 1977/78 may be attributed to the consecutive negative growth of agricultural production which registered a growth of 5.2 per cent and 3.2 per cent in 1976/77 and 1977/78 respectively. The rupee was devalued by 4.0 per cent vis-a-vis U.S. dollar on March 22, 1978. Besides, there was relatively a higher increase in the growth of money supply, decrease in export growth by 10.7 per cent and a substantial increase in external borrowings by 132.4 per cent during 1977/78 as compared with the previous year. During 1975-80, the country's efforts to contain inflation at a relatively lower level was reflected in the imposition of credit ceiling since 1975/76. As per this arrangement it was directed that the outstanding loans due from non-financial enterprises and private sector of the two large state owned commercial banks (Nepal Bank Limited and Rastriya Banijya Bank) should be within the limit of Rs. 2366.2 million at year end.

The high level of inflation rates recorded during the period between 1980-83 was the consequence of higher inflation rates in India as a result of the hike in the prices of the petroleum products, the lagged impact of rise in petroleum products in Nepal in 1979/80, increase in the cost of production due to the rise in the fertilizer prices and expansionary fiscal policy of the government which registered a growth of 30-31 per cent in government expenditure in 1981/82 and 1982/83 each². Besides, a dramatic shortfall in agricultural production

by 15.9 per cent was recorded in 1982/83 because of the drought which occurred both in Nepal and bordering areas of India. The devaluation of the Nepalese rupee vis-a-vis the US dollar by 9.1 per cent on September 19, 1981 and 7.7 per cent on December 17, 1982 also contributed to this flaring up of the inflation.

A number of anti-inflationary policy measures with regard to monetary management were taken during the period 1980-85. The two large state owned commercial banks were allowed to open a number of branches so as to mobilize savings and also mop up the excess liquidity in the economy. The commercial banks were directed to maintain 25 per cent of total deposit liabilities in liquid assets while a compulsory cash reserve ratio of 4 per cent of total deposits in their safe vaults and 5 per cent of total deposits with the Nepal Rastra Bank (NRB) effective from July 16, 1981. The central bank also instructed the commercial banks to maintain a 3:1 ratio between borrowings and capital fund effective from the fiscal year 1981/82. A number of consecutive changes in the interest rate structure were effected on June 15, 1982 and August 17, 1982 to control domestic prices, correct the ever-widening trade deficit and maintain an appropriate level of liquidity. For instance, effective June 15, 1982, loan and deposit rates were raised by 1 per cent and 0.5 per cent to 17.0 per cent and 8.5 per cent respectively. Similarly, lending rates for fixed and working capital provided to cottage industries were fixed at 11 per cent effective from May 15, 1982. The commercial banks were also directed to provide loans against the government's Development Bonds for a maximum period of one year at a rate of 1.5 per cent higher than the rate specified in the Bonds. A new era of joint venture banking service was introduced in the financial sector with the establishment of Nepal Arab Bank Limited (NABIL) - the first joint venture bank which was set up on July 12, 1984. To foster healthy competition among banks, commercial banks were granted autonomy to offer 1.5 per cent (savings deposits) and 1.0 per cent (time deposits) above the prevailing rates of interest effective November 16, 1983. In addition, measures were also adopted to enable commercial banks to maintain a credit-deposit ratio of 75 per cent by mid-July 1985.

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2. Overall budget deficit (before grants) increased from an average of 5.9 per cent of GDP during 1976/77 - 1980/81 to 10.3 per cent during 1981/82 - 1985/86.

In spite of the improvement witnessed in containing the inflation during 1983/84 and 1984/85 basically as a result of better growth in agricultural production (28.0 per cent) in 1983/84 and also the pursuance of above-mentioned anti-inflationary measures, the inflation trend deteriorated further during the period between 1985-90. As mentioned earlier, the incremental rates of annual inflation averaged at double digits for four years of the five-year period under consideration with an exception in the year 1988/89. The devaluation of the Nepalese rupee vis-a-vis the U.S. dollar by 14.7 per cent on November 30, 1985 was the main contributing factor to this higher rate of inflation. Following the devaluation, the electricity tariff was also raised by 22 per cent and fertiliser prices by 20 to 33.5 per cent. All this affected the cost of production of domestic goods and the prices of imported goods. A negative growth of agricultural production by 7.3 per cent in 1986/87 and relative increase in the growth of Wholesale Price Index (WPI) of India for cereals during four years out of the five-year period under consideration also added spark to the inflation. Another contributing factor that helped in the upward movement of the price during above period was the trade and transit impasse with India beginning on March 23, 1989. Although this impasse terminated in June 1990, it had wide-ranging impact in Nepal's economic development, affecting adversely the overall growth rate, creating supply bottlenecks due to heavy rationing of petroleum products and pushing up the prices of imported goods. Relatively better performance of the agricultural production could not nullify the negative impact created by the trade and transit deadlock with India and the increase in the WPI of India for cereals by 12.8 per cent during 1988/89 as well.

In order to redress this situation, the government embarked on an economic stabilization program in 1985/86 which was supported by a stand-by arrangement with the International Monetary Fund. The program brought significant stabilisation gains in the field of external current account deficit and the overall balance of payments but not in the price sector. In pursuit of redressing structural constraints to growth and maintaining inflation rate at a desirable level and strengthening the external current account position over the medium term, the country embarked on a three-year SAP (1987/88-1989/90). The introduction of programme budgeting, enhancing of the private sector participation in industrialisation, implementation of liberal export promotion policy and the financial policy intended to keep bank credit expansion within desirable limit were some of the strategies adopted under the SAP

(Structural Adjustment Program). On May 29, 1986, the central bank instructed the commercial banks to decide interest rates on their own with the conditions that rates for savings should not fall below 8.5 per cent and that for the one-year fixed deposits, 12.5 per cent. However, after entering into SAP agreement, financial policy was further liberalized by completely liberalizing the interest rate effective August 31, 1989. The commercial banks were further instructed to maintain a minimum of 9.0 per cent of total deposits as cash in vault or balance with NRB. A new directive was issued on September 2, 1989 on SLR (Statutory Liquidity Requirement) whereby SLR was to be calculated on the basis of weekly average outstanding deposit eight weeks before. Effective September 24, 1989, the SLR was raised to 12 per cent.

Although the aggregate price movement during the period 1990-94 was somewhat smoothing in three of the four years, due basically to the amicable resolution of the 15-month old trade and transit disputes with India, there occurred double digit annual average inflation rate of 12.2 per cent during the period. The unprecedented higher rate of inflation at 21.0 per cent experienced in the year 1991/92 was the principal reason for pushing up the inflation to double-digit level during the period. The inflation was relatively at a comfortable level of 9.8 per cent in 1990/91, the result of the better supply situation induced from the settlement of the trade and transit impasse with India. However, the outbreak of the Gulf war in August 1990, slow-down of the agricultural production (6.7 per cent in 1990/91) and its negative growth (6.2 per cent in 1991/92 and 10.2 per cent in 1992/93), combined with relatively higher growth of the aggregate WPI of India along with the WPI of India for cereals, prevented the inflation rate from lowering down below 8.9 per cent recorded in 1992/93.

Many other factors were also responsible for bringing up the inflation at record level in 1991/92. Firstly, the Nepalese rupee was devalued two times by an aggregate of 20.9 per cent vis-a-vis the U.S. Dollar and other convertible currencies on July 2 and 3, 1991 which pushed up the import prices of raw materials, fuels, fertilizers, construction materials, daily consumer goods, etc. Following the devaluation, the government reduced subsidies on the administered goods such as petrol, fuelwood, milk, education fee, telephone and electricity charges. The higher rate of inflation in India (13.5 per cent in aggregate WPI and 23.2 per cent in cereals-WPI) and the resultant devaluation of the Indian currency also assisted in raising the prices of imported goods

from India. Moreover, shortage in the supply of essential food grains was also experienced in Nepal. Besides, the perpetually long expansionary fiscal policy of the government in the past continued to put pressure on monetary liquidity ultimately contributing to the higher rate of the inflation. The narrow and broad money during 1991-1994 also went up by the annual average of 19.4 per cent and 21.9 per cent respectively.

The period under consideration (1991-94) was crucial for the Nepalese economy from various points of view. Along with the restoration of democracy in 1990 and the assumption of the political power by the popularly-elected government in 1991, Nepal entered into the era where difficult challenges for rebuilding the economy in the desirable direction and alleviating the poverty at the faster pace laid ahead. To maintain macroeconomic stability and also to bring out structural changes in the economy, the new government initiated many reform measures. These included, among others, containment of monetary expansion within the manageable limit, making it consistent with the real sector growth and inflation. Open market operation was introduced as an indirect tool to control monetary aggregates within the desirable limit. For this purpose, open market sales of development bonds and treasury bills was effected while the amount of budget deficit financed by banks was lowered. The type of bonds, maturity date, issue date, etc. were determined by the open market committee of the NRB. It was also arranged to make charges on treasury bills (issued in the condition of excess deposit of the government with NRB) at an average treasury auction rate.

Major steps were undertaken in the financial sector policy reforms. The most prominent ones were the complete decontrol of the margin rates on import L/Cs, reduction in SLR to 22 per cent in November, 1992 and to 12 per cent in July 1993, amendment to the Commercial Bank Act to maintain Capital Adequacy Ratio at 6.0 per cent effective mid-July 1992, amendment to the Finance Company Act, Insurance Act and Securities Exchange Act and the adoption of liberal policy as to the establishment of the banks and finance companies in the private sector.

Liberal policies were also adopted in sectors like the public enterprises, industry, foreign investment and technology and, trade and foreign exchange. Prudential fiscal policy was adopted to contain grow-

ing budget deficit by strengthening revenue administration and prioritizing and restraining government expenditure. Privatization of public sector enterprises was initiated in 1991/92. During the same year, new Industrial and Foreign Investment Policies were enacted. Effective March 4, 1992 Nepal adopted partial convertibility of the Nepalese rupee vis-a-vis convertible currencies in the current account. With this arrangement, the foreign exchange earned could be converted into the Nepalese currency to the extent of 65 per cent at the market rate and 35 per cent was to be surrendered to the Nepal Rastra Bank at the official rate. These proportions were changed later to 75:25 ratio during July 1992. Following the encouraging results of the partial convertibility, the government made Nepalese currency fully convertible in current account and simultaneously revalued it against the Indian currency by 3.125 per cent with effect from February 12, 1993. To avoid possible immediate adverse impact of the adjustments on foreign exchange rates, certain adjustments were also made in general customs duties, sales taxes and excise duties.

The liberal reform policies taken up by the government in the various macroeconomic sectors during 1991/92 have been instrumental in containing the rate of inflation to 8.9 per cent in 1993/94. Besides, entering into ESAF³ (Enhanced Structural Adjustment Facility) agreement with IMF as a follow up of SAF in 1992/1993 also helped to achieve significant progress in macroeconomic situation including the containment of annual average inflation rate at single digit level in the following consecutive years. The steady decline in the rate of inflation during 1992/93 and 1993/94 thus reflects a considerable improvement in agriculture and non-agriculture production, reduction in tariff rates, control in deficit financing and relative stability in exchange rates.

2.3 Price Movement by Commodity Groups

An analysis of price movement by commodity groups during 1975-94 shows that the annual rate of price rise averaged at 9.6 per cent for food and beverages group and 9.9 per cent for non-food and services group. Also, both the food and beverages group and the non-food and services group prices revealed increasing trend during the period 1975-94. The prices of food and beverages group which registered an

3. Details of SAF and ESAF program will be dealt later.

annual average increment of 4.7 per cent during 1975-80, went up by 9.4 per cent in 1980-85, 12.3 per cent in 1985-90 and 12.6 per cent in 1990-94. Likewise, the prices of the non-food and services group which recorded an annual average growth of 6.8 per cent in 1975-80, moved up by 10.3 per cent in 1980-85, 11.5 per cent in 1985-90 and 11.6 per cent in 1990-94.

Region-wise, the movement of price for food and beverage group showed highest annual average rate of inflation in Kathmandu followed by the Hills and the Terai except for the period 1990-94 where annual average rate of inflation is higher in the Terai as compared to that of the Hills. The annual average rate of inflation for the food and beverage group during 1975-80 remained relatively low at 6.3 per cent in Kathmandu followed by 5.5 per cent in the Hills and 3.4 per cent in the Terai. However, during the same period, the price index for non-food and services group registered the growth of 7.8 per cent, 6.5 per cent and 6.4 per cent in the Hills, the Terai and Kathmandu respectively.

Price movements by broad commodity groups also indicate that the price index for the non-food and services group went up by a higher annual average rate of 11.9 per cent in the Hills, 10.6 per cent in the Terai and 9.6 per cent in Kathmandu during the period 1980-85. By contrast, during the same period, a relatively lower annual average inflation of 10.2 per cent in the Hills, 9.3 per cent in the Terai and 9.2 per cent in Kathmandu was observed for food and beverages group. However, the following two periods (1985-90 and 1990-94) revealed higher growth of price rise in the food and beverages group as compared with that of the non-food and services group. During these above periods, the respective price indices of the food and beverages group surged by 13.7 per cent and 13.9 per cent in Kathmandu followed by 11.4 per cent and 11.8 per cent in the Terai and 11.8 per cent and 10.9 per cent in the Hills. The comparative figures of movement in prices for the non-food and services group during the same periods showed the respective annual average increments in price at 11.4 per cent and 13.9 per cent in Kathmandu, 11.9 per cent and 10.3 per cent in the Terai and 10.2 per cent and 10.6 per cent in the Hills.

It may be recalled that the overall regional price movement reveals relatively a higher pressure on price in Kathmandu as compared to that

of the Hills and the Terai. Price movement in Kathmandu, which witnessed an annual average price rise of 6.3 per cent in 1975-80 flared up by 9.3 per cent in 1980-85, 12.8 per cent in 1985-90 and 13.9 per cent in 1990-94. The annual average inflation for the Terai registered a growth of 4.3 per cent in 1975-80. It suddenly spurted up by 9.7 per cent in 1980-85 and moved up further by 11.5 per cent in 1985-90. The rate of increment in price was, however, similar at 11.3 per cent during 1990-94. Similarly, the annual average inflation of 6.1 per cent in the Hills during 1975-80 flared up to 10.7 per cent in 1980-85, 11.3 per cent in 1985-90 and like in the Terai, its increment rate dropped to 10.8 per cent in 1990-94.

The trend of broad commodity-wise price fluctuation in the country suggests that the poor performance of the agricultural production along with the WPI of India for cereals during most of the period under consideration is basically responsible for the inflationary pressure exerted on the food and beverages group. Both the food and beverages group and non-food and services group seem to exert almost the same degree of pressure in escalating the price in Kathmandu. Also, the price rise in Kathmandu and the Hills is more vulnerable to any distortions in the supply situation as compared with the Terai.

To summarise, a bird's eye-view of the price movement during the period 1975-94 revealed that the annual average inflation which remained at a relatively low level of 5.7 per cent during 1975-80 accelerated to a double digit after 1985. And the highest rate of inflation over the period as noted earlier, was recorded at 21.0 per cent in the year 1991/92.

Inflationary pressure was mostly heavier in the case of the food and beverages group due to the poor performance of the agricultural production and the occasional after effects of the increase in WPI of India for cereals. By region, the most vulnerable one to the inflationary pressure was found to be Kathmandu. The foregoing review also reveals that several internal and external factors are responsible in contributing in varying degrees to the escalation of the price in the review period. These factors may be noted below:

(a) Internal Factors:

- (i) Occasional devaluation of the Nepalese rupee vis-a-vis foreign currencies;

- (ii) Fluctuations in agricultural production due to climatic factors creating supply bottlenecks;
 - (iii) Lack of integrated national marketing system for the domestic production;
 - (iv) Excessive deficit financing resulting in the expansionary growth in money supply and domestic credit;
 - (v) Revision of the administered prices of the government-controlled commodities.
- (b) External Factors:
- (i) Price rise in India (both aggregate and cereals);
 - (ii) Global price rise including external shocks like the hike in the prices of petroleum products;
 - (iii) Occasional trade and transit problems with India;
 - (iv) Free mobility of goods and services across borders between Nepal and India.

2.4 Structural Programs and the Containment of Inflation

The overall performance of the Nepalese economy during the period under observation was not that satisfactory. The Nepalese economy was suffering from an ever widening deficit financing and the consequent current account deficit in the external sector for a significant period of time. The fiscal deficit as well as the expansion of the bank credit to the public enterprises resulted in monetary expansion much above the growth in production. This phenomenon could be equally responsible for maintaining the annual average inflation rate at double digits for most of the five-year period between 1975-94.

In the beginning years of the eighties, large and unsustainable fiscal deficits of the government, which resulted in expansionary monetary policy, created both the external and internal macroeconomic instability in the economy. As a result, there was a heavy pressure in the balance of payments resulting in the large-scale dwindling of the

foreign exchange reserves. In order to mitigate this problem, Nepal entered into an economic reform program with the IMF in December 1985 with a broad objective of containing fiscal/external deficits, reducing monetary expansion and inflation to desirable levels and accelerate economic growth. As a follow-up of this reform program, SAF and ESAF were also implemented consecutively in the latter periods.

2.4.1 Economic Reform Program

Nepal adopted economic reform (stabilization) program in 1985/86 supported by an 18-month stand-by arrangement with the IMF. The main elements of the program were to maintain the external value of the currency at the realistic level through devaluation of the Nepalese currency by 14.7 per cent vis-a-vis the foreign currencies, maintenance of the flexible exchange rate system, adoption of tighter budgetary policy and revenue generating measures besides the reduction in the expansion of credit to the government and the government enterprises in order to make their operations more businesslike and healthier for the self-sustained growth of the economy over the medium and long-term. Apart from these, the liberalization of interest rates, the adjustment in administered prices, restraints on non-productive external borrowing and import liberalization for greater competitiveness of the economy were the other elements of the program.

The program was successful in bringing significant stabilization gains in adjusting external and internal imbalances in the economy. The budget deficit was reduced, the current account deficit was improved and the proportion of domestic financing of the budget deficit went down and the overall balance of payments improved considerably. Although the program did not show acceptable impact in maintaining desirable level of inflation, the encouraging results in other macroeconomic sectors of the economy led the country to embark on SAP program.

2.4.2 Structural Adjustment Program (SAP)

This three-year (1987/88-1989/90) program was implemented in 1987/88 and supported by the IMF and the World Bank. The program envisaged to achieve a GDP growth of 4.5 per cent, reduce inflation to an annual average of 5.0 per cent, and strengthen the external sector of the economy. The program's main focus was on increasing domes-

tic resource mobilisation for investment, improving monetary stance and improving the resource allocation and project implementation aspects.

The results of this program were quite encouraging in the sense that the three-year annual average output growth was 5.7 per cent which was more than the target envisaged. The inflation, although not in line with the target, subdued at a single-digit level of 9.6 per cent. A significant improvement in the overall balance of payments was achieved with the foreign exchange reserve capable of meeting more than eight months of merchandise imports by 1989/90. It is believed that the SAP could have more beneficial results for the Nepalese economy if the trade and transit impasse with India had not emerged.

2.4.3 Enhanced Structural Adjustment Program (ESAP)

After the SAP was over in 1990, the government, in its commitment to maintain macroeconomic stability, entered into an ESAF arrangement with the IMF. The principal macroeconomic objectives of this program were to raise GDP to around 5.0 per cent per annum during the three-year period between 1992/93 and 1994/95, reduce the annual inflation to 5.0 per cent and limit the current account deficit to 9.6 per cent of GDP. The program also envisaged the increased reliance on the private sector participation in productive economic activities and services. The target was therefore fixed to reduce fiscal deficit to 7.8 per cent of GDP (before grants) with domestic borrowing of the government limited to 0.2 per cent of GDP by the end of the program period in 1994/95.

The implementation of ESAF program was satisfactory with the inflation reducing substantially from 21.0 per cent in 1991/92 to 8.9 per cent in 1992/93. The external position also strengthened with the current account deficit/GDP ratio declining to 5.6 per cent in 1992/93. However, the growth performance fell of expectations registering only 2.9 per cent and slippages were also visible in the fiscal sector where fiscal deficit (before grants)/GDP ratio stood at 9.6 per cent and domestic borrowing/GDP at around 1.0 per cent.

Economic performance in the consecutive second year of the program was also encouraging. Despite severe flooding in July 1993, which caused substantial loss of life and significant damage to transport links

thus apparently hampering the production activities in the central region of the country, the output growth was 7.8 per cent well ahead of the target of 6.25 per cent. The inflation rate was 8.9 per cent slightly higher than the targeted 8.0 per cent but still comfortably at a single-digit level. Both narrow money and broad money growth rates went down from 22.5 per cent and 27.5 per cent in 1992/93 to 21.1 per cent and 18.8 per cent in 1993/94 respectively.

Major structural reforms were pursued under ESA program. Streamlining and prioritizing the development budget and broadening the tax base and simplification of tax structure were effected toward fiscal reform. Administrative reform was also initiated by curtailing a substantial number of over-staffed civil servants and restructuring of the regulation guiding the civil service cadres. The public enterprises which could be termed as 'white elephants' of the economy were put into the privatization process. In order to enhance the allocative efficiency and competitiveness of the economy through greater allocation of resources to the private sector, ceilings on bank credit to the public enterprise sector were established and the practice of providing guarantees to the domestic borrowing of the public sector enterprises by the government was also abolished. A number of important pricing decisions were taken. For example, the petroleum product prices were raised three times since 1992 through 1994. Water tariffs were raised by 100 per cent on two separate occasions and electricity tariff rates were doubled during the program period.

Along with the objective of enhancing competitiveness through tighter financial policies while maintaining stable exchange rates vis-a-vis foreign currencies, reforms were also initiated in the trade sector. The import license auctioning system which was introduced in 1986 was abolished in July 1993; all quantitative trade restrictions (except for defence and environmental reasons) were eliminated and the tariff structure was greatly simplified. The elimination of all the exchange restrictions on current account transactions through the full convertibility in the current account of the external sector effected on February 12, 1993 led to the acceptance of the obligations of Article VIII of IMF 1994.

The sectoral policy that was directly related to contain inflation at realistic level was the phasing out of the direct involvement of the government in the provision of the many of the public services and

utilities. For example, fertilizer marketing controls were officially relaxed and subsidies eliminated for all the fertilizers except for urea. Besides, strategies were developed to provide preference to private fertilizer dealers for fertilizer distribution which in the past was provided to the agricultural cooperatives. Likewise, price and distribution controls on sugar were eliminated in January 1994.

Open market operations as the indirect monetary instruments were pursued by the NRB to improve monetary management and maintain inflation at a desirable level. The NRB auction committee started weekly auctioning of the treasury bills and the NRB bonds as its regular monetary programming exercise. To improve the commercial orientation of the commercial banks, several measures were undertaken in order to comply with the reserve requirements and reporting procedures as prescribed by the central bank. Moreover, the SLR was abolished in July 16, 1993. Restriction was also placed to limit the government's unrestricted access to NRB financing.

With all these measures adopted and reforms undertaken, it has been envisaged to contain inflation at 7.0 per cent under the ESAF program for the year 1994/95.

2.5 The Structure of Consumer Price Index (CPI)

The National Urban Consumer Price Index is the only reliable and authentic index prepared by the country. The Consumer Price Index (CPI) is solely computed and published by the Nepal Rastra Bank, the central bank of the country. The price index prepared by the bank is a National Weighted Consumer Price Index and it represents the Cost of Living Index of middle income families residing in Urban Centers.

2.5.1 Design and Construction of CPI

NRB has been legally authorized to be involved in the study of the movement of prices on regular basis since its establishment in 1956. Till 1972/73, the price indices developed by the NRB were unweighted ones. In order to make the information on price movements more realistic and scientific, a Household Budget Survey was conducted in 1972/73. Thereafter, the concept of the consumption weight was developed for preparing the price index in accordance

with the consumption pattern of the goods and services. With the increasing pressure on population and introduction of new goods and services in the market along with the changes in the consumption habits of the people, the bank felt it necessary to update the design and composition of items in constructing the CPI. Accordingly, the NRB conducted the Multi-Purpose Household Budget Survey in 1983/84 in 23 representative districts of the kingdom. Altogether 13 town municipalities were selected for the purpose of the computation of price indices to represent the urban population of the country. Of the thirteen municipalities, six towns each were selected from the Terai and the Hills region respectively and the remaining one was the Kathmandu region.

2.5.2 Criteria Followed for Selection of Household Families

The following criteria were established in selecting the household families from afore-mentioned towns for developing price index:

- (i) Households having two to ten number of family members;
- (ii) Households having income ranging from Rs. 450 to Rs. 3500 per month;
- (iii) Households which spend more than 50 per cent of their income in purchasing goods and services from the market.

2.5.3 Commodity Group and Weighting

Broadly, two groups of commodities and services were considered in developing the National Weighted Consumer Price Index. They are food and beverages group and non-food and services group.

The food and beverages group is categorised into 10 sub-groups namely, restaurant meals, grains and cereal products, pulses, vegetables and fruits, spices, meat, fish and eggs, milk and milk products, oil and clarified butter, sugar and related products and beverages. Likewise, non-food and services group comprises of 7 number of sub-components, namely, cloth, clothing and sewing services, footwear, housing, transport and communication, medical and personal care, education, reading and recreation, and cigarettes and tobacco related products.

Of the two major groups of commodities, the food and beverages group holds a relatively larger weight of 62.63 per cent while the non-food and services group holds 37.37 per cent at the national level. Region-wise, the food and beverages group occupies a higher share of 65.2 per cent in Terai followed by 63.5 per cent in the Hills and 60.0 per cent in Kathmandu. The non-food and services group, however, have a larger share of 40.0 per cent in Kathmandu followed by 36.5 per cent in the Hills and 34.8 per cent in the Terai.

The above weighting of the respective groups was computed after deriving the weight of each item from the expenditure on that item as estimated by the Multi-Purpose Household Budget Survey (Consumer Expenditure Survey).

2.5.4 Formula Used to Compute CPI

By definition, the Weighted Consumer Price Index has been considered to measure the effect of changes in prices over time for goods and services where all the items are treated according to their consumption importance. The formula, therefore, used for calculating CPI is Laspeyres type which can be stated as

$$P_{io} = \frac{\sum P_i Q_o}{\sum P_o Q_o} \times 100$$

where P_{io} = Weighted Price Index for the i th year,

$\sum P_i Q_o$ = Expenditure in the base period at current prices,

$\sum P_o Q_o$ = Expenditure in the base period at base (previous) prices

While calculating the index, price changes for the various listed items in each center/area are averaged together with their respective weights so as to represent their importance in the spending by the appropriate population group. The population weight used in generating regional indices is based on the population projection made by the Central Bureau of Statistics in 1983/84. The population covered by

the index is estimated to be 7,03,333 which is 60.4 per cent of the total urban population. Of the total population weight, the indices of Kathmandu occupies a share of 34.66 per cent followed by 51.80 per cent in Terai and 13.54 per cent in the Hills.

The items selected for calculating the index vary in number in different regions. For instance, altogether 323 items of goods and services are covered for Kathmandu while 274 and 276 items are covered for Terai and Hills respectively.

2.5.5 Data Collection Method

As CPI represents price situation of goods and services which are finally consumed by households, it depicts the changes in real purchasing power of average middle-income Nepalese households. At present, the changes in the price movements in different regions are being monitored through 13 urban collection centers. These price collection centers under the Banking Development and Research Unit collect the price of the indexed commodities (goods and services) regularly on weekly, fortnightly, monthly, quarterly, half yearly and yearly basis. For each item, the price is monitored taking information from 3 different shops⁴ from the pre-determined market and the averages of prices of each item are calculated and sent to the Price Division of the Research Department located in Kathmandu. The Price Division, after receiving the average prices of the indexed commodities from all the centers, computes the monthly price indices first on regional basis and thereafter on the national basis. Movements of the indices from one period to another are usually expressed as percentage changes rather than changes in index points.

2.5.6 Some Limitations of CPI

Although CPI shows the price movement of goods and services that are consumed by average middle-income households, its scope is limited as far as the representation of overall price situation is concerned. It does not depict the movement of prices in segregation for the specific groups like agricultural laborers, industrial laborers, construction workers, salaried employees, etc.

4. In Kathmandu Region, five different shops for each item are consulted.

III. Theoretical Framework, Methodology and Empirical Results

3.1 Theoretical Framework

3.1.1 Introduction

It is widely believed that the inflation is not only a phenomenon in third world countries but also a common feature in the developed economies as well. Economists have put forth various theories in explaining the causes of inflation. According to these, the demand side source of inflation has generated the theory of excess demand (persistent excess in demand over supply) while supply side source of inflation has given birth to cost-push theory and the Phillips Curve. In addition, structural inflation has been identified mostly in the developing economies.

Excess demand theory postulates that prices are prone to escalate when there is monetary expansion in excess of growth in real output. The cost-push theory, on the other hand, identifies that domestic supply-side inflation could originate mainly either from increasing money wages relative to productivity increments or changes in market structure and structural constraints. The Phillips Curve hypothesis, however, states that the rate of money wage increment depends upon excess demand for labor, i.e. wage inflation could persist in the wake of slackness in labor markets where there is declining unemployment. The structural theory of inflation suggests that the inflation is inevitable in an economy where the basic structural constraints such as supply inelasticity, foreign exchange bottlenecks and financial constraints play pivotal role in the economy.

To date, a large number of monetarist type of empirical studies have been carried out. The Phillips Curve approach could be applied in the countries only where there exists accepted level of full employment and where there is easy access to data on real wage rate. In this context, this approach cannot be tested in Nepal as there is a dearth of time series data on real wage rate accompanied by the problem of unemployment and underemployment. The structuralist type of empirical studies has been taken as an accepted approach to study inflationary behavior in the least developed countries. Nevertheless, the monetarist and structuralist approaches have dominated the studies on the causes of inflation in developing and underdeveloped countries.

It is, therefore, worthwhile to discuss about the theoretical framework under both the monetarist and structuralist approaches.

3.1.2 The Monetarist Approach

The monetarist theory suggests that the inflation is purely a monetary phenomenon which results out of excess growth in money supply. That is, the theory itself is rooted in the classical quantity theory of money. According to the classical quantity theory of inflation, the relationship between money supply and prices can be established as

$$MV = PY$$

where, M = Quantity of Money Supply

P = Level of Prices

V = Income Velocity

Y = Volume of Real Income

The theory asserts that changes in money stock will cause changes in prices under the assumption that volume of real income is determined independently of the money stock. That is, income velocity and volume of real income are assumed as constant in the short run. However, the modern quantity theory is of the view that changes in the money supply may not bring proportional changes in the prices in the long run. It is argued that the monetary impact on real income and income velocity will gradually disappear in the long run. Many empirical studies have been found to validate the long run quantity theory type of relationship between money supply and prices.

3.1.3 The Structuralist Approach

The structuralist approach of the inflation argues that the nature of the inflation in the developing countries cannot be adequately determined with reference to the level of aggregate demand. There are invariably structural characteristics which cause fragmentation between supply and demand in and between different sectors of the economy thereby inducing inflation. The basic structural characteristics or limitations to cause inflationary pressures are inelastic supply of food, existence of saving-investment gap, foreign exchange constraint, inelasticity of tax revenue under fiscal constraint, infrastructural bottlenecks etc.

3.1.4 Inflation Under Open Economy

The 'Law of One Price' asserts that perfect international commodity substitution ensures that domestic prices are equal to foreign prices times the exchange rate. On the basis of this hypothesis, the monetary approach to the Balance of Payments (BOP) states that the domestic price level is given by the product of the exchange rate and world price level. That is, changes in world prices cause changes in domestic prices while at the same time the domestic price level is completely determined by world prices. An implication of this hypothesis is that the domestic money supply does not have an impact on domestic prices. Instead domestic money accommodates to the changing level of prices with domestic money change through the balance of payments until the nominal money supply equals nominal money demand. The relationship of the monetary approach to the balance of payments can be expressed as :

$$PD = PW \cdot FXR \dots\dots\dots(a)$$

where, PD = Domestic Price Level
PW = World Price Level
FXR = Foreign Exchange Rate

In equilibrium money market, we have,

$$MS = MD \dots\dots\dots(a)$$

where, MS = Money Supply
MD = Money Demand

$$\text{We have, } MD = PD \cdot kY \dots\dots\dots(b)$$

i.e., nominal money demand equals the domestic price level times kY where Y is real income and $k = 1/v$ where v is income velocity.

Likewise, we have,

$$MS = h (R+D) \dots\dots\dots(c)$$

i.e., money supply is some multiple (h) of monetary base (Foreign Reserves R + Net Domestic Component D)

Substituting (a) and (c) into (b), we get,

$$R = \frac{PW \cdot FXR \cdot kY}{h} \quad D \dots\dots\dots (d)$$

If world prices rise or the exchange rate depreciates, and thereby domestic price level rises, then money supply must rise until equilibrium is restored. If the authorities do not increase net domestic component, international reserves flow into the home country until $MS = MD$. However, in the country like Nepal, the transmission of inflation linked by fixed exchange rate is somewhat debatable to validate the above hypothesis. Therefore inflation in the country with the fixed exchange rate regime should be considered as the function of both foreign inflation and domestic monetary expansion.

3.2 Methodology

3.2.1 Choice of Variables and Data

Based on the conceptual framework presented earlier, an eclectic approach has been taken to empirically analyse the behavior of prices in the country. National Urban Consumer Price Index (CPI) measured in terms of annual average percentage change is chosen as the dependent variable. While the independent variables such as money supply, real output, wholesale prices of India, government expenditure, and inflationary expectations are considered to capture both the monetarist and structuralist concepts of inflation.

Regarding the choice of money supply variable, past studies indicate the better performance of narrow money over broad money on prices. However, three alternative forms of money supply (narrow money, broad money and narrow money plus savings deposits) has been taken into account for empirical study.

Regarding the choice of Indian prices, the wholesale price index is selected. The underlying reasons for this choice are as follows:

- (a) Nepal's share in India's total export is negligible.
- (b) Nepal's import price is mostly determined by the wholesale price in India ; and
- (c) the past empirical studies show the evidences of strong association between wholesale price index of India and CPI of Nepal.

Regarding the choice of real output and government expenditure, gross domestic product at constant price is used to denote real output and total actual expenditure of the government at current price is chosen to represent government expenditure.

The expected rate of inflation is represented by one-year lag rate of inflation as it is assumed to depend on the current year's average rate of inflation.

Dummy variable has also been used to capture the unusual movement on behavior of prices during periods when there was a devaluation of Nepalese currency by 14.7 per cent in Nov. 1985 and 20.9 per cent in July, 1991 accompanied by trade and transit deadlock towards 1988/89 - 1989/90, outbreak of gulf war in August 1990 followed by political unrest in the period between 1989/90 and 1990/91. Thus the years 1985/86 and 1991/92 are considered as fiscal years with unusual movement of prices in the country.

Annual data for the period between 1974/75 and 1993/94 are used in our study. Apart from exercising the relationships between inflation rate and explanatory variables in the form of annual percentage changes, annual averages of month-end values and one-period lag in case of monetary aggregates are also used for the purpose of the study. The estimating procedure is the limited information, the Ordinary Least Square technique. All the data are in growth rates of the series.

3.2.2 General Linear Model

As explained before, the reduced form of quantity theory equation can be written in growth rate terms as :

$$\ln M + \ln V = \ln P + \ln Y$$

Functionally, it can be rearranged as

$$\ln P = f(\ln M) + g(\ln V, \ln Y) + u$$

where, u is stochastic term.

Assuming $g(\ln V, \ln Y)$ as constant a_0 , then the function becomes:

$$\ln P = f (\ln M) + a_0 + u$$

In regression equation form, it can be stated as :

$$\ln P_t = a_0 + a_1 \ln M_t + u$$

Since inflation is influenced not only by the monetary aggregate but also by the structural variables, a general linear model can be written as:

$$P_t = f (Y_t, GE_t, M_t, WPII_t, P_t^*)$$

- where, P_t = Inflation Rate in Nepal
 Y_t = Growth Rate of Gross Domestic Product at Constant Prices
 GE_t = Percentage Growth in Government Expenditure
 M_t = Percentage Growth in Money Supply
 $WPII_t$ = Percentage Growth in Wholesale Price Index of India
 P_t^* = Percentage Change in the rate of Growth of Cost of Holding Money

Here, $dP/dY_t < 0$, dP/dGE_t , dP/dM_t , $dP/dWPII_t > 0$ and $dP/dP_t^* > 0$

3.3 Empirical Results

3.3.1 Unit Root Test

Time series data have to be tested for stationarity. In other words, the mean, variance and covariances of the selected series needs to be constant over time. If the regressing equation is having non-stationary variables, it may give rise to so-called spurious relationships and lead to incorrect statistical inferences. Unit root test is generally performed to test whether the time series data in question are stationary or not. Besides, it is also done to develop stationary time series data. Therefore, the unit root test is performed with a view to identifying the order of integration of the selected time series, i.e., the annual average rate of changes in Consumer Price Index (CPI), narrow money (M1), broad money (M2), average of narrow money at the end of the period (AM1), average of narrow money plus savings deposits at the

end of the period (AMS1), real GDP (GDPR), government expenditure (GE) and wholesale price index of India (WPII). The selected method of unit root test is the augmented Dicky-Fuller (ADF) (1981) method based on arbitrarily chosen lag lengths. The results of ADF test for unit roots are presented in Table 1.

Table - 1

UNIT ROOT TEST RESULTS

Series	Constant/Trend	No. of Lags	ADF 't' Statistic
CPI	Constant	1	- 3.8130**
GDPR	Constant	1	- 4.4132*
M1	Trend	1	- 4.0362**
M2	Constant	1	- 4.0786*
AM1	Trend	4	- 3.8687**
$\delta(\text{AMS1})$	Constant	1	- 5.4166*
WPII	Constant	1	- 3.1452**
GE	Constant	1	- 3.3246**

* Significant at 1 per cent level.

** Significant at 5 per cent level.

The ADF regressions used for these tests are based on a constant or time trend. According to the Table1, GDPR and M2 series are stationary at 1 per cent level of significance. The series CPI, M1, AM1, WPII and GE are stationary at the 5 per cent level of significance. Since the series AMS1 is found non-stationary, the first-order difference of this series is found stationary at the 1 per cent level of significance. Thus, all the series in question with an exception to AMS1 are integrated at zero order i.e., $I(0)$.

After testing the stationarity of the selected variables, the OLS technique is used for 12 regressions with 19 years time series data. The results are presented below. Since all the selected time series are found stationary except AMS1, it is felt that there is no need to follow

the cointegration test to establish the long-run relationship. As such, the regression function of AMS1 will be followed with first-order difference technique.

3.3.2 Inflation Under Closed Economy

The regression results of the equations using the monetarist approach indicate that the lagged value of money supply has significant effect on the movement of prices in Nepal.

The first equation is estimated using narrow money (M1) along with one year lag value and real output as the explanatory variables. The empirical result of the equation is as follows:

$$\text{CPI} = 3.327 - .241 \text{ GDPR} - .027 \text{ M1} + .392 \text{ M-1} + 11.881 \text{ DM1}$$

$$(\ .8) \quad (-.8) \quad (-.1) \quad (2.8)^* \quad (4.0)^*$$

$$\begin{aligned} R^2 &= .62 & F &= 5.7 & DW &= 1.3 \\ \text{Adjusted } R^2 &= .51 \end{aligned}$$

* Significant at 1 per cent level.

Note: Because of technical constraints on the accessibility to the relevant software, Durbin - m test has not been possible, though it is necessary in the case of lagged independent variable.

The explanatory power of the above equation is 62 per cent. The coefficient of real output and narrow money is, however, insignificant. Although the real output has the expected sign, the coefficient of narrow money has the wrong sign. But the coefficient on one-year lag value of narrow money is found statistically significant at the 1 per cent level with the expected sign. Likewise, the coefficient on dummy variable is also significant at 1 per cent level.

An alternative estimation of the monetarist equation using broad money (M2) as the explanatory variable demonstrated a poor fit as compared to the equation using narrow money. The estimated equation is:

$$\text{CPI} = 6.750 - .305 \text{ GDPR} - .171 \text{ M2} + .331 \text{ M-2} + 10.687 \text{ DM1} \\ (.9) \quad (.9) \quad (.6) \quad (1.7) \quad (3.5)^*$$

$$R^2 = .51 \quad F = 3.71 \quad DW = 1.3$$

$$\text{Adjusted } R^2 = .37$$

* Significant at 1 per cent level.

The explanatory power of the equation is just 51 per cent. The coefficients of real output and broadly defined money are statistically insignificant with a wrong sign on the broadly defined money. The coefficient on one-year lag value of broad money is significant at 20 per cent level.

In both of the above equations, money supply was defined as the money stock as at the end of the fiscal year. As inflation rate is measured in terms of annual average percentage change, it casts doubt whether the money supply figures as at the end of fiscal year is comparable with annual average inflation rate. Hence the price equation with monetarist approach is re-estimated taking the money supply figure as the average of two periods⁵. The newly estimated equation with average money stock (narrow money) as the main explanatory variable is as follows:

$$\text{CPI} = 3.436 - .402 \text{ GDPR} - .187 \text{ AM1} + .598 \text{ AM-1} + 11.547 \text{ DM1} \\ (.5) \quad (-1.37) \quad (-.57) \quad (2.55)^{***} \quad (4.02)^*$$

$$R^2 = .58 \quad F = 4.94 \quad DW = 1.76$$

$$\text{Adjusted } R^2 = .46$$

* Significant at 1 per cent level.

*** Significant at 5 per cent level.

The explanatory power of this equation is at acceptable level, that is, 58.0 per cent. The coefficient on average money stock is not statistically significant and it has the wrong sign. However, one- year lag

5. Average money stock is calculated as $\text{AM1} = (\text{Amt-1} + \text{Amt+1})/2$ where mt-1 and mt+1 are money stock for preceding fiscal year and current fiscal year respectively.

value of the same is found statistically significant at the 5 per cent level. It again implies that there is no strong relationship between current money supply and prices. Rather, prices in Nepal are affected by money supply after a certain lag period. Using the average money stock as explanatory variable, an improvement is seen in the coefficient of real output which is statistically significant at 20 per cent level.

In the first-order difference version of price equation using monetary aggregate as the average of narrow money plus savings deposits figure at the end of the period, the estimated result is a poorer fit. The estimated equation is:

$$\delta(\text{CPI}) = -1.105 - .187\delta(\text{GDPR}) - .482\delta(\text{AMS1}) + .093\delta(\text{AMS}-1) + 14.347 \text{ DM1}$$

(-.69)(-.62)
(-.88)
(.18)
(2.77)**

$$R^2 = .43 \quad F = 2.29 \quad DW = 2.45$$

$$\text{Adjusted } R^2 = .24$$

** Significant at 2 per cent level.

The explanatory power of the equation is less than fifty per cent. The coefficient on one-year lag value of the monetary aggregate, though, bears the expected sign, is found statistically insignificant. Thus, time series on monetary aggregate defined as the average of narrow money plus savings deposits at the end of the period is non-stationary while the effect is insignificant in the log in first-difference form of the same on CPI.

It implies that the average of narrow money instead of narrow money plus savings deposits at the end of two periods lagged by one year can exert significant effect on CPI. It can also be asserted that of all the alternate definitions of monetary aggregate, the average of narrow money at the end of the period lagged by one year is more prominent in affecting the behavior of the prices in Nepal. One per cent change in AM-1 is found to bring 0.59 per cent change in prices.

Finally, lagged rate of inflation (considered as proxy for cost of holding money) is included in the estimating equations. In the first equation narrow money is chosen while in the second, the broad money is selected as the explanatory variable. The results derived are as follows:

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$$(i) \quad CPI = 5.500 - .131 \text{ GDP} - .055 \text{ M1} + .292 \text{ M-1} + .239 \text{ P}^* + 8.403 \text{ DM1} \\ (1.34) \quad (-.50) \quad (-.36) \quad (2.08)^{****} \quad (1.69) \quad (2.44)^{***}$$

$$R^2 = .68 \quad F = 5.76 \quad D.W. = 1.16 \\ \text{Adjusted } R^2 = .56$$

$$(ii) \quad CPI = 9.243 - .134 \text{ GDP} - .136 \text{ M2} + .160 \text{ M-2} + .286 \text{ P}^* + 6.541 \text{ DM1} \\ (1.40) \quad (-.44) \quad (-.59) \quad (.77) \quad (1.74)^{****} \quad (1.76)^{****}$$

$$R^2 = .60 \quad F = 4.01 \quad D.W. = 1.12 \\ \text{Adjusted } R^2 = .45$$

*** Significant at 5 per cent level.

**** Significant at 10 per cent level.

The inclusion of expected rate of inflation (P^*) as one of the explanatory variables does not seem to improve the explanatory power of the equation. It has slightly reduced the coefficient on the growth of one-period lagged narrow money but is found statistically significant at 10 per cent level. The coefficient on expected inflation, however, is significant at 20 per cent level. In the estimating equation with broad money as monetary variable, the coefficient on expected inflation rate is found statistically significant at 10 per cent level of probability. The coefficients on both the current and one-period lagged broad money are found statistically insignificant. It reveals that the inflationary expectations can exert significant role on current prices along with the combined effect of broad money.

3.3.3 Inflation Under Open Economy

The foregoing analysis has indicated that the relationship between money and prices is of long term nature. The existence of some lag in their relationship has been empirically evidenced by the significant coefficient on lagged value of the monetary aggregate in the price equation. However, it has also been realized that the indigenous factors behind inflation have not been able to fully explain the behavior of prices in Nepal. As explained earlier, inflation in Nepal is a function of both foreign inflation and domestic monetary expansion. An attempt has, therefore, been done to estimate the price equation including international prices along with money supply and real output as the explanatory variables. As there is close geographic proximity and large scale Nepalese trade with India, the relevant foreign inflation is taken

as wholesale price index of India (lagged by three and half months). The estimated results of the equation is as follows:

$$\text{CPI} = .394 - .260 \text{ GDPR} + .072 \text{ M1} + .288 \text{ M-1} + .409 \text{ WPPI} + 10.162 \text{ DM1}$$

(.10)(-1.13) (.50) (2.35)*** (2.50)*** (3.91)*

$$\begin{aligned} R^2 &= .74 & F &= 7.55 & DW &= 1.82 \\ \text{Adjusted } R^2 &= .64 \end{aligned}$$

* Significant at 1 per cent level.

*** Significant at 5 per cent level.

The results of the regression of the equation with wholesale price index of India represented as the foreign price are quite sensible in all respects. The R^2 is quite satisfactory in terms of the explanatory power of the equation at 74 per cent. Besides, all the coefficients in the equation show consistent signs as theoretically expected. The coefficients on one-year lagged value of narrow money and Indian prices show statistical significance at the 5 per cent level implying the close association of Nepalese inflation with the rates of growth of money supply and Indian wholesale prices. The insignificant coefficient on real income suggests that the domestic output has not been successful to exert a dampening effect on domestic prices. Likewise, the insignificant coefficient on current narrow money reveals that a certain lag period is needed for a change in money supply to have significant effect on price.

The results on the estimated equation also suggests that a 10 per cent change in narrow money causes 2.9 per cent change in the rate of inflation. Likewise, the coefficient on WPPI indicates that a 10 per cent increase in wholesale prices of India causes a 4.1 per cent increase in domestic prices. The coefficient on dummy variable is significant at the 1 per cent level which supports the assumption that unusual movement in price during 1985/86 and 1991/92 occurred due to uncontrollable external factors.

With a view to seeing the influence of broad money on prices in an open economy, a modified equation is estimated with one-year lagged broad money as one of the main explanatory variables. The estimated results are as follows:

$$\text{CPI} = 1.206 - .345 \text{GDPR} - .067 \text{M2} + .324 \text{M-2} + .494 \text{WPPI} + 9.799 \text{DM1}$$

(.21) (-1.44) (-.35) (2.15)*** (3.21)* (4.12)*

$$\begin{aligned} R^2 &= .73 & F &= 7.03 & DW &= 1.71 \\ \text{Adjusted } R^2 &= .62 \end{aligned}$$

* Significant at 1 per cent level.

*** Significant at 5 per cent level.

Regression of this equation is more satisfactory. R^2 is quite high. The coefficient on current broad money has, however, the wrong sign and is statistically insignificant. The coefficient on one-year lagged value of broad money is statistically significant at the 5 per cent level. Similarly, the coefficients on Indian wholesale prices and dummy variable are statistically significant at 1 per cent level.

The coefficient on one-year lag broad money shows that a 10 per cent change in one-year lag broad money brings 3.2 per cent change in the rate of inflation. Similarly, a 10 per cent increase in wholesale prices of India is found to bring a 4.9 per cent increase in domestic prices. It implies that broad money can exert relatively more pressure on domestic prices in an open economy model.

In order to see the explanatory power of the price equation with the alternative definitions of money supply in an open economy model, the price equations are re-estimated with the inclusion of the average of narrow money at the end of the period and average of narrow money plus savings deposits at the end of the period separately. The following results are obtained:

$$(i) \text{CPI} = .807 - .360\text{GDPR} + .088 \text{AM1} + .360\text{AM-1} + .428 \text{WPPI} + 10.124 \text{DM1}$$

(-.14) (-1.43) (.29) (1.60) (2.40)*** (3.97)*

$$\begin{aligned} R^2 &= .71 & F &= 6.47 & D.W. &= 1.77 \\ \text{Adjusted } R^2 &= .60 \end{aligned}$$

$$(ii) \delta(\text{CPI}) = -1.29 - .225\delta(\text{GDPR}) - .312\delta(\text{AMS1}) + .305\delta(\text{AMS-1}) + 1.605\delta(\text{WPPI})$$

(-.86) (-.79) (-.59) (.30) (1.60)

$$+ 13.737\text{DM1}$$

(2.81)**

$$\begin{aligned} R^2 &= .54 & F &= 2.59 & D.W. &= 2.16 \\ \text{Adjusted } R^2 &= .33 \end{aligned}$$

- * Significant at 1 per cent level.
- ** Significant at 2 per cent level.
- *** Significant at 5 per cent level.

The analysis of the above equations indicates that both forms of monetary aggregates mentioned earlier show a weak relationship with the prices in an open economy. The coefficient on AM-1 is weakly significant at 20 per cent level of probability along with the real output as one of the explanatory variables while the coefficient on (AMS-1) is not statistically significant. This suggests that the domestic prices in Nepal are more influenced by modified version of monetary aggregates (AM-1) only in the condition of closed economic situation.

3.3.4 Structuralist Model of Inflation Under Closed and Open Economy

Among the structural variables like budgetary operations, per capita availability of foodgrains and foreign exchange reserves, it is often argued that expansionary fiscal policy of the government aggravates the escalation of prices in Nepal. Of the two variants of fiscal policy, i.e. government expenditure and budget deficit, the government expenditure can exert instant pressure in increasing aggregate money expenditure in the economy and thereby, on prices. Government spending may have expansionary effect on money supply either through increased domestic credit of the banking system or from net foreign assets of the banking system. In order to see whether the government expenditure has significant effect on sparking the domestic prices, the following equations are estimated including government expenditure, real output and narrow money as the main explanatory variables.

$$(a) \text{ CPI} = -2.036 + .041\text{GDPR} - .043\text{M1} + .421\text{M-1} + .236\text{GE} + .232\text{Pt}^* + 9.856\text{DM1}$$

(-.36) (.15) (-.30) (2.86) (1.83)**** (1.79)**** (3.02)*

$$R^2 = .75 \quad F = 6.23 \quad D.W. = 1.70$$

$$\text{Adjusted } R^2 = .63$$

$$(b) \text{ CPI} = -4.889 - .022\text{GDPR} + .046\text{M1} + .368\text{M-1} + .236\text{GE} + .332\text{WPPII} + .144\text{Pt}^*$$

(-0.96) (-.09) (.35) (2.81)** (2.00)**** (2.15)*** (1.20)

$$+ 9.674\text{DM1}$$

(3.38)*

$$R^2 = .82 \quad F = 7.63 \quad D.W. = 2.53$$

$$\text{Adjusted } R^2 = .72$$

- * Significant at 1 per cent level.
- ** Significant at 2 per cent level.
- *** Significant at 5 per cent level.
- **** Significant at 10 per cent level.

The coefficient of determination (R^2) for the equation (a) is 0.75 while for equation (b) is 0.82 indicating that the relatively higher percentage of variation in the rate of growth of CPI has been explained by the independent variables in the structuralist model under open economy. The t-statistics show significance of one-year lag narrow money at 2 per cent level both for closed and open economy model. The coefficient on current narrow money does not bear the expected sign in equation (a) while all the explanatory variables in equation (b) have shown the expected sign. The coefficient on government expenditure is statistically significant at 10 per cent level in both the equations. The coefficient on price expectation is significant at 10 per cent level in equation (a) but it is insignificant in equation (b). Besides, the coefficients on real output and current narrow money have not exhibited significant effect on prices in both the equations (a) and (b).

The coefficient on government expenditure in the estimated equation under closed economy also implies that a 10 per cent increase in government expenditure brings about 2.36 per cent changes in domestic prices. Estimated results of the structuralist equation under open economy is consistent with the above, i.e., it brings about the same amount of effect on domestic prices as under closed economy. Other forms of structuralist equations were estimated with different definitions of monetary aggregates. The results reveal that the coefficient on government expenditure is statistically significant mostly at the 10 per cent level in the equations with monetary aggregate expressed as narrow money or broad money as explanatory variable. However, it does not show any significant impact on prices in the estimation which include monetary aggregate either in the form of average of narrow money at the end of the period or average of narrow money plus savings deposits at the end of the period.

3.3.5 Causality Test

In an effort to identify the causal relationship between different forms of monetary aggregate, output growth and prices in Nepal, the Granger Causality Test was carried out in eleven combinations of (i)

CPI and M1 (ii) CPI and M2 (iii) M1 and GDPR (iv) M2 and GDPR (v) GE and GDPR (vi) GE and M1 (vii) GE and M2 (viii) AM1 and CPI (ix) AM1 and GDPR (x) AM1 and GE and, (xi) CPI and GE.

Granger causality postulates that X causes Y if the coefficients on the lagged X help to predict Y more accurately and vice-versa. Based on a simple bivariate model developed by Granger (1969), the following equation can be stated for estimation to see the causal relationship between the selected variables:

$$Y_t = a_0 + \sum_{i=1}^m a_i X_{t-i} + \sum_{j=1}^n b_j Y_{t-j} + u_t$$

$$X_t = c_0 + \sum_{i=1}^o c_i Y_{t-i} + \sum_{j=1}^p d_j X_{t-j} + \varepsilon_t$$

where, Y_t = Different monetary aggregates (M1, M2 & AM1)

X_t = Real GDP (GDPR), Prices (CPI) and Government Expenditure (GE)

u_t & ε_t = uncorrelated random error terms

a, b, c and d are parameters to be estimated; m and n are the number of lagged values of the independent and dependent variables respectively in equation (i), and o & p in equation (ii)

The null hypotheses are $\sum a_i = 0$ and $\sum c_i = 0$

The causality test provides the direction of causal relation or the independent movement of the selected variables in the following conditions:

- Unidirectional causality from X to Y, if $\sum a_i \neq 0$ and $\sum c_i = 0$;
- Unidirectional causality from Y to X, if $\sum a_i = 0$ and $\sum c_i \neq 0$;
- Bi-directional relationship between X and Y, if $\sum a_i \neq 0$ and $\sum c_i \neq 0$, and
- Independence is suggested, if a_i and c_i are not statistically significant, i.e. $\sum a_i = 0$ and $\sum c_i = 0$.

The null hypothesis of no unidirectional causality is rejected, if the computed F-statistics exceed the tabular value of F-statistics.

Six time series data on the growth rates of narrow money, average of narrow money at the end of the period, broad money, real GDP, consumer price index and government expenditure for the period 1975-1994 are used for the test. A unit root test is also carried out to test for the stationarity in the series before embarking on causality test. Selection of lag length of causality test is done on arbitrary basis. It is, however, to be noted that selection of the lag length is of prime importance in causality tests. Too many lags may reduce the number of effective observations while too few lags may affect the size of the test. That is, the selection of lag lengths in the Granger causality test substantially influences the test results. Because, premature truncation of the lag lengths could result in overlooking a significant impact that exists and vice-versa, the autoregressive least square estimation is carried out arbitrarily from lag length one to lag lengths three for our purpose. The Granger Causality Test results based on these arbitrarily chosen lag lengths are presented in Table - 2.

The results of Granger's causality test reveals that there is no direct causal relationship between different forms of monetary aggregates and consumer price indices. F - value shows statistically insignificant results even at longer lag lengths for the causal variable in question. However, unidirectional causality is seen from GDP to narrow money at three lag lengths (significant at 5 per cent level). Likewise, unidirectional causality is detected from real GDP to government expenditure and narrow money to government expenditure both at three lag lengths (significant at 10 per cent level). Besides, there is also unidirectional causation running from real GDP to average of narrow money at the end of the period at two lag lengths (significant at 1 per cent level) and, average of narrow money at the end of the period to government expenditure (at 10 per cent in one lag length and 5 per cent in three lag lengths). The strong unidirectional causality is also observed running from government expenditure to domestic prices at two lag lengths (significant 1 per cent level).

The analysis of the Granger's causality test results indicates that the government expenditure is playing a most significant channel in recording a feedback relation from prices to money supply. As evidenced by the results, the change in growth rate in real GDP has an unidirectional

causation both in narrow money and government expenditure. Similarly, both the narrow money and average of narrow money at the end of the period growth rates have unidirectional causation to government expenditure. This implies that there is no direct causal relation either between CPI and monetary aggregates or CPI and real GDP. However, there is clear indication of the possibility of indirect causation to the price through change in growth of the government expenditure induced by change in growth of real GDP or monetary aggregates (M1 and AM1).

IV. Analysis of the Causes of Inflation

In an attempt to identify and analyse the main determinants of inflation in Nepal, an eclectic approach between monetarist and structuralist framework has been adopted. Consumer Price Index is chosen to represent the inflation rate and the explanatory factors that have been found to cause the inflation are identified as some variants of money supply, wholesale price index of India as a proxy to international prices, government expenditure and finally the cost of holding money. In addition, due consideration is given to some qualitative factors which affect the behaviour of prices in Nepal.

4.1 Quantitative Factors Causing Inflation

The empirical results of the various estimated equations in a closed economy within a monetarist framework reveal that the growth of money supply does not exert immediate impact on the rate of inflation. Rather, one-year lag value of money supply in excess of real output growth may have significant positive impact on the rate of inflation. The policy implication of this observation is that the government efforts to contain inflation by contractionary monetary policy may not necessarily reduce prices instantaneously. Regression results of alternative definitions of monetary aggregate suggests that narrow money has an edge over broad money in explaining the behaviour of the prices under closed economy. However, the reverse is true under open economy. This has been demonstrated by the empirical results that while growth of broad money is not helpful to establish significant impact on the rate of inflation under closed economy, the coefficient on the growth of broad money is not only significant but also can exert a higher (3.24 per cent) change in the rate of inflation under open economy. The price equation defining monetary aggregate as

Table 2

BIVARIATE GRANGER CAUSALITY TEST RESULTS

Null Hypothesis	No. of Lags	F-value	Significance Level
1. M1 → CPI	1/1	0.2444	0.7869
	3/3	0.8538	0.5404
CPI → M1	1/1	0.2782	0.7618
	3/3	0.5596	0.7011
2. CPI → M2	1/1	0.2210	0.645
	3/3	1.8195	0.2137
M2 → CPI	1/1	0.0093	0.9241
	3/3	1.1286	0.3882
3. GDPR → M1	1/1	0.2725	0.6093
	3/3	5.1259 **	0.0244
M1 → GDPR	1/1	0.0006	0.9793
	3/3	0.4136	0.7472
4. GDPR → M2	1/1	2.3318	0.1395
	3/3	2.3377	0.1688
M2 → GDPR	1/1	0.2910	0.7526
	3/3	0.2194	0.9181
5. GDPR → GE	1/1	2.1378	0.1643
	3/3	2.7623 ***	0.1037
GE → GDPR	1/1	0.1667	0.3520
	3/3	0.3558	0.7863
6. M1 → GE	1/1	2.1322	0.1649
	3/3	3.4133 ***	0.0665
GE → M1	1/1	1.0117	0.3304
	3/3	1.0712	0.4089
7. M2 → GE	1/1	2.4075	0.1416
	3/3	1.4313	0.2968
GE → M2	1/1	0.2845	0.6016
	3/3	0.3463	0.7928
8. CPI → AM1	1/1	0.0348	0.8544
	3/3	0.4896	0.6980
AM1 → CPI	1/1	0.4914	0.4940
	3/3	0.4933	0.6957

Table 2 (Cont'd)

BIVARIATE GRANGER CAUSALITY TEST RESULTS

	Null Hypothesis	No. of Lags	F-value	Significance Level
9.	GDPR $\rightarrow$ AM1	1/1	0.1545	0.6998
		2/2	8.7662	0.0045
	AM1 $\rightarrow$ GDPR	1/1	1.6760	0.2150
		2/2	0.9792	0.4037
10.	GE $\rightarrow$ AM1	1/1	1.3899	0.2568
		3/3	0.4461	0.7260
	AM1 $\rightarrow$ GE	1/1	3.0336 ***	0.1020
		3/3	4.2803 **	0.0389
11.	GE $\rightarrow$ CPI	1/1	0.0575	0.8137
		2/2	7.3402 *	0.0083
	CPI $\rightarrow$ GE	1/1	0.1851	0.6731
		3/3	0.3086	0.7401

* Significant at 1 per cent level.

** Significant at 5 per cent level.

*** Significant at 10 per cent level.

the average of the period figures shows that the average of narrow money at the end of the period lagged by one year period can exert relatively higher impact on the behaviour of the prices in a closed economy. A 10 per cent increase in average of narrow money at the end of the period lagged by one year period is found to bring 5.98 per cent increase in domestic prices. The average of narrow money plus savings deposits at the end of the period used in the estimation of price equation is also found to exert strong impact on escalating the price. Nevertheless, owing to its non-stationarity and insignificant results obtained from the estimated equation on log in first-order difference, one can easily argue with the notion that this is an intermediate target variable rather than the narrow or broad money as mentioned elsewhere.

The results of the estimated price equation under open economy suggest that exchange rate does not play a significant role in determining the behaviour of the domestic prices. Since the country was under a fixed exchange rate regime for a substantial period in the past, this variable could not detect the direct effect on the domestic prices. However, a strong bearing of wholesale prices of India on domestic prices has been exhibited by all the alternative price equations with real output growth, wholesale prices of India and money supply with alternative definitions of (M1 or M2 or AM1) as the explanatory variables. The estimated results reveal that the above explanatory variables along with a dummy variable could explain more than 71 per cent of the variation (71 to 74 per cent) in the rate of inflation. The coefficient on wholesale prices of India shows that a 10 per cent increase in wholesale prices of India could bring 4.1 to 4.9 per cent increase in domestic prices.

Another pertinent source of inflation in Nepal is found to be government expenditure. Against the background that the expansionary fiscal policy of the government is responsible for escalating the domestic prices in Nepal, the price equation estimated with real output growth, narrow money, government expenditure and price expectations as the main explanatory variables revealed the significant impact of government expenditure on domestic prices. As evidenced by the estimated results, all selected explanatory variables could explain 75 per cent of the variation in the rate of inflation. The coefficient on government expenditure shows that a 10 per cent increase in the government expenditure could induce 2.3 per cent increase in domes-

tic prices. Likewise, a 10 per cent increase in narrow money lagged by one year could cause 4.2 per cent increase in domestic prices. With the inclusion of the wholesale prices of India as one of the explanatory variables in the above equation, the result is still significant as regards the impact of government expenditure on the domestic prices. A 10 per cent increase in government expenditure could escalate the domestic prices by 2.3 per cent. This suggests that in Nepal the quantum of government expenditure is found to have a direct impact on domestic prices both under closed and open economic scenario. This assertion is verified by the results of Bivariate Granger Causality Test since there is a strong unidirectional causality running from government expenditure to domestic prices. This could be attributed to the fact that although a portion of government expenditure is financed by tax revenue which has a dampening effect on inflation, in a country like Nepal where 80 per cent of the tax revenue comes from indirect taxes, it is liable to have direct impact on prices.

Attempts to examine effect of price expectations defined as the rate of inflation lagged by one year period on prices revealed that a 10 per cent increase in price expectations brings about 2.3 per cent increase in prices in closed economy. However, it does not exhibit any significant relationship with the prices under the open economy paradigm.

Similarly, analysis of the sources of inflation with real output as the main explanatory variable in the estimated equation both in the monetarist and structuralist framework indicates that domestic output has not been successful to exert dampening effect on domestic prices. The continuous meagre growth in real output during most of the years in the past decades could be the real cause for insignificant impact of domestic output on the prices.

4.2 Qualitative Factors Causing Inflation

Besides the quantitative factors, there are several qualitative factors affecting the prices in Nepal. The country is landlocked associating with 800 km long open border with India. Given the prevailing trade and exchange system, the domestic prices can be escalated through the external factors such as flight of Nepalese goods to India when prices in India are high, thus creating artificial shortage and eventually rise in domestic prices. The country lacks extensive transportation

facilities and communication network. The nature of much of the land is rugged topographically, and therefore involves a costlier mode of transport. These infrastructural bottlenecks assist in escalating the regional prices. The country has fragmented markets and pocket economics. Because of immobility of goods from one place to another, the food-surplus districts may export essential foods to India rather than supply the deficit districts, a condition which ultimately creates inflation in the country.

As explained in the previous chapter, the excessive government intervention in the past, at times, had created price distortion in the market. Controlled trade and fixed foreign exchange rate regime in the past had often created monopoly in the imports of goods and services. As a result, the determination of market prices relied on the discretion of the monopolist. The policies to protect domestic industries through the imposition of high tariff has also put forth upward pressure both in imported and domestically produced commodities prices.

Besides, the inefficiency of a large number of public enterprises involved in acquiring and distributing the essential commodities is also responsible in aggravating the inflation. The implication of administered prices by the government over the years is also worth mentioning for the inflation to rise. The economic liberalization process initiated with SAP in 1986/87 together with the policy of partial convertibility of Nepalese currency in March 1992 and full convertibility in February 1993 required upward adjustment in administered prices. Such upward adjustment of the consumption goods has direct effect on the general price level while an indirect effect of the non-consumption goods is also a great concern. The share of consumption goods under administered prices in consumer price index (CPI) of urban Kathmandu is estimated by Nepal Rastra Bank at 18.3 per cent. The upward adjustment of the prices of these consumption goods could have significant impact on the general price level.

As regards the effects of administered prices of non-consumption goods, the government has maintained the price of urea unchanged while the prices of other types of fertilizer has increased by varying degrees (Complex by 76%, TSP by 72%, DAP by 66% and MOP by 124%). Also the fertilizer marketing controls were officially relaxed and subsidies were eliminated for all the fertilizers except for urea.

The government has followed the policy of cross-subsidizing in determining the prices of petroleum products (POL) rather than gross subsidies. This is done to contain the prices of essential items such as kerosene and diesel at a desired level. However, the effect of resulting loss could be quite high to be sustainable in future as the consumption of such products are deemed to go up with the expansion of development activities. The possible net effect of subsidy element incorporated in the essential commodities will further increase the money supply generated through fiscal deficit. Therefore, the magnitude of decontrol and deregulation demands a careful assessment of the compliance of subduing of the general price level.

V. Towards a More Effective Management of Inflation

The contention that changes in the monetary aggregates exerts significant impact in domestic prices in Nepal has been decisively shown by the empirical results obtained from the regression of the price equation under monetary framework. It also appears that prices take some time to respond to changes in money supply (by one year lag). It implies that the adaptation of contractionary monetary policy to manage the inflation instantly may not be possible. It is therefore suggested to monitor the position of growth of monetary aggregate particularly the narrow money at regular intervals so as to caution the government in advance to keep its growth under the desired limit. In this respect, the monetary authority has to execute a prudential monetary policy to maintain the liquidity in the economy under the desired limit either through the use of direct instruments or indirect instruments. As the financial sector reforms in Nepal are already in the direction of liberalization, the monetary authority has, perhaps, no other options except to develop open market operations which is an indirect instrument of monetary policy. One of the instruments used by Nepal Rastra Bank to control excess liquidity as well as inflation is the regular issuance of the NRB bonds in the open market so that excess liquidity could be absorbed in time. The NRB should, however, opt for other measures for the effective control and management of excess liquidity and inflation. In the context of Nepal's open border situation with India and fixed exchange rate regime with Indian rupee, if there occurs large unanticipated changes in the balance of payments, this may create difficulty for the monetary authority to control reserve money within a desired limit. It is therefore worthwhile to have a reserve money programming wherein the position of

changes in net foreign assets (NFA) and net domestic assets (NDA) can be regularly reviewed and a time-bound target for reserve money can be determined. This short-term monetary program should be able to reflect the seasonal pattern in the demand for liquidity, the general public's preference for holding currency than deposits and also the demand for excess reserves. The reserve money programming should be managed with the sole objective of absorbing the excess liquidity in the economy either through commercial banks or other institutions as well as private sector instead by Nepal Rastra Bank so that the multiplier effect in the economy can be neutralized.

The wholesale prices of India have shown as a foreign inflation rate which has a strong bearing on our domestic prices. There could be basically two reasons for the behaviour of domestic prices being dependent on wholesale prices of India. Firstly, there is a close geographical proximity and open border along the southern, western and eastern parts of Nepal accessing free mobility of goods and services to and fro across the border. Secondly, there is a large scale trade with India as a single major trade partner, the share of import of commodities from which is fairly high (32.0 per cent). Besides, the strong relation between the two price levels could be the result of a common underlying variable rather than being evidence of a strong direct price effect. For instance, increase in money supply in India would lead to an increase in Indian prices and therefore a flow of money to Nepal. The accumulation of foreign assets in the host country increases the money supply and therefore the domestic price level. Under such situation, it becomes a difficult task as to the choice of an appropriate policy to contain inflation. Because frequent adjustments of the exchange rate with Indian currency seems to pose uncertainty as there could arise fear of capital flow both ways between Nepal and India. Moreover, the empirical results also entail insignificant impact of adjustment of exchange rate in the growth of prices. An indirect approach is therefore suggested emphasizing on the policies to increase our output growth rate. Our empirical results have indicated that the present level of average growth rate of output does not seem to exert dampening effect on the domestic prices. Therefore, a policy of boosting production particularly agricultural production should be taken as a hard core for the effective management of inflation in the long run. Besides, administrative measures have to be enforced to reduce the possibility of unofficial mobility of goods and services across the border. However, the very basic solution, though, is to seal the open

border but it is not so easy task from the geo-social and political tie-up.

A widely recognized fact that the expansionary fiscal policy of the government in the past was one of the pertinent factors in escalating the prices has been detected by the empirical findings also. Nepal's fiscal policy was expansionary for most of plan period under study. The higher level of expenditure in excess of growth in revenue and foreign aid had further widened the fiscal deficit which was mostly met through borrowings from the banking sector. The penultimate effect of this sort of borrowings was the expansion of monetary aggregates leading to an upward pressure on inflation. To meet the growing government expenditure, the government, at times, applied higher tax rates particularly on indirect taxes to realize higher level of revenue. Since indirect taxes constitute 80 per cent of total tax revenue, this tax structure has a direct effect in creating inflationary situation through cost-push factor. Thus, the growing government expenditure is attributed to cause liquidity in the economy and thereafter inflation both from demand and supply side. The significant role of government expenditure on behaviour of domestic prices has not only been revealed by the empirical results of the estimation of price equation under structuralist framework but also the evidence that a strong unidirectional causality is detected running from government expenditure to domestic prices. It also implies that the growth in government expenditure does have significant impact on domestic prices in the long run. The foregoing analysis suggests that efforts to realize higher amount of revenue through increase in the rate of indirect taxes may be detrimental to the growth of domestic price level. The government should rather opt for the policy to keep the government expenditure at the level where the current realization of revenue and foreign aid can match it. In other words, expansionary fiscal policy should be discouraged. Besides, the existing facility of borrowing from the NRB by the government for short-term/medium-term adjustments to meet the fiscal deficit should be diverted to commercial banks and non-bank financial institutions. In addition, the government must adhere to its fiscal discipline in abiding by the limit set on the overdraft facility from the monetary authority.

Looking at the qualitative factors that may assist in escalating the domestic prices temporarily, supply management of the essential commodities comes under top priority. The government should ensure the

better supply of essential commodities from surplus districts to deficit districts by way of developing sufficient infrastructures such as godowns and keeping in advance the buffer stock of main commodities .

Secondly, the expenditure burden of the government borne on account of requirement of laying out budget for inefficient public enterprises should be substantially reduced by adopting the policy of privatization. This would help in lowering the amount of borrowing from the banking system and thus will have less impact on money supply and inflation.

It appears that the subsidy component incorporated in agri-inputs including agricultural credit and essential commodities has net effect of increasing money supply and inflation as the development activities prosper. This calls for the adaptation of an appropriate policy on subsidy aspects, which should not impinge on the sustainability of the economy of the nation in the long run.

Table A
ANNUAL AVERAGE INFLATION BY FIVE YEAR PERIOD
(In Per Cent)

Fiscal Year	National	Kathmandu	Terai	Hills
1975 / 80	5.3	6.3	4.3	6.1
1980 / 85	9.7	9.3	9.7	10.7
1985 / 90	12.0	12.8	11.5	11.3
1990 / 94*	12.2	13.9	11.3	10.8

* *Four year period only.*

Table B

ANNUAL PERCENTAGE CHANGE IN CPI

(In Per Cent)

Fiscal Year	National	Kathmandu	Terai	Hills
1975/76	-0.7	5.3	-5.8	2.9
1976/77	2.7	0.3	4.1	3.7
1977/78	11.2	10.2	11.2	10.7
1978/79	3.5	3.3	3.7	3.5
1979/80	9.8	12.2	8.1	9.8
1980/81	13.4	14.6	13.0	12.9
1981/82	10.4	10.6	10.9	10.1
1982/83	14.2	12.3	15.0	14.8
1983/84	6.3	5.4	6.3	6.5
1984/85	4.1	3.8	3.1	9.2
1985/86	15.8	17.1	15.8	11.8
1986/87	13.3	14.0	12.4	13.6
1987/88	11.0	9.5	12.2	11.7
1988/89	8.1	8.4	7.5	10.4
1989/90	11.5	15.1	9.7	9.0
1990/91	9.8	10.0	9.8	9.7
1991/92	21.0	20.8	21.5	19.7
1992/93	8.9	11.9	7.1	7.3
1993/94	8.9	12.8	6.7	6.4

Table C

URBAN CONSUMER PRICE INDEX
(Commodity Groupwise)
(In Per Cent)

Group/ Fiscal Year	1975-1980	1980-1985	1985-1990	1990-1994
<u>Food & Beverages</u>				
Kathmandu	6.3	9.2	13.7	13.9
Terai	3.4	9.3	11.4	11.8
Hills	5.5	10.2	11.8	10.9
National	4.7	9.4	12.3	12.6
<u>Non-Food & Services</u>				
Kathmandu	6.4	9.6	11.4	13.9
Terai	6.5	10.6	11.9	10.3
Hills	7.8	11.9	10.2	10.6
National	6.8	10.3	11.5	11.6
<u>Overall</u>				
Kathmandu	6.3	9.3	12.8	13.9
Terai	4.3	9.7	11.5	11.3
Hills	6.1	10.7	11.3	10.8
National	5.3	9.7	12.0	12.2

Table D

ANNUAL PERCENTAGE CHANGE IN CPI
(Groupwise)

Fiscal Year	National		Kathmandu		Terai		Hills	
	F & B	NF & S	F & B	NF & S	F & B	NF & S	F & B	NF & S
1975/76	-4.0	7.3	3.7	7.9	-10.3	5.5	-0.5	10.7
1976/77	0.3	7.0	-3.0	5.5	2.2	8.1	2.3	7.1
1977/78	14.9	4.4	14.3	4.2	14.8	3.6	12.8	6.9
1978/79	1.5	7.5	2.2	5.1	1.4	8.8	1.8	6.7
1979/80	11.0	7.6	14.2	9.2	8.9	6.3	11.0	7.4
1980/81	13.5	13.3	15.1	13.7	12.9	13.2	12.2	14.1
1981/82	11.0	9.4	10.7	10.4	12.0	8.6	10.6	9.4
1982/83	16.0	10.6	14.5	8.9	16.1	12.7	17.9	7.8
1983/84	5.2	8.5	4.8	6.4	5.2	9.1	4.2	12.4
1984/85	1.3	9.9	0.8	8.8	0.4	9.4	6.1	15.8
1985/86	18.5	10.8	20.3	11.9	18.6	10.1	13.3	9.0
1986/87	15.2	9.5	16.3	10.2	14.1	8.6	16.1	8.4
1987/88	12.1	9.0	10.5	7.7	12.9	10.6	13.6	7.8
1988/89	5.9	12.8	6.9	11.3	4.9	14.0	8.7	14.1
1989/90	9.6	15.3	14.8	15.7	6.6	16.0	7.5	11.7
1990/91	10.2	9.1	9.8	10.1	10.6	8.0	8.7	11.4
1991/92	24.4	15.0	22.4	18.2	26.2	12.8	22.8	14.5
1992/93	6.5	13.5	9.6	15.9	4.3	12.7	5.9	10.0
1993/94	9.1	8.9	13.8	11.3	6.1	7.8	6.4	6.4

*Note: F & B denotes Food & Beverages Group.
NF & S denotes Non-Food & Services Group.*

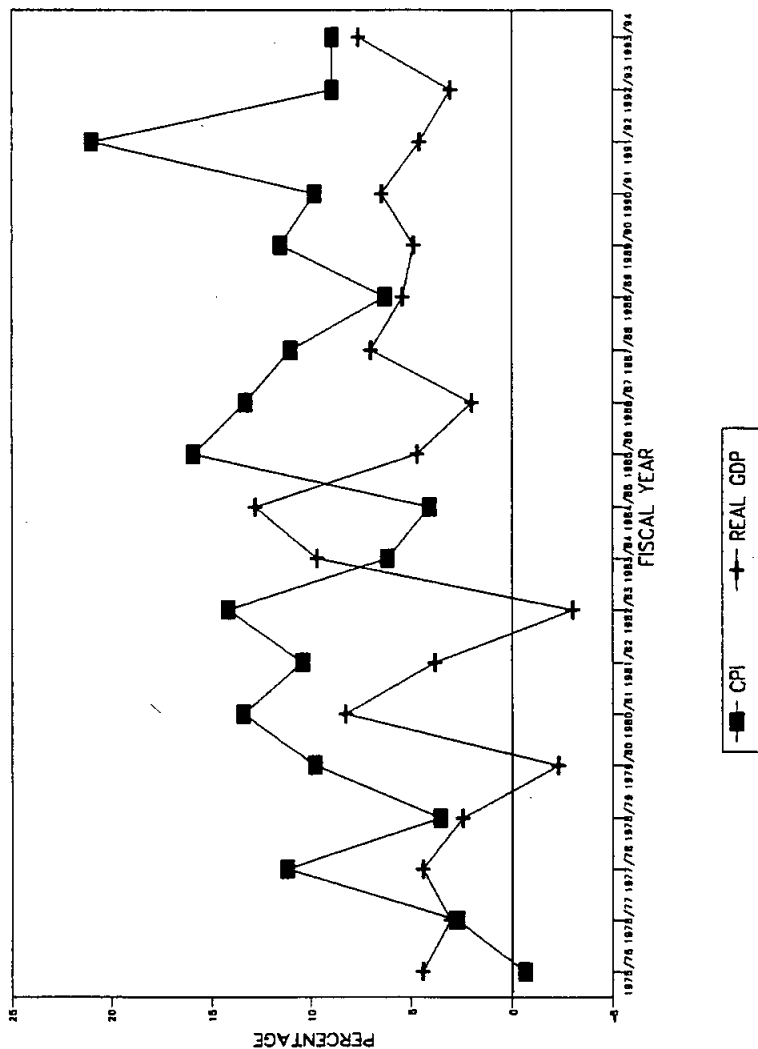
Table E

**INFLATION, AGRICULTURAL PRODUCTION OF
NEPAL AND WPI OF INDIA**

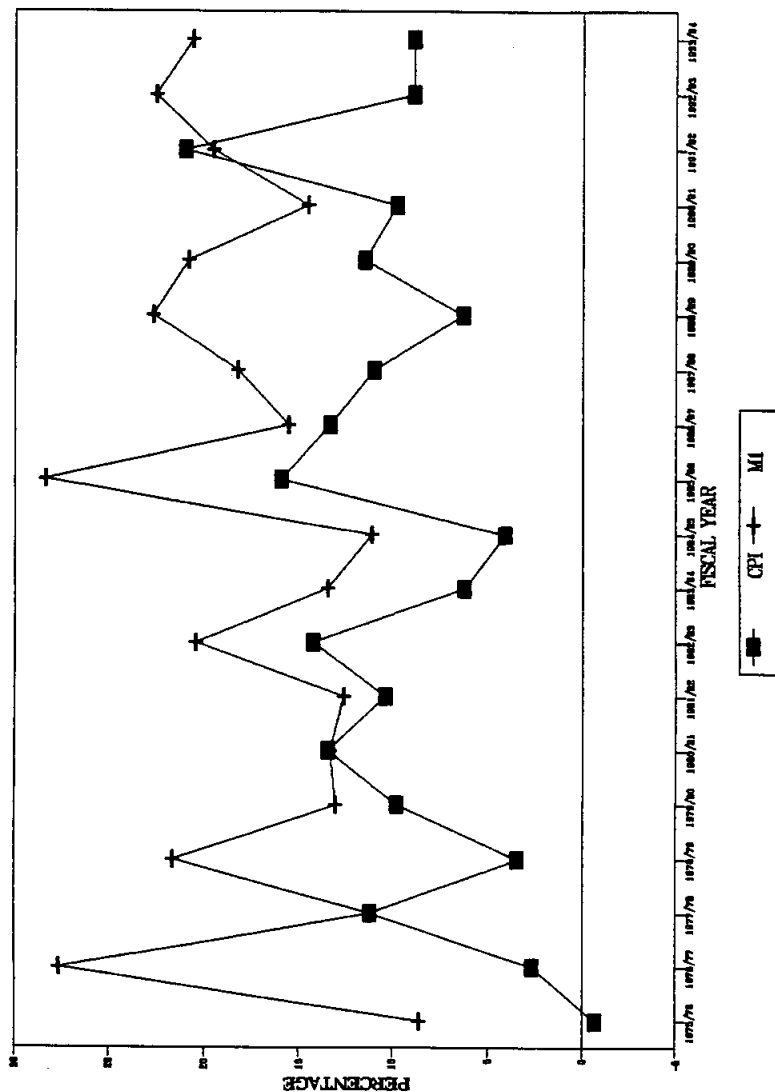
(Annual Percentage Change)

Fiscal Year	Annual Average Inflation	Agricultural Production	Wholesale Price Index of India	WPI of India for Cereals
1975/76	-0.7	3.4	0.1	-25.3
1976/77	2.7	-5.2	2.0	-10.7
1977/78	11.2	-3.2	5.3	4.6
1978/79	3.5	1.8	0.0	-2.4
1979/80	9.8	-11.8	17.1	9.9
1980/81	13.4	19.0	18.1	12.6
1981/82	10.4	4.0	9.5	11.2
1982/83	14.2	-15.9	4.9	9.7
1983/84	6.2	28.0	7.5	8.9
1984/85	4.1	-14.3	6.5	-5.5
1985/86	15.9	2.5	4.4	6.9
1986/87	13.3	-7.3	5.8	5.6
1987/88	11.0	10.9	8.1	8.2
1988/89	8.1	10.7	7.5	12.8
1989/90	11.5	4.5	7.4	2.1
1990/91	9.8	1.7	10.3	7.9
1991/92	21.0	-6.2	13.5	23.2
1992/93	8.9	-10.2	10.3	13.6
1993/94	8.9	19.9	8.2	5.5

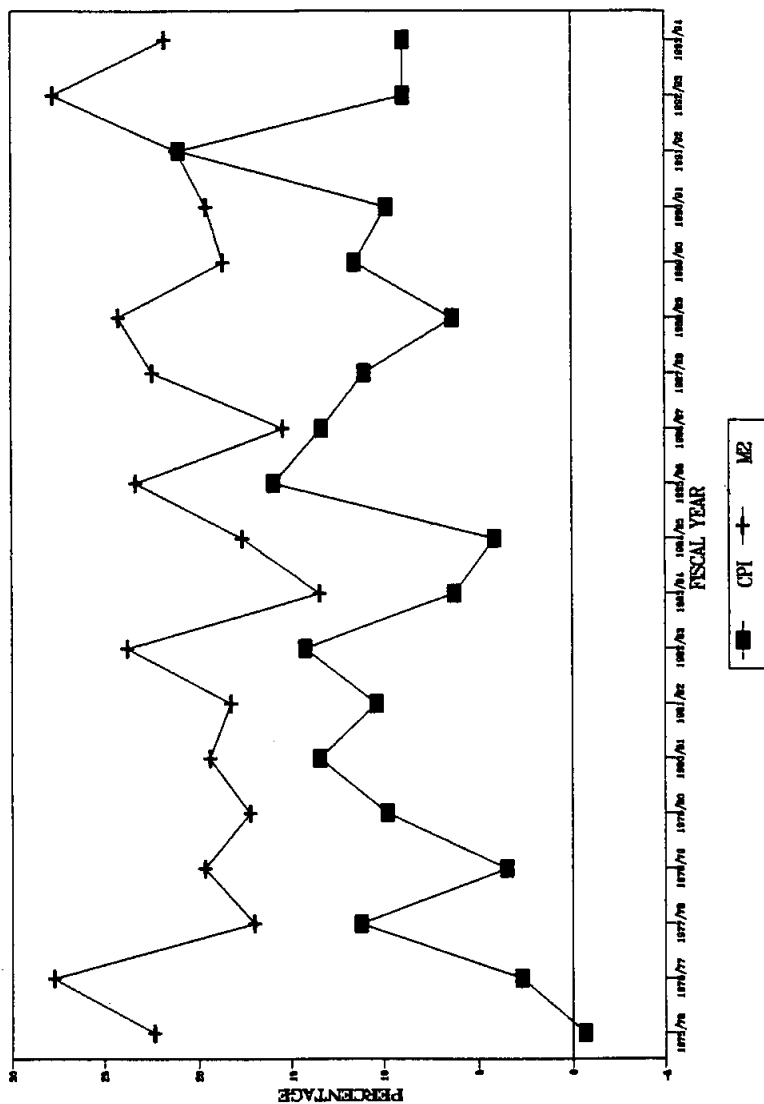
Consumer Price Index & Real GDP



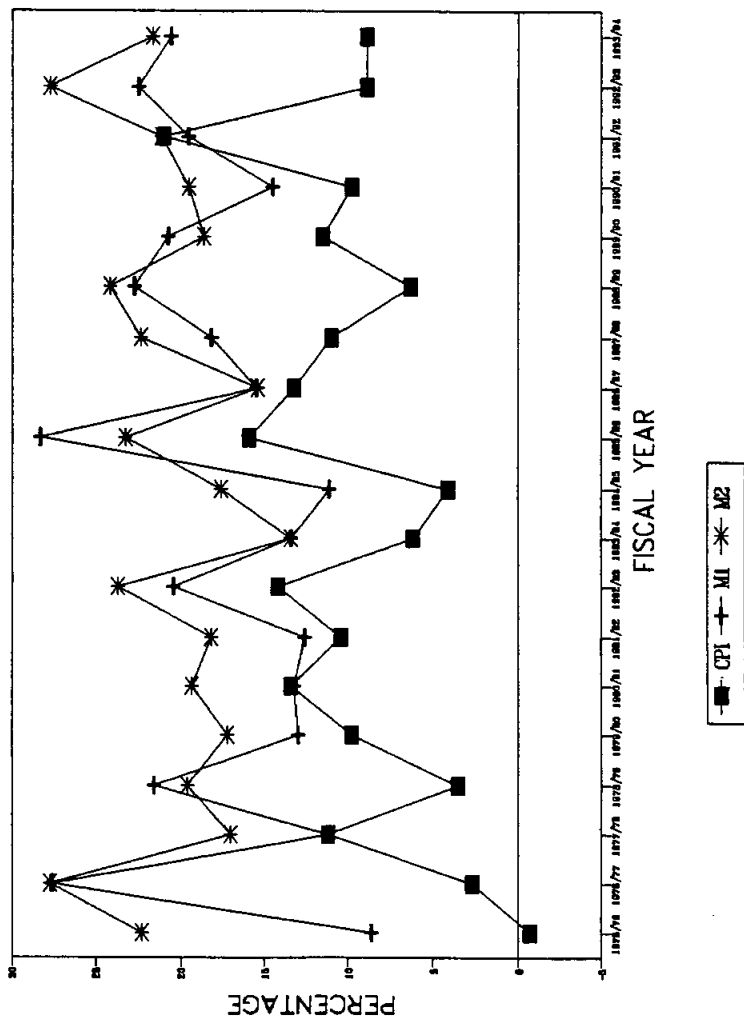
Consumer Price Index & M1



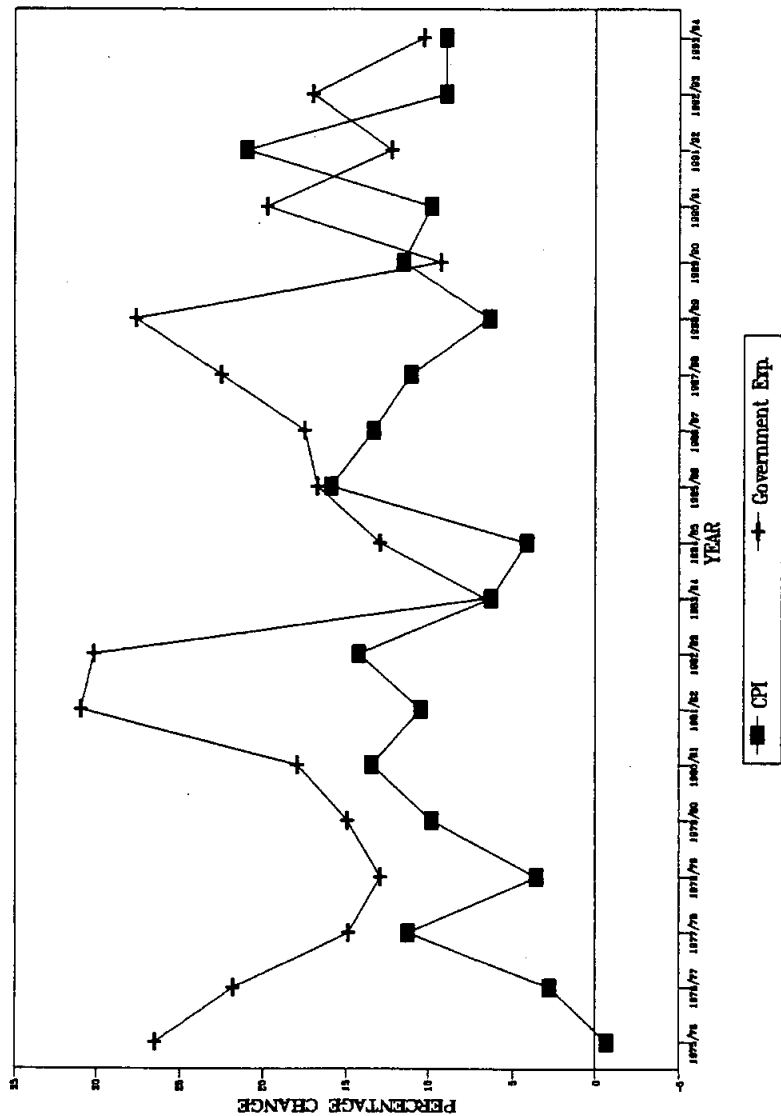
Consumer Price Index & M2.



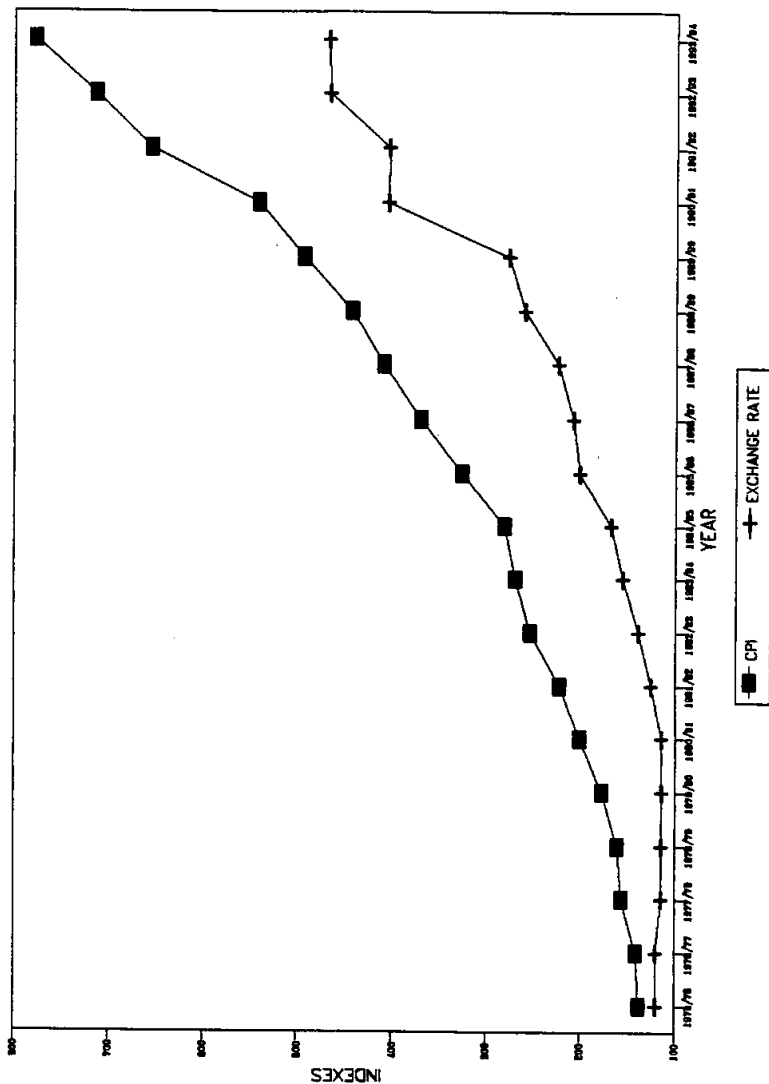
Consumer Price Index, M1, & M2



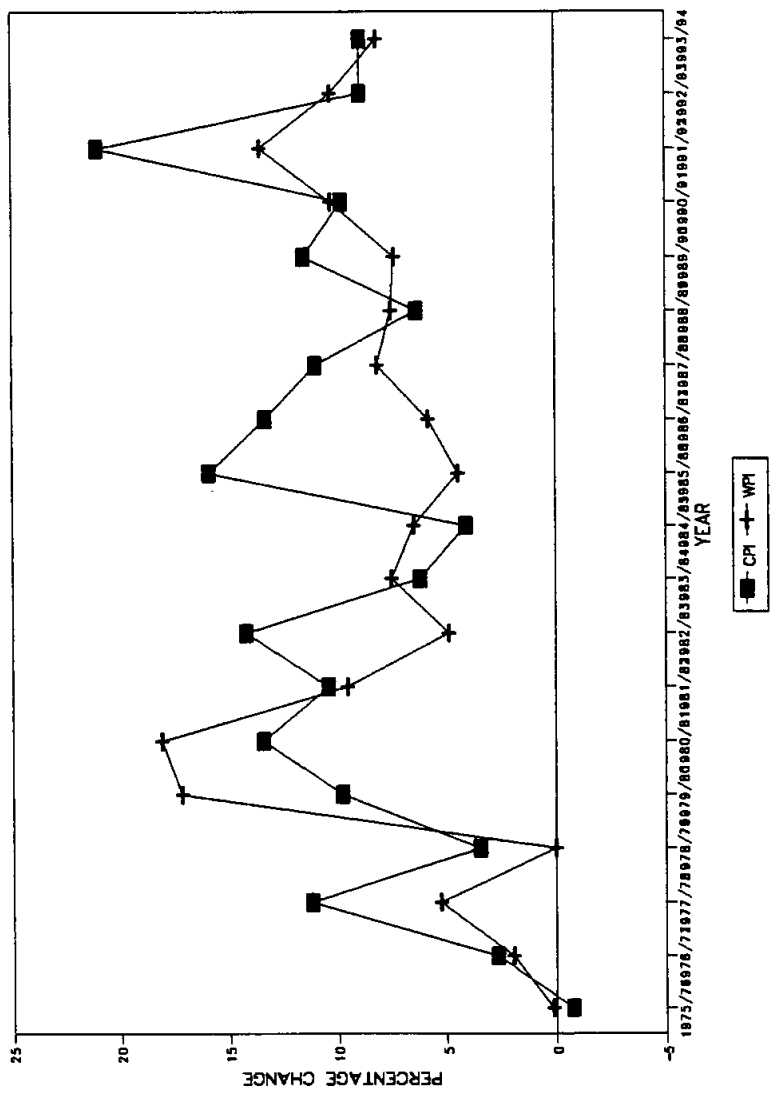
Consumer Price Index & Government Exp.



Consumer Price Index & Exchange Rate



Consumer Price Index & WPI



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SELECTED ECONOMIC INDICATORS: NEPAL (Annual Percentage Change)

Fiscal Year	Real GDP	Savings	Investments	CPI (Annual avg inflation)	Money Supply		Exports	Imports	Govt. Exp.	Revenue Receipt	Domestic Borrowings	External Borrowings
					M1	M2						
1975/76	4.4	22.7	9.6	-0.7	8.6	22.4	33.3	9.1	26.4	10.6	100.0	40.3
1976/77	3.0	14.3	5.2	2.7	27.6	29.0	-1.8	1.3	21.8	18.6	50.0	12.6
1977/78	4.4	8.9	26.7	11.2	11.2	19.1	-10.7	23.0	14.8	19.6	-20.0	13.4
1978/79	2.4	1.8	0.2	3.5	21.6	16.5	23.9	16.8	12.9	14.5	-16.7	2.2
1979/80	-2.3	0.2	21.5	9.8	13.0	17.2	-11.3	20.6	14.9	3.8	-10.0	37.1
5 Yrs Avg	2.4	9.6	12.6	5.3	16.4	20.8	6.7	14.2	18.2	13.4	20.7	44.9
1980/81	8.3	14.8	12.6	13.4	13.3	19.3	39.8	27.2	17.9	28.9	36.9	29.6
1981/82	3.8	3.8	10.5	10.4	12.6	18.2	-7.3	11.3	31.0	10.8	100.0	5.3
1982/83	-3.0	-6.5	24.7	14.2	20.4	23.7	-24.1	28.1	30.2	6.0	100.0	35.1
1983/84	9.7	34.6	10.9	6.2	13.4	13.3	50.5	3.2	6.6	20.0	57.7	69.5
1984/85	6.2	60.6	38.5	4.1	11.1	17.7	60.8	18.9	12.9	14.9	14.1	5.3
5 Yrs Avg	5.0	21.5	19.4	9.7	14.2	18.4	23.9	17.7	19.7	16.1	62.1	29.0
1985/86	4.7	-5.6	4.1	15.9	28.3	23.2	12.3	20.7	16.7	18.6	-22.0	42.5
1986/87	2.0	24.3	21.7	13.3	15.5	15.5	-2.8	16.7	17.5	28.6	17.2	8.2
1987/88	7.0	3.9	18.1	11.0	18.2	22.7	37.6	27.2	22.5	23.0	-31.3	41.0
1988/89	5.4	33.5	27.4	8.1	22.7	24.3	2.0	17.3	27.6	5.8	17.7	48.5
1989/90	4.9	-19.8	-1.7	11.5	20.8	18.7	24.8	13.1	9.2	19.4	61.7	5.2
5 Yrs Avg	4.8	7.3	13.9	12.0	21.1	20.8	14.8	19.0	18.7	19.1	8.7	29.1
1990/91	6.4	30.7	31.4	9.8	14.5	20.0	45.2	31.5	19.7	15.5	111.8	5.0
1991/92	4.6	40.7	26.1	21.0	19.5	21.3	85.5	37.5	12.2	25.9	-54.3	8.9
1992/93	3.0	22.3	14.8	8.9	22.5	27.5	27.7	21.0	16.9	12.1	-22.1	1.5
1993/94	6.9			8.9	21.1	18.8	12.9	35.7	10.2	29.2	12.3	37.5
4 Yrs Avg	5.2	31.2	24.1	12.2	19.4	21.9	52.8	30.0	14.8	20.7	11.9	13.2

P: Provisional.

E: Estimated.

Note: Growth rate in GDP up to 1984/85 is based on base year 1974/75 while that of onwards is on 1984/85.

ECONOMIC INDICATORS AS PERCENTAGE OF GDP: NEPAL

Fiscal Year	Nominal GDP In Million Rs.	Government Expenditure/GDP %	Revenue receipt/GDP %	Exports/GDP %	Imports/GDP %	Fiscal Deficit/GDP %	Current Ac Deficit/GDP %	Domestic Borrowing/GDP %	External Borrowing/GDP %	Debt service Ratio %	BOP Position In Million Rs.
1975/76	17394	11.0	6.4	6.8	11.4	-2.5	-2.5	0.3	1.1	0.8	358.2
1976/77	17280	13.5	7.7	6.7	11.6	-3.6	-3.6	1.5	1.7	0.9	310.8
1977/78	19732	13.6	8.0	5.3	12.5	-3.2	-3.2	1.2	1.9	2.13	10.8
1978/79	22215	13.6	8.2	5.8	13.0	-2.7	-2.7	0.9	0.9	1.7	583.4
1979/80	23351	14.9	8.1	4.9	14.9	-3.4	-3.4	0.8	0.8	2.35	26.4
5 Yrs Avg.	19994	13.3	7.7	5.9	12.7	-3.1	-3.1	0.2	1.1	1.5	257.9
1980/81	27307	15.0	8.8	5.9	16.2	-2.9	-2.9	-1.1	0.9	2.5	194.0
1981/82	30988	17.3	8.6	4.8	15.9	-5.4	-5.4	-1.3	1.6	2.3	501.5
1982/83	33761	20.7	8.4	3.4	18.7	-9.0	-9.0	-4.9	2.9	2.9	-675.0
1983/84	39390	18.9	8.6	4.3	16.5	-8.0	-8.0	-3.4	4.0	4.2	-126.0
1984/85	44441	18.9	8.8	6.2	17.4	-8.0	-8.0	-4.2	4.0	3.9	-866.0
5 Yrs Avg.	35177	18.2	8.6	4.9	16.9	-6.7	-6.7	-3.0	2.7	3.2	-194.3
1985/86	53215	18.4	8.7	5.8	17.6	-7.5	-7.5	-4.6	2.6	4.7	561.0
1986/87	61140	18.8	9.8	4.9	17.8	-7.0	-7.0	-4.8	2.7	4.4	628.5
1987/88	73170	19.3	10.0	5.6	18.9	-6.4	-6.4	-6.3	1.5	5.2	2273.0
1988/89	85330	21.0	9.1	4.9	18.9	-9.9	-9.9	-7.4	1.5	6.6	75.9
1989/90	99702	19.7	9.3	5.2	18.4	-8.4	-8.4	-7.7	2.2	6.0	2649.6
5 Yrs Avg.	74611	19.4	9.4	5.3	18.3	-7.8	-7.8	-6.2	2.1	5.4	1237.6
1990/91	116128	20.3	9.2	6.4	20.0	-9.2	-9.2	-8.2	3.9	5.4	4132.2
1991/92	144931	18.2	9.3	9.5	22.0	-7.8	-7.8	-6.9	1.4	4.7	3394.4
1992/93	164634	18.8	9.1	10.6	23.5	-7.3	-7.3	-5.6	1.0	4.2	7803.8P
1993/94P	191006	16.8	9.6	10.3	27.4	-5.0	-5.0	0.9	5.0	9.63	
4 Yrs Avg.	154175	18.5	9.3	9.2	23.2	-7.3	-7.3	-6.9	1.8	4.8	2508.9

P: Provisional.

Notes: 1) Fiscal deficit refers to total government expenditures minus sum of revenue receipts and foreign grants.

2) Debt Service Ratio computed as ratio of amortization plus debt interest payments to exports of goods and services less investment income receipt.

Sources: Economic Survey, 1993/94, Ministry of Finance, 1994.

Quarterly Economic Bulletin, Vol. XXVIII - XXIX, Mid Jul/Mid Oct - 1994, No. 4 & 1., Nepal Rastra Bank.

NATIONAL URBAN CONSUMER PRICE INDEX

Years	Food & Beverages		Non-Food & Services		Overall Index	
	Index	% Change	Index	% Change	Index	% Change
1975/76	135.7	-4.0	139.8	7.3	137.0	-0.7
1976/77	136.1	0.3	149.6	7.0	140.7	2.7
1977/78	156.4	14.9	156.2	4.4	156.4	11.2
1978/79	158.8	1.5	167.9	7.5	161.8	3.5
1979/80	176.2	11.0	180.7	7.6	177.6	9.8
1980/81	199.9	13.5	204.8	13.3	201.4	13.4
1981/82	221.9	11.0	224.0	9.4	222.4	10.4
1982/83	257.4	16.0	247.7	10.6	253.9	14.2
1983/84	270.9	5.2	268.7	8.5	269.8	6.3
1984/85	274.5	1.3	295.3	9.9	280.9	4.1
1985/86	325.4	18.5	327.1	10.8	325.4	15.8
1986/87	374.8	15.2	358.1	9.5	368.6	13.3
1987/88	420.1	12.1	390.5	9.0	409.3	11.0
1988/89(A)	444.9	5.9	440.6	12.8	442.4	8.1
1988/89(B)	165.9	n.a.	153.7	n.a.	161.3	n.a.
1989/90	181.9	9.6	177.2	15.3	179.9	11.5
1990/91	200.4	10.2	193.4	9.1	197.6	9.8
1991/92	249.2	24.4	222.4	15.0	239.1	21.0
1992/93	265.4	6.5	252.4	13.5	260.4	8.9
1993/94	289.5	9.1	274.8	8.9	283.7	8.9

From 1975/76 to 1988/89(A) – Old Series (Base Year:1972/73=100)

From 1988/89(B) to 1993/94 – New Series (Base Year:1983/84=100)

Appendix 4

URBAN CONSUMER PRICE INDEX : KATHMANDU

Years	Food & Beverages		Non-Food & Services		Overall Index	
	Index	% Change	Index	% Change	Index	% Change
1975/76	140.6	3.7	141.9	7.9	141.1	5.3
1976/77	136.4	-3.0	149.7	5.5	141.5	0.3
1977/78	155.8	14.3	156.1	4.2	155.9	10.2
1978/79	159.3	2.2	164.0	5.1	161.1	3.3
1979/80	181.9	14.2	179.1	9.2	180.8	12.2
1980/81	209.4	15.1	203.7	13.7	207.2	14.6
1981/82	231.8	10.7	224.9	10.4	229.2	10.6
1982/83	265.4	14.5	244.9	8.9	257.5	12.3
1983/84	278.1	4.8	260.5	6.4	271.4	5.4
1984/85	280.4	0.8	283.6	8.8	281.6	3.8
1985/86	337.4	20.3	317.4	11.9	329.7	17.1
1986/87	392.4	16.3	349.8	10.2	376.0	14.0
1987/88	433.7	10.5	376.6	7.7	411.7	9.5
1988/89(A)	463.6	6.9	419.1	11.3	446.5	8.4
1988/89(B)	173.5	n.a.	152.9	n.a.	165.3	n.a.
1989/90	199.2	14.8	177.0	15.7	190.3	15.1
1990/91	218.8	9.8	194.9	10.1	209.3	10.0
1991/92	267.9	22.4	230.5	18.2	252.9	20.8
1992/93	293.7	9.6	267.0	15.9	283.0	11.9
1993/94	334.1	13.8	297.3	11.3	319.3	12.8

From 1975/76 to 1988/89(A) – Old Series (Base Year:1972/73=100)

From 1988/89(B) to 1993/94 – New Series (Base Year:1983/84=100)

Appendix 5

URBAN CONSUMER PRICE INDEX : TERAJ

Years	Food & Beverages		Non-Food & Services		Overall Index	
	Index	% Change	Index	% Change	Index	% Change
1975/76	133.5	-10.3	138.5	5.5	135.2	-5.8
1976/77	136.5	2.2	149.8	8.1	140.7	4.1
1977/78	156.7	14.8	155.1	3.6	156.4	11.2
1978/79	158.9	1.4	168.8	8.8	162.2	3.7
1979/80	173.0	8.9	179.5	6.3	175.2	8.1
1980/81	195.3	12.9	203.2	13.2	198.0	13.0
1981/82	218.7	12.0	220.7	8.6	219.5	10.9
1982/83	253.9	16.1	248.6	12.7	252.6	15.0
1983/84	267.2	5.2	271.1	9.1	268.6	6.3
1984/85	268.2	0.4	296.7	9.4	277.0	3.1
1985/86	318.1	18.6	326.6	10.1	320.8	15.8
1986/87	362.8	14.1	354.5	8.6	360.6	12.4
1987/88	409.6	12.9	392.1	10.6	404.7	12.2
1988/89(A)	429.5	4.9	447.1	14.0	435.0	7.5
1988/89(B)	162.4	n.a.	154.3	n.a.	159.6	n.a.
1989/90	173.2	6.6	179.0	16.0	175.0	9.7
1990/91	191.5	10.6	193.4	8.0	192.1	9.8
1991/92	241.7	26.2	218.1	12.8	233.5	21.5
1992/93	252.2	4.3	245.8	12.7	249.9	7.1
1993/94	267.5	6.1	264.9	7.8	266.6	6.7

From 1975/76 to 1988/89(A) - Old Series (Base Year:1972/73=100)

From 1988/89(B) to 1993/94 - New Series (Base Year:1983/84=100)

Appendix 6

URBAN CONSUMER PRICE INDEX : HILLS

Years	Food & Beverages		Non-Food & Services		Overall Index	
	Index	% Change	Index	% Change	Index	% Change
1975/76	132.4	-0.5	138.3	10.7	134.3	2.9
1976/77	135.5	2.3	148.1	7.1	139.4	3.7
1977/78	152.8	12.8	158.3	6.9	154.3	10.7
1978/79	155.7	1.8	168.9	6.7	159.7	3.5
1979/80	172.7	11.0	181.5	7.4	175.3	9.8
1980/81	193.9	12.2	207.1	14.1	197.9	12.9
1981/82	214.5	10.6	226.5	9.4	218.0	10.1
1982/83	252.9	17.9	244.3	7.8	250.2	14.8
1983/84	263.5	4.2	274.5	12.4	266.5	6.5
1984/85	279.5	6.1	318.0	15.8	291.1	9.2
1985/86	316.8	13.3	346.7	9.0	325.4	11.8
1986/87	367.7	16.1	375.7	8.4	369.6	13.6
1987/88	417.6	13.6	405.0	7.8	413.0	11.7
1988/89(A)	453.9	8.7	462.1	14.1	456.1	10.4
1988/89(B)	160.1	n.a.	152.9	n.a.	157.5	n.a.
1989/90	172.2	7.5	170.8	11.7	171.7	9.0
1990/91	187.2	8.7	190.4	11.4	188.4	9.7
1991/92	229.9	22.8	218.0	14.5	225.6	19.7
1992/93	243.4	5.9	239.8	10.0	242.1	7.3
1993/94	258.9	6.4	255.2	6.4	257.5	6.4

From 1975/76 to 1988/89(A) - Old Series (Base Year:1972/73=100)

From 1988/89(B) to 1993/94 - New Series (Base Year:1983/84=100)

LIST OF SELECTED ECONOMIC VARIABLES
(Absolute Values)

Fiscal year	CPI*	GDPN	GDPR	M1	AM1	AMS1	M2	GE	FXR	WPII	WPIC
1973/74	118.2	14339.0	16333.0	1281.1	1148.5	1278.3	1912.2	1226.3	10.6	62.1	85.5
1974/75	138.0	16571.0	16571.0	1337.7	1193.7	1359.1	2065.3	1513.7	10.60	61.4	106.6
1975/76	137.0	17394.0	17300.0	1452.5	1395.1	1580.5	2528.0	1913.3	10.60	61.5	79.6
1976/77	140.7	17280.0	17822.0	1852.9	1652.8	1886.4	3260.7	2330.4	12.55	62.7	71.1
1977/78	156.4	19732.0	18607.0	2060.6	1956.7	2271.9	3884.3	2674.9	12.55	66.0	74.4
1978/79	161.8	22215.0	19048.0	2504.9	2282.7	2690.5	4527.1	3020.5	12.10	66.0	72.6
1979/80	177.6	23351.0	18606.0	2830.4	2667.6	3180.5	5306.6	3470.7	12.10	77.3	79.8
1980/81	201.4	27307.0	20158.0	3207.8	3019.1	3663.1	6331.4	4092.3	12.10	91.3	89.9
1981/82	222.4	30988.0	20920.0	3611.5	3409.6	4206.7	7484.8	5361.3	13.30	100.0	100.0
1982/83	253.9	33761.0	20297.0	4348.9	3980.2	4953.3	9256.4	6979.2	14.60	104.9	109.7
1983/84	269.8	39390.0	22262.0	4931.5	4640.2	5841.5	10491.4	7437.3	16.50	112.8	119.5
1984/85	280.9	44441.0	23620.0 (44441.0)**	5480.0	5205.8	6760.9	12348.2	8394.8	17.80	120.1	112.9
1985/86	325.4	53215.0	46512.0	7029.3	6254.6	8270.6	15214.2	9797.1	21.30	125.4	120.7
1986/87	368.6	61140.0	47427.0	8120.2	7574.8	10038.8	17578.7	11513.2	22.00	132.7	127.5
1987/88	409.3	73170.0	50762.0	9596.6	8858.5	11864.0	21562.3	14105.0	23.70	143.5	138.0
1988/89	442.4 (161.3)**	85830.0	53518.0	11775.4	10686.0	14516.3	26806.0	18005.0	27.60	154.3	155.7
1989/90	179.9	99702.0	56151.0	14223.0	12999.2	17769.2	31814.3	19669.3	29.30	165.7	159.0
1990/91	197.6	116128.0	59768.0	16283.6	15253.2	21198.1	38188.7	23549.8	42.90	182.7	171.5
1991/92	239.1	144931.0	62531.0	19457.7	17870.6	25523.8	46335.1	26418.2	42.80	207.4	211.3
1992/93	260.4	164634.0	64373.0	23833.0	21692.6	32454.5	59074.0	30897.7	49.48	228.7	240.0
1993/94+	283.7	191006.0	68815.0	28865.1	26349.0	41363.7	70201.0	34042.2	49.59	247.4	253.2

* Base Year: 1972/73.

** New Series.

+ The figures are either estimated or provisional.

Note: All the figures are in million Rs. except CPI, FXR, WPII and WPIC.

Sources: *Economic Survey, 1993/94*, Ministry of Finance, Nepal.
Quarterly Economic Bulletin, Mid January, 1994, Nepal Rastra Bank.
Reserve Bank of India Bulletin, Various Issues.

Appendix 8

SELECTED ECONOMIC VARIABLES
(Growth Rate)

Fiscal year	CPI	GDPN	GDPR	M1	M-1	AM1	AM-1	AMS1	M2	M-2	GE	Pt*	FXR	WPPI	WPIC
1975/76	-0.7	5.0	4.4	8.6	4.4	16.9	3.9	16.3	22.4	8.0	26.4	-17.5	0.0	0.1	-25.3
1976/77	2.7	-0.7	3.0	27.6	8.6	18.5	16.9	19.4	29.0	22.4	21.8	3.4	18.4	2.0	-10.7
1977/78	11.2	14.2	4.4	11.2	27.6	18.4	18.5	20.4	19.1	29.0	14.8	8.5	0.0	5.3	4.6
1978/79	3.5	12.6	2.4	21.6	11.2	16.7	18.4	18.4	16.5	19.1	12.9	-7.7	-3.6	0.0	-2.4
1979/80	9.8	5.1	-2.3	13.0	21.6	16.9	16.7	18.2	17.2	16.5	14.9	6.3	0.0	17.1	9.9
1980/81	13.4	16.9	8.3	13.3	13.0	13.2	16.9	15.2	19.3	17.2	17.9	3.6	0.0	18.1	12.6
1981/82	10.4	13.5	3.8	12.6	13.3	12.9	13.2	14.8	18.2	19.3	31.0	-3.0	9.9	9.5	11.2
1982/83	14.2	8.9	-3.0	20.4	12.6	16.7	12.9	17.7	23.7	18.2	30.2	3.8	9.8	4.9	9.7
1983/84	6.2	16.7	9.7	13.4	20.4	16.6	16.7	17.9	13.3	23.7	6.6	-8.0	13.0	7.5	8.9
1984/85	4.1	12.8	6.2	11.1	13.4	12.2	16.6	15.7	17.7	13.3	12.9	-2.1	7.9	6.5	-5.5
1985/86	15.9	19.7	4.7	28.3	11.1	20.1	12.2	22.3	23.2	17.7	16.7	11.8	19.7	4.4	6.9
1986/87	13.3	14.9	2.0	15.5	28.3	21.1	20.1	21.4	15.5	23.2	17.5	-2.6	3.3	5.8	5.6
1987/88	11.0	19.7	7.0	18.2	15.5	16.9	21.1	18.2	22.7	15.5	22.5	-2.3	7.7	8.1	8.2
1988/89	8.1	17.3	5.4	22.7	18.2	20.6	16.9	22.4	24.3	22.7	27.6	-2.9	16.5	7.5	12.8
1989/90	11.5	16.2	4.9	20.8	22.7	21.6	20.6	22.4	18.7	24.3	9.2	3.4	6.2	7.4	2.1
1990/91	9.8	16.5	6.4	14.5	20.8	17.3	21.6	19.3	20.0	18.7	19.7	-1.7	46.4	10.3	7.9
1991/92	21.0	24.8	4.6	19.5	14.5	17.1	17.3	20.4	21.3	20.0	12.2	11.2	-0.2	13.5	23.2
1992/93	8.9	13.6	3.0	22.5	19.5	21.4	17.1	27.0	27.5	21.0	16.9	-12.0	15.6	10.3	13.6
1993/94+	8.9	16.0	6.9	21.1	22.5	21.5	21.4	27.5	18.8	27.5	10.2	0.0	0.2	8.2	5.5

+ The figures are either estimated or provisional.

Chapter 11

INFLATION IN THE PHILIPPINES: ITS CAUSES AND MANAGEMENT*

by

Agnes Cecilia B. Apostol

I. General Macroeconomic Environment in the Philippines

Philippine macroeconomic developments in the 1970's were influenced by exogenous shocks such as the escalation of world oil prices as well as stagflation and protectionist policies in the country's major trading partners that depressed exports sales and hiked import prices. On the domestic front, macroeconomic developments in the seventies were likewise influenced by social unrest against the prevailing political regime and the subsequent imposition of martial law that lasted until the early eighties.

In 1970, in response to the growing imbalance in the country's balance of payments and rising price level, an economic stabilization program was implemented. These measures to mop up excess liquidity, limit credit, dampen imports, stimulate exports and conserve foreign exchange consequently led to an improvement in the external account although inflation remained a problem. The following year primarily saw a continuation of these concerns aggravated by the international liquidity crisis that triggered a realignment of major currencies. By 1972, martial law was imposed and an expansionary program was ushered in with the eventual slackening of prices and improvement in the external front. 1973 was a period with a relatively good economic performance. Production expanded and export shipments increased with favorable export prices and buoyant demand. However, the oil price hike in 1974 translated to a spiraling of prices. As the after-effects of stagflation in industrial countries took their toll on the Philippine economy, policies to stimulate demand were again put in

*. Prepared by MMAG staff, Department of Economic Research, Bangko Sentral ng Pilipinas: Agnes Cecilia B. Apostol, Carmela C. Espina, Enrique Oliver I. Rey-Matias, Gilda Fernandez, Francis Dakila, Olivia A. Vital and Teresita D. Teensma.

place in 1975 to compensate for the slack in the international market. Output responded positively in 1976 while prices remained relatively stable. Moderate growth was seen through the remainder of the decade even as high oil prices and lingering weakness of the major economies continued to impact on prices and production. The period may also be characterized by high government expenditures principally on infrastructure financed by foreign debt and the growth of public corporations which eventually led to fiscal imbalance.

In the first half 1980's, the Philippine macroeconomic picture was rather gloomy. The impact of economic management and economic performance under the given political backdrop was initially shown by the balance of payments crisis and the crisis of confidence in the financial sector exacerbated by the assassination of a staunch oppositionist, Senator Benigno Aquino, Jr., in August 1983. Modest growth was recorded in 1980 due to the oil price hike and extended recession abroad while the financial scandal in 1981 brought about liquidity problems to several financial institutions which necessitated Central Bank emergency assistance and financial reforms in the money market. To promote greater financial intermediation, this period likewise saw the deregulation of interest rates which had previously been subject to ceilings. Meanwhile, the incipient foreign debt problem in the past years ballooned to crisis proportions by 1983 leading to a debt payment moratorium as foreign exchange cover for the maturing foreign obligations became scarce. The crisis resulted in a 41 per cent devaluation of the peso against the dollar which sent shock waves anew to the economy particularly with regard to the inflation problem. The Central Bank had to engage in costly open market operations to contain inflation. These factors consequently led to a period of recession in 1984 and 1985.

The February Revolution in 1986 ushered in new confidence in the floundering economy as the new democratic government successfully negotiated with foreign creditors a restructuring of the country's foreign debt to ensure the viability of the external payments position. A pump-priming program aided by the easing of oil prices and of international interest rates placed the economy once again in the growth mode through the rest of the eighties. Notwithstanding moderate growth, the series of coup attempts against the Corazon Aquino Administration, particularly the December 1989 putsch and the growing fiscal imbalance seriously affected growth in the early 1990s calling for an ex-

panded macroeconomic stabilization program. Moreover, a series of natural calamities and the Gulf war further dampened economic activities.

The relatively peaceful and orderly conduct of the 1992 presidential elections paved the way for renewed political stability and economic optimism. Turning away from the previous regime of controls and regulations, the government, the Central Bank in particular, fully liberalized the foreign exchange system as well as its bank branching policy. The import levy instituted during the period of economic stabilization was likewise lifted. By 1993, there was faster GNP growth despite the power supply shortages. This was also the year when the Central Bank of the Philippines was restructured into the more efficient and effective *Bangko Sentral ng Pilipinas* (BSP). Similarly, 1994 economic performance was favorable as structural reforms continued, sustaining the growth impetus of the previous year, and continuing the rein on inflation with the National Government (NG) even posting a fiscal surplus, the first in a very long time. And as prospects of the economy became brighter in 1994, foreign investments followed, consequently leading to a peso appreciation vis-à-vis the dollar. By 1995, the economy continued to perform creditably, driven mainly by exports and investments. Notwithstanding the contagion effects of the Mexican peso crisis, foreign investments continued to flow into the economy further improving the country's stock of international reserves. As in 1994, inflation was single-digit for the whole year of 1995, albeit slightly higher, even as the rice supply shortage during the latter part of the year and as oil price and wage hikes during the first two months of 1996 pushed prices to double-digit levels.

II. Price Developments

2.1 Factors Behind Price Movements (1970 to latest)

For the past decades of the 1970's and 1980's as well as in the early 1990's, average inflation registered were at double-digit rates. From 14.8 per cent in the 1970's, average inflation slightly dipped to 14.3 per cent in 1980s, and further slowed down to 13.9 per cent in 1990 to 1992. Inflation peaked in 1984 at 47.3 per cent at the height of the balance of payments (BOP) crisis, then registered lowest at negative 0.4 per cent in 1986 after a period of recession.

The financial restructuring of the Bangko Sentral ng Pilipinas (BSP) in 1993 has enhanced its performance, significantly contributing to the stabilization of prices as inflation rates were consistently single digit at 7.6 per cent in 1993, 9.0 per cent in 1994, and 8.1 per cent in 1995. Price movements in the Philippines have been influenced by cost-push or supply factors, demand and structural rigidities as well as inflationary expectations or speculations.

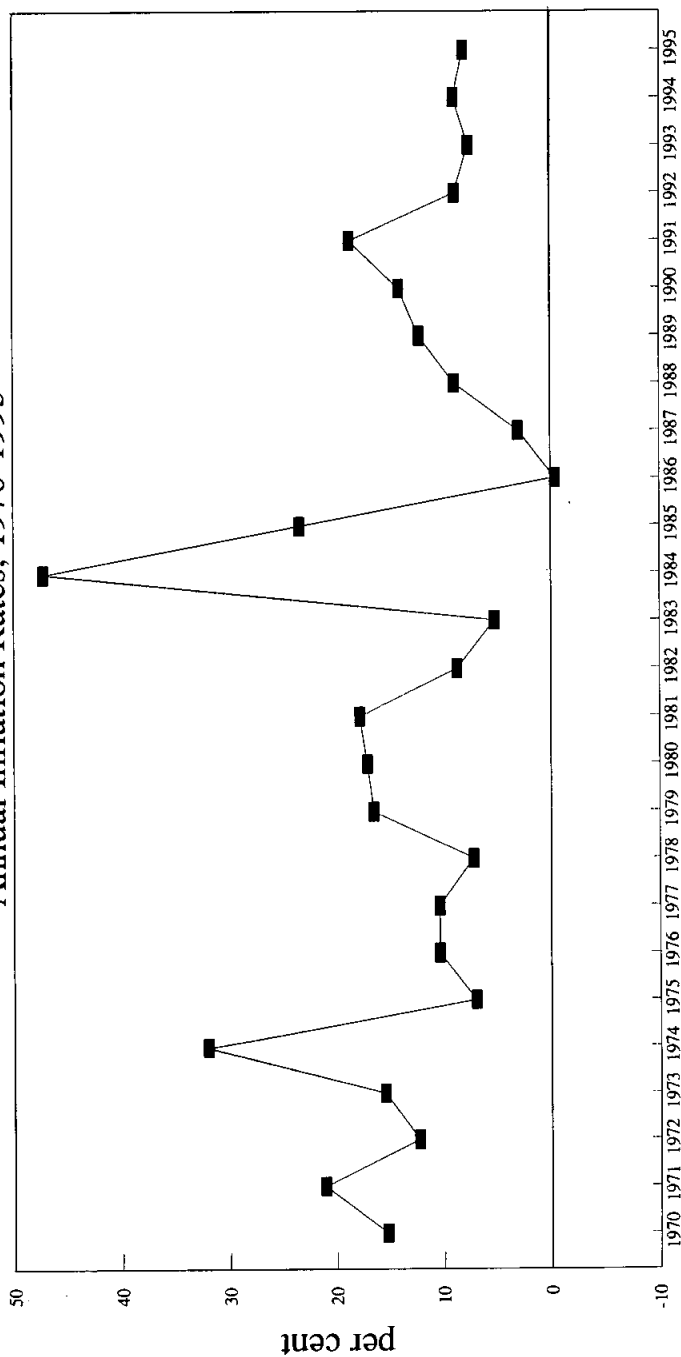
2.1.1 Cost-Push Factors (Table 1)

- (i) A slowdown in the domestic economic growth, as measured by the Gross Domestic Product (GDP), would result in higher prices given a constantly increasing demand. Negative GDP growth rates for 1984 and 1991 were registered at -7.3 per cent and 0.58 per cent, respectively, due to low performance rates of the different production sectors, particularly the agricultural sector which comprises at least 20 per cent of the economy. The CPI-based inflation rate was heavily influenced by **price movement of the food-beverage-tobacco group**, which contributes 58.5 per cent to overall inflation. Typhoons, drought or other natural calamities often caused production setbacks and distribution bottlenecks in the agricultural sector, thus raising food prices. In particular, the earthquake in 1990 and the lahar flows from the eruption of Mt. Pinatubo in 1991 destroyed infrastructure and farmlands specifically in Central Luzon, adversely affecting agricultural supply, partly contributing to higher inflation rates of 14.1 per cent and 18.7 per cent in 1990 and 1991, respectively.
- (ii) The **movement of the peso against the US dollar** affects the cost of production via **import costs of raw materials**. The adoption of the floating exchange rate resulted in a peso depreciation in 1970 and 1971 which contributed to the escalation of prices. At the height of the BOP crisis, the peso depreciated to P14 per dollar by end-1983 and further to P18 per dollar in mid-1984. The successive depreciation of the peso effected a surge in prices posting an inflation of 47.3 per cent in 1984. The peso continued to weaken in the succeeding years up to end-1990 when the peso was already valued at P28 per dollar. As the economy started to pick up in 1992, given more stable political situation and improved business/investment climate, the peso likewise started to appreciate and remained relatively stable till 1995 lowering production

Table 1
MOVEMENT OF FACTORS AFFECTING INFLATION

	Annual Inflation Rate (%)	Average Peso-\$ Rate (P)	Appreciation(-)/ Depreciation Rate (%)	91-day Treasury Bill Rate (%)	Peso				Production			M3 (P Mil.)	M3 Growth Rate (%)
					Real GDP Growth Rate (%)	Personal Consumption Growth Rate (%)	Capital Formation Growth Rate (%)	Real GDP Growth Rate (%)	Personal Consumption Growth Rate (%)	Capital Formation Growth Rate (%)			
1970	15.3	6.0246	53.7	13.135	3.76	2.97	6.46	9388	8.9				
1971	21.1	6.4317	6.8	11.948	5.43	3.38	9.48	10494	11.8				
1972	12.3	6.6748	3.8	11.918	5.45	3.30	3.63	11872	13.1				
1973	15.5	6.7563	1.2	9.425	8.92	5.76	11.85	18064	52.2				
1974	32.0	6.7879	0.5	10.047	3.56	4.89	20.81	24242	34.2				
1975	7.0	7.2479	6.8	10.342	5.56	4.80	24.08	28923	19.3				
1976	10.4	7.4403	2.7	10.186	8.81	5.00	18.87	35990	24.4				
1977	10.4	7.4028	-0.5	10.901	5.6	5.27	0.97	44015	22.3				
1978	7.2	7.3658	-0.5	10.888	5.17	5.21	8.09	51984	18.1				
1979	16.5	7.3776	0.2	12.254	5.64	4.85	4.36	57598	10.8				
Ave (70-79)	14.8								21.5				
1980	17.1	7.5114	1.8	12.141	5.15	4.51	-3.70	68273	18.5				
1981	17.8	7.8997	5.2	12.606	3.42	2.66	2.83	82540	20.9				
1982	8.7	8.5400	8.1	13.811	3.62	3.46	8.42	96078	16.4				
1983	5.2	11.1127	30.1	14.173	1.87	0.61	6.40	114211	18.9				
1984	47.3	16.6987	50.3	30.534	-7.32	0.27	-36.99	122432	7.2				
1985	23.4	18.6073	11.4	26.806	-7.31	-1.16	-31.85	134140	9.6				
1986	-0.4	20.3859	9.6	14.433	3.42	3.32	10.06	144325	7.6				
1987	3.0	20.5677	0.9	11.390	4.31	4.04	19.69	161824	12.1				
1988	8.9	21.0947	2.6	14.406	6.75	6.23	14.69	198409	22.6				
1989	12.2	21.7367	3.0	19.333	6.21	5.01	20.45	253921	28.0				
Ave (80-89)	14.3								16.2				
1990	14.1	24.3105	11.8	23.396	3.04	5.38	15.83	300541	18.4				
1991	18.7	27.4786	13.0	21.351	-0.58	5.26	-17.29	347079	15.5				
1992	8.9	25.5125	-7.2	16.118	0.34	3.26	7.83	385385	11.0				
Ave (90-92)	13.9								15.0				
1993	7.6	27.1198	6.3	12.251	2.12	3.04	7.87	480329	24.6				
1994	9.0	26.4172	-2.6	13.620	4.42	3.72	8.65	607619	26.5				
1995	8.1	25.7144	-2.7	11.345	4.85	3.81	3.52	761420	25.3				
1996													
Jan.	11.2	26.2116	6.5	12.523	n.a.	n.a.	n.a.	n.a.	n.a.				
Feb.	11.8	26.1588	4.5	12.792	n.a.	n.a.	n.a.	n.a.	n.a.				

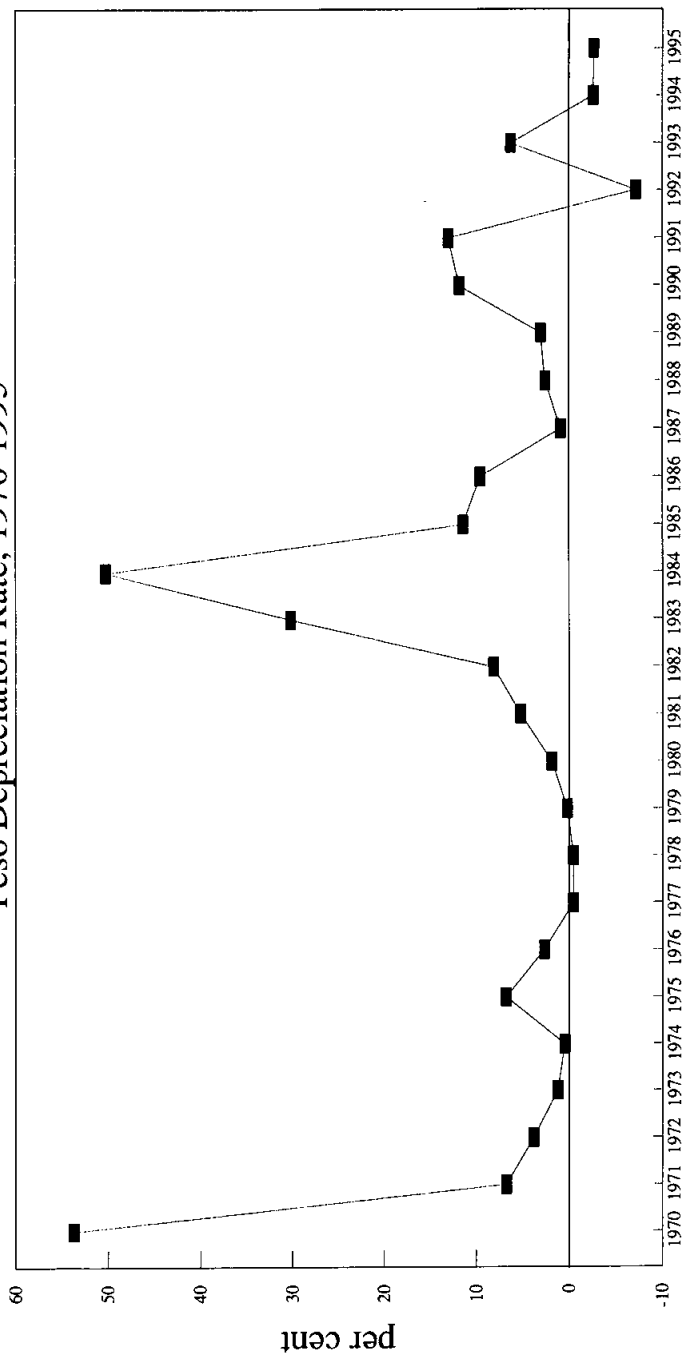
CHART 1
Annual Inflation Rates, 1970-1995



costs through cheaper imports of raw materials. This development contributed to a single-digit inflation rate.

- (iii) Another inflationary pressure comes from the implementation of a **wage hike** which increases the cost of production as well as the consumer demand. Wage hikes had been implemented throughout the period in review, particularly in 1989 when the Salary Standardization Law took effect. Double-digit inflation rate of 12.2 per cent was once again posted in 1989, partly due to the said wage hike. Likewise, the phased increases in minimum wages in December 1993 and April 1994 triggered inflationary pressures.
- (iv) Any **movement in domestic oil prices** would definitely affect inflation as the energy-related components in the CPI were found to be volatile. In 1974, inflation worsened at 32.0 per cent as domestic oil prices spiraled four-fold following high OPEC prices. The succeeding years witnessed relatively stable prices as no major oil price shock was experienced. However in 1979, inflation once again picked up to 16.5 per cent, mainly due to the two oil price adjustments during the year. After the recession period, inflation declined reaching as low as negative 0.4 per cent in 1986 which could be attributed in part to the three-fold rollback in domestic oil prices. But the Gulf War crisis in 1990 affected international oil supply which inevitably resulted in an increase in domestic oil prices, hence the higher inflation up to 1991. As domestic oil prices remained stable till 1994, inflation was maintained at single-digit level. With the impending oil price hike in 1995, speculations arose partly influencing the double-digit inflation rates in the latter part of the year up to February 1996 when an average oil price hike of 55 centavos per liter was finally implemented.
- (v) **Interest rates affect the financing cost of production.** In particular, the 91-day Treasury bill rate remained relatively stable in the 1970's but moved more in step with the market in the 1980's as interest rates became deregulated. In 1984, it reached as high as 30.5 per cent as the country was experiencing tight liquidity and high inflation. After the period of recession, interest rates declined in 1986 to 1988 which helped pull down production costs and inflation. When the 91-day T-bill rates started to go up in 1989 to 1991, inflation also started to pick up. It may be noted though that inflation likewise affects interest rates. With the start of the

CHART 2
Peso Depreciation Rate, 1970-1995

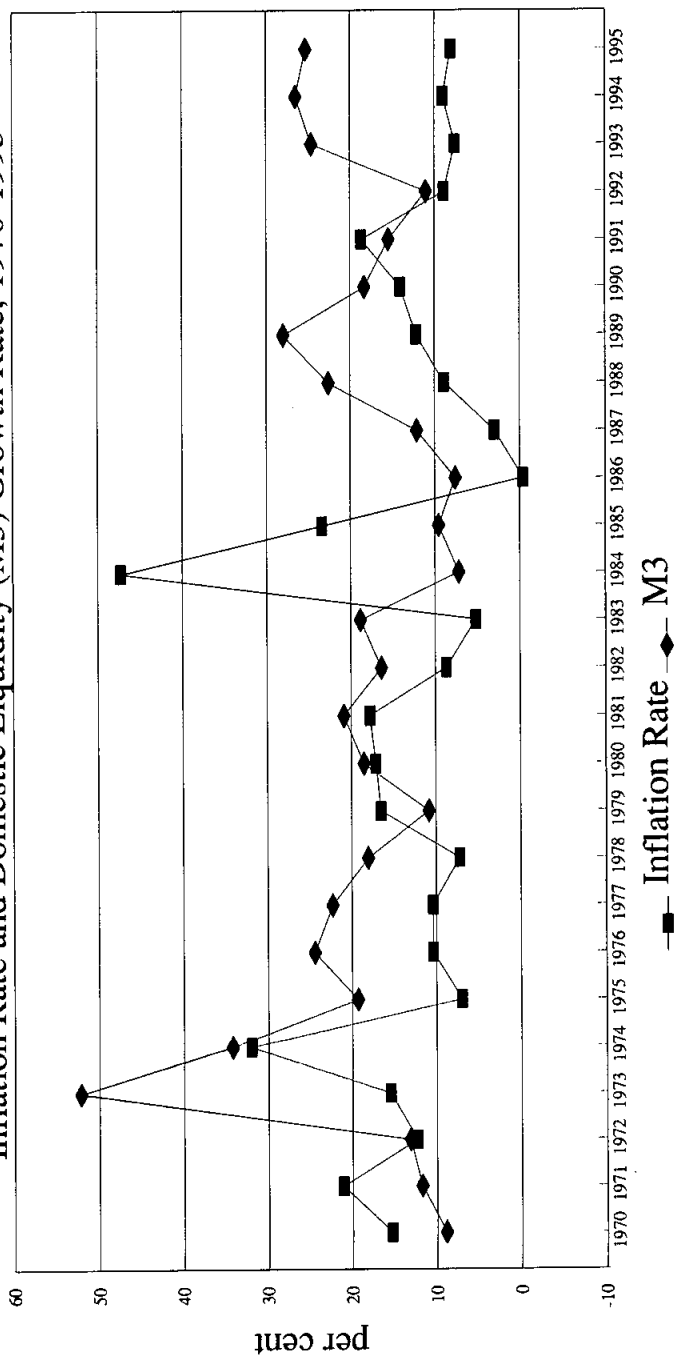


BSP operations in 1993, and the decline in reserve requirements against deposit and deposit substitute liabilities, interest rates were successfully lowered from 16.1 per cent in 1992 to 11.3 per cent in 1995. Inflation remained at single digit since 1993.

2.1.2 Demand Factors (Table 1)

- (i) **Excess liquidity growth** is expected to be inflationary. Domestic liquidity (M3) grew by an average of 22.9 per cent in the 1970's, with the highest growth recorded in 1973 at 52.2 per cent as influenced by the country's BOP surplus following the rise in exports due to higher foreign demand. Inflation during the decade averaged 14.8 per cent. During the BOP crisis in 1983-1984, inflation rate peaked at 47.3 per cent despite single-digit liquidity growth rates as inflationary pressures were mainly due to the sharp devaluation of the peso. The period 1989 to 1991 witnessed M3 posting double-digit growth rates averaging at 20.6 per cent partly causing inflation to post likewise double-digit rates. In recent years, M3 has been growing fast — 24.6 per cent, 26.5 per cent and 25.3 per cent in 1993, 1994 and 1995, respectively. However, these high M3 growth rates did not translate into higher prices due to the high absorptive capacity of the real sector which prevented the economy from overheating and the process of financial deepening taking place due to foreign exchange liberalization, the entry of foreign banks, and the liberalized bank branching. Moreover, the bulk of credits extended by the banking system was channeled to the manufacturing sector. In fact, double-digit inflation rates during the last four months of 1995 were principally caused by inadequate rice supply arising from lack of production, importation and poor distribution system.
- (ii) **Inflationary expectations** influence price movements as they create speculations among consumers. Speculative activities such as hoarding, hedge-buying and other unscrupulous practices among retailers could raise prices. Speculations arising from the failed coup attempts in 1987 and 1989, from the Gulf War in 1990, from impending oil price hikes in 1992 and 1995, and from the impending implementation of the expanded Value Added Tax (EVAT) in 1995 also influenced price movements.

CHART 3
Inflation Rate and Domestic Liquidity (M3) Growth Rate, 1970-1995



- (iii) When the **GDP is more consumption-driven instead of investment-led**, it is likely that inflationary pressures exist. The increase in personal consumption as triggered by a wage hike could be inflationary if not translated to higher productivity. In 1988, the expansion in personal and government expenditures by 6.2 per cent and 9.1 per cent, respectively, partly caused the inflation to move up to 8.9 per cent from 3.0 per cent in 1987. Starting 1993 up to 1995, real GDP growth was investment-led but despite inflationary pressures from supply factors, higher productivity of investments prevailed.
- (iv) **Expenditures related to several elections** in the country had tended to raise prices but on a short-term basis.

2.2 The Consumer Price Index (CPI) of the Philippines

The CPI provides a general measure of average monthly and annual changes in the retail prices of commodities commonly bought by consumers in the Philippines, covering all income households. Price data used in the computation of the CPI are collected from retail outlets in Metro Manila (11 markets), in all provincial capitals (73 provinces) and in approximately 600 municipalities throughout the country. Each of the 14 regions has its own market basket of goods and services purchased for consumption by households in the region. The commodity items were selected to present the composite price behavior of all goods and services based on their representation and importance in household purchases. The index computations are solely undertaken by the National Statistics Office (NSO), while price data collection is shared by NSO with the Bureau of Agricultural Statistics and the National Food Authority.

2.2.1 Its Components (Table 2)

Nearly 60 per cent of the CPI is accounted for by the prices of food items. Food prices are greatly affected by weather-related factors. Of the food components, rice accounts for 12.8 per cent of the total CPI. Rice shortages heavily influenced high inflation particularly in 1973 to 1974, and recently towards the end of 1995. Double-digit inflation rates once again reappeared starting September 1995 at 11.3 per cent until February 1996 at 11.8 per cent. The uptrend in rice prices was mainly due to agricultural production setbacks caused by

destructive typhoons and lahar flows and to ineffective marketing distribution.

Of the non-food items, the housing and repairs subgroup accounted for a high weight of 13.3 per cent of the total CPI. The boom in construction activities since 1989 had significantly influenced the increase in rentals as well as in the prices of construction materials, particularly cement and wood products.

The increase in domestic petroleum prices particularly premium gas and diesel feeds into the transportation sub-group (accounting for 0.61 per cent of the CPI) of the services group, while the increase in kerosene and LPG prices is reflected in the fuel sub-group (accounting for 0.97 per cent of the CPI) of the fuel-light- water group. Other non-food items are categorized under clothing and miscellaneous non-food groups.

2.3 Policy Responses

Mandated to promote price stability, the BSP has implemented several policies to contain inflationary pressures. BSP's stronger financial position has helped its capability to undertake monetary management.

2.3.1 Open Market Operations

In addition to the traditional open market instruments, the former Central Bank of the Philippines (CBP) began the issuance of Central Bank Certificates of Indebtedness (CBCIs) in 1973 to contain upward pressures on prices coming from high M3 growth of 52.2 per cent and the growing economy as measured by the 8.9 per cent GDP growth rate. In the 1980's, government securities particularly Treasury bills were used as a tool for open market operations replacing the maturing CBCI's since such instruments competed with the NG's Treasury bills. The proceeds of the sale of Treasury bills net of the amount used for fiscal deficit financing were deposited by the NG with the CB which facilitated monetary management. The build-up of **NG deposits** has become a major factor in controlling the growth of reserve money.

Open market operations in early 1990's were mainly in the form of **reverse repurchase (RRPs) agreements** which refer to CB bor-

Table 2
ANNUAL INFLATION RATES : 1973 - 95

COMMODITY GROUP	Weights (1)	INFLATION RATE (2)																						
		1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
ITEMS	100.0	15.1	32.4	6.8	10.7	10.1	7.2	16.4	17.3	17.8	8.6	5.3	47.1	23.4	0.4	3.0	8.9	12.2	14.2	18.7	8.9	7.6	9.0	8.1
Food, Beverages & Tobacco	58.5	15.9	32.7	5.4	10.3	9.7	6.2	14.9	14.9	17.9	6.8	4.8	50.8	23.4	-1.6	3.8	10.0	14.0	11.9	15.4	6.9	6.1	8.3	9.5
Clothing	4.4	11.8	46.5	11.4	5.9	11.2	8.2	18.6	21.7	17.3	7.0	4.9	53.6	27.9	3.8	2.0	6.8	9.4	10.0	16.9	10.7	7.5	4.8	3.3
Housing & Repairs	13.3	28.6	19.6	5.5	15.5	15.2	10.1	17.7	15.3	17.4	13.1	6.5	30.9	23.5	4.2	2.8	6.3	13.6	16.9	20.2	17.5	12.6	13.1	10.7
Fuel, Light & Water	5.4	9.3	38.7	10.2	13.6	5.4	13.9	25.3	33.9	27.5	14.2	8.1	45.4	25.7	-9.7	0.0	3.7	9.9	23.7	27.4	6.0	7.3	6.9	3.0
Services	10.9	15.5	27.6	12.3	8.9	11.5	8.2	18.3	23.5	15.8	13.6	8.3	40.1	18.8	2.9	2.8	8.6	5.9	22	32.6	7.1	7.8	8.8	6.4
Miscellaneous	7.6	6.2	34.3	13.0	9.1	9.3	6.9	19.6	17.7	13.9	7.1	3.5	49.3	24.9	3.2	0.9	9.4	7.9	11.7	16.2	13.1	8.4	11.0	0.9
		CONTRIBUTION TO OVERALL INFLATION (in Percentage Points) ^y (3) = (1/2)(100)																						
ITEMS		1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Food, Beverages & Tobacco		9.3	19.1	3.2	6.0	5.7	3.6	8.7	8.7	10.5	4.0	2.7	29.7	13.7	-0.9	2.2	5.8	8.2	7.0	9.0	4.0	3.6	4.9	5.6
Clothing		0.5	2.0	0.5	0.3	0.5	0.4	0.8	0.9	0.8	0.3	0.2	2.3	1.2	0.2	0.1	0.3	0.4	0.4	0.7	0.5	0.3	0.2	0.1
Housing & Repairs		3.8	2.6	0.7	2.1	2.0	1.3	2.4	2.0	2.3	1.7	0.9	4.1	3.1	0.6	0.4	0.8	1.8	2.2	2.7	2.3	1.7	1.7	1.4
Fuel, Light & Water		0.5	2.1	0.5	0.7	0.3	0.7	1.4	1.8	1.5	0.8	0.4	2.4	1.4	-0.5	0.0	0.2	0.5	1.3	1.5	0.3	0.4	0.4	0.2
Services		1.7	3.0	1.3	1.0	1.3	0.9	2.0	2.6	1.7	1.5	0.9	4.4	2.1	0.3	0.3	0.9	0.6	2.4	3.6	0.8	0.9	1.0	0.7
Miscellaneous		0.5	2.6	1.0	0.7	0.7	0.5	1.5	1.3	1.1	0.5	0.3	3.7	1.9	0.2	0.1	0.7	0.6	0.9	1.2	1.0	0.6	0.8	0.1
		PERCENTAGE SHARE TO OVERALL INFLATION (in Percent) ^y (4) = (3)/(2)																						
ITEMS		1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Food, Beverages & Tobacco		61.6	59.0	46.4	56.3	56.2	50.4	53.1	50.4	58.8	46.2	50.8	63.1	58.5	233.9	74.1	65.7	67.1	49.0	48.2	45.3	46.9	53.9	68.6
Clothing		3.4	6.3	7.3	2.4	4.8	5.0	4.9	5.5	4.2	3.5	4.0	5.0	5.2	-41.4	2.9	3.3	3.4	3.1	3.9	5.2	4.3	2.3	1.8
Housing & Repairs		25.2	8.1	10.8	19.3	20.0	18.7	14.4	11.8	13.0	20.3	16.3	8.7	13.4	-139.8	12.4	9.4	14.8	15.8	14.4	26.2	22.1	19.4	17.6
Fuel, Light & Water		3.3	6.4	8.0	6.8	2.9	10.3	8.3	10.5	8.3	8.9	8.2	5.2	5.9	130.0	0.0	2.2	4.3	8.9	7.9	3.6	5.1	4.1	2.0
Services		11.2	9.3	19.7	9.1	12.4	12.4	12.2	14.8	9.7	17.3	17.1	9.3	8.8	-79.1	10.2	10.5	5.3	16.9	19.0	8.7	11.2	10.7	8.6
Miscellaneous		3.1	8.0	14.5	6.5	7.0	7.3	9.1	7.8	5.9	6.3	5.0	7.9	8.1	-60.7	2.3	8.0	4.9	6.3	6.6	11.2	8.4	9.3	0.8

^y Details may not add up due to rounding.

Source of Basic Data: Prices Section, NSO.

rowings from banks using CB holdings of government securities. To supplement RRP, short-term **CB bills** were issued. These RRP were undertaken to sterilize the liquidity effects of CB's purchases of banks' foreign exchange surpluses. After its restructuring in 1993, the BSP then stopped issuing CB bills and instead used its **holdings of Treasury bills** and RRP as major tools in neutralizing the expansionary impact of BSP dollar purchases to mitigate the peso appreciation. **Overnight RRP** were likewise used to smooth out large fluctuations in liquidity in the money market and to current speculative exchange rate fluctuations.

2.3.2 Higher Reserve Requirements

Throughout the years, the monetary authorities have used the **reserve requirements** as an effective tool in controlling liquidity to stabilize interest rates as well as inflation rates. Reserve requirements on demand deposits of commercial banks ranged from a low of 10 per cent in 1966 to a high of 25 per cent in 1990; while those for savings and time deposits ranged from 5 per cent in 1949 to 25 per cent in 1990. The structure of reserve requirements varied depending on the nature and maturity of deposits, as well as on the category of banks (i.e., commercial, thrift or rural). Reserve requirement levels were changed quite frequently (around 2-3 times a year) during the foreign exchange crisis in 1983 up to 1992, reaching a high of 25 per cent. The relatively high reserve requirements have encouraged banks to engage in off-balance sheet activities which were not subject to this imposition. These activities were lodged in "Trust Department Account (known as "common trust funds" (CTFs)), the proliferation of which created foreign exchange speculation against the peso in 1993 prompting the BSP to impose a 10-per cent reserve requirement on peso-denominated CTFs.

Following the financial restructuring of the BSP in 1993, reserve requirements against deposit and deposit substitute liabilities were lowered to reduce banks' intermediation costs and stabilize the cost of borrowed funds. From an average reserve requirement of 25.0 per cent in 1991, required reserves were reduced to an average of 22.7 per cent in 1993, to 18.9 per cent in 1994 and to 15 per cent in June 1995. The decline in the 91-day Treasury bill rate, a leading indicator of interest rates, is even more apparent with the fiscal surplus. From 21.4 per cent in 1991, the 91-day T-bill rate was down to 11.3 per cent in 1995 but rose to 12.8 per cent in February 1996.

2.3.3 Central Bank Windows Supportive of Production Ventures

The CB's **rediscounting window** provided funding requirements for exports and agricultural sectors as well as to small and medium-scale industries in order to promote production as well as stabilize food supply.

In line with the policy thrust to deregulate interest rates and to enhance the role of the **rediscount window** as an effective tool for liquidity control, the **rediscount rate** throughout the years has been rationalized to reflect market trends through the removal of fixed spreads and constant review of the base rate computation. Starting August 1995, the rediscount rate is one percentage point below the average 91-day Treasury bill rate on the last auction of the preceding month.

In the early 1980's, the CB engaged in **foreign exchange swap transactions** to support the dollar requirements of the oil, grains and steel industries.

2.3.4 Structural Reforms

- (i) **Financial Reforms.** Various reforms from the 1970's to the present have helped stabilize the banking system. In the 1980's, universal banking promoted greater efficiency in the financial system via increased competition and scale economies and to ensure industry access to long-term funds. The number of expanded commercial banks rose following several mergers and consolidation of financial institutions. In the 1990's, bank branching policy was liberalized and 10 foreign banks were allowed to operate in 1995. Aimed at stabilizing interest rates and greater access to credits, financial reforms indirectly helped to contain inflation.
- (ii) **Trade Liberalization.** When inflation soared in the 1970's following the depreciation of the peso and increased foreign demand, liberalization of export duties and import restrictions helped arrest the continued price upsurge.

In 1995, Congress has already passed a bill to lift restrictions and reduced tariffs for some agricultural imports which the President recently signed into law.

- (iii) **Resolution of the Power Crisis and Improving Investment Climate.** Starting 1992, particularly during the Ramos Administration, inflation was successfully held down to single-digit levels due largely to more stable political situation, and **improving investment climate** and economic performance. **The resolution of the power crisis** which improved the capacity of the economy to grow, and together with structural reforms, such as the foreign exchange liberalization, helped stabilize interest rates and exchange rates.
- (iv) **Other Policies.** The Government also pursues an integrated anti-inflationary stance that addresses the problems of production, excess demand, and rigidities in market structure or institutional arrangements. This continues to be achieved through sustainable agri-industrial development via rural industrialization, effective implementation of the comprehensive agrarian reform program, increased government investments in infrastructures, reduction in tariff rates on agricultural inputs and outputs, and strengthening of cooperatives in the areas of production inputs, marketing, credit and savings.

From 9.0 per cent in 1994, inflation rate in 1995 at 8.1 per cent was lower. The inflation rate could have been much lower were it not for the rice supply shortage in the second half of the year. Massive rice importation was implemented by the Government to augment the country's requirements. Likewise, the combined government efforts to closely monitor the prices of rice and other basic commodities via a *price watch campaign* in the markets and to curb the unscrupulous practices among retailers. The adoption of prudent fiscal and monetary policies such as — budgetary surplus generated by the national government, declining interest rates, stable exchange rates and monetary aggregates kept at below targets — helped diffuse inflationary pressures.

III. ANALYSIS OF THE DETERMINANTS OF INFLATION IN THE PHILIPPINES: A VECTOR AUTOREGRESSION (VAR) ANALYSIS

3.1 Methodological Framework

Conventional macroeconometric models are constructed by relying on economic theories which impose a priori restrictions. However,

there is often disagreement among economists about the direction of changes, the presence of feedback, or the length of the lag effect of a particular variable on another. For instance, a positive shock to money growth may either decrease interest rates through the liquidity effect or increase interest rates due to the anticipated inflation effect.

On the other hand, vector autoregression (VAR) models rely on economic theory only to the extent of choosing relevant variables to be included in the model. VAR models estimate future values of a set of variables from their own past or lagged values. More formally, a VAR model may be represented as follows:

$$Y_t = \sum_{j=1}^n \theta_j Y_{t-j} + \varepsilon_t \quad \dots\dots\dots (1)$$

where Y_t is an $r \times 1$ vector, θ is an $r \times r$ matrix of parameter estimates, ε is an $r \times 1$ vector of error terms with mean 0 and covariance matrix Ω , n represents the number of lagged values included, and r is the number of endogenous variables in the system. The coefficients of this system can be estimated using ordinary least squares (OLS) since the right-hand side of the system contains only pre-determined variables and the error terms are assumed to be serially uncorrelated with constant variance. Furthermore, OLS produces consistent and asymptotically efficient estimates.

Since the estimated coefficients of the system are difficult to interpret, it would be useful to consider both the impulse response functions and the variance decompositions of the system, together called innovation accounting. Both can be useful tools to determine the relationships among economic variables.

A VAR model can be written as a vector moving average (VMA) just as a scalar autoregression can be represented in moving average form. The VMA representation, which contains the same information as the VAR system, enables one to trace the time path of the various shocks on the endogenous variables. The following represents the VAR system in (1) as a VMA:

$$Y_t = \mu + \sum_{i=1}^{\infty} \phi_i \varepsilon_{t-i} \quad \dots\dots\dots (2)$$

where μ is an $r \times 1$ vector of constants and Φ_j is an $r \times r$ matrix of impact multipliers. The elements of Φ_j measure the instantaneous impact of the error terms on the endogenous variables of the system. The sets of coefficients in Φ_j are called the impulse response functions. By plotting the said functions against the number of lags, one can visually represent the behavior of the endogenous variables in response to the various shocks.

On the other hand, the forecast error variance decomposition reflects the proportion of movements of the endogenous variables due to their own shocks as against the shocks to the other variables in the system.

The estimation of VAR systems gives rise to the issue of identification. A system is identified if it is possible to obtain values of the structural parameters of the model from the reduced-form equation system. Comparing the number of parameters in a structural VAR with its reduced-form reveals that the former is underidentified. Hence, it is usual practice to restrict the structural VAR to make the system exactly identified. One common way of doing this is through the Choleski decomposition method. In effect, this asymmetrically decomposes the residuals of the system by arbitrarily assigning common components to error terms of particular variables. The resulting residuals from this process are called orthogonalized residuals. It should be noted that the order of decomposition will greatly affect the results of innovation accounting, depending on the extent to which the error terms across equations are correlated.

Another issue arising from VAR models is whether the variables need to be stationary. This is a relatively gray area. Some recommend against differencing to make non-stationary variables stationary since this process throws away information concerning the co-movements in the data. On the other hand, the majority believe that the form of the variables in a VAR model should closely follow the true data-generating process. Hence, stationarity is required. A relatively recent development in the literature on multi-equation time-series models states that even though the variables in a system are nonstationary, it is possible for there to be a linear combination of integrated variables that is stationary; such variables are said to be cointegrated.

Finally, in estimating VAR models, one has to determine the appropriate number of lags to include. There are many different methods

used in the literature. One commonly used method is the minimization of the Akaike information criterion (AIC), which was originally designed to select the order of a univariate autoregression. The formula for the AIC is as follows:

$$AIC(m_1, ..., m_k) = (N-p)\log\sigma^2 + 2p..... (3)$$

where k is the number of variables in the VAR model, m_i is the lag length for the i^{th} variable in the equation, p is the number of estimated coefficients, N is the number of observations, and σ^2 is the maximum likelihood estimate of the residual variance. Equation (3) reflects the trade-off that exists in adding coefficients to a model. The first term will decline if the additional coefficient improves the fit of the model. The second term increases with each additional coefficient, reflecting the reduction in precision of all the coefficient estimates each time a coefficient is added with a fixed number of observations.

VAR models are increasingly being adopted as an alternative to conventional macroeconometric models, particularly in the area of forecasting. This is because empirical studies have shown that VAR models yield equally, if not more accurate, forecasts than large, macroeconometric models which require more sophisticated statistical techniques and are more cumbersome to maintain.

3.2 Data

The study used monthly data for the period 1987 to 1995. The price variable used was the Consumer Price Index of the Philippines with 1988 as the base year, which is the official price indicator of the country. The money variable used was M3 or domestic liquidity which is composed of currency in circulation, peso deposits-demand, time and savings-plus deposit substitutes.

This is the broadest measure of liquidity and is in nominal terms. For the foreign exchange variable, the average peso-dollar rate was used.

These data were converted to logarithm form since it is assumed that they have a logarithmic relationship.

3.3 Empirical Results

3.3.1 Tests of Data for Unit Roots and Cointegration

Prior to the use of the vector autoregression analysis (VAR) to explain inflation in the Philippines, the time series variables M3, CPI, and the peso-dollar rate (in logarithm) were subjected to the Unit Root Test to find out if the variables are stationary over time.

In Table 3, the results of the augmented Dickey-Fuller (ADF) tests for units roots are shown. Most of the variables M3, CPI, peso-dollar rate are integrated of order one. They had to be differenced once to achieve stationarity.

Despite the different levels of integration, there may be a linear combination of variables which tend to drift together over time. Table 4 shows that CPI, M3 and the peso-dollar rate are cointegrated. The ADF t-statistics are significant at the 10 per cent level.

3.3.2 Test for Lag Lengths

The optimal lag lengths also had to be identified to incorporate the dynamics of the inflation model. Adding several lagged values to the model would result to over-parametrization. The model would lose a lot of information if the degrees of freedom were reduced. On the basis of the Akaike and Schwarz Bayes information criteria, the optimal lag length for the logarithmic values of CPI, M3 and the peso-dollar rate is from 11 to 12 months (Table 5).

3.3.3 Block Exogeneity (Specification) or Causality Tests

To establish causal linkages, three block exogeneity tests were conducted using two VAR systems. The tests would indicate whether lagged values of the explanatory variables do not significantly explain the dependent variable. The null hypothesis of this test is that the coefficient of the lagged values are not significantly different from zero.

Test 1 of Table 6 shows that lagged values of M3 and the peso-dollar rate significantly explain the prices.

Table 3

UNIT ROOT TEST

PERIOD: JANUARY 1987 - DECEMBER 1995

VARIABLE	TRANSFORMATION	ADF T-STATISTIC
M3	LOGARITHM	1.5762
M3	FIRST DIFFERENCE OF LOGARITHM	-6.3817 ***
CPI	LOGARITHM	0.5166
CPI	FIRST DIFFERENCE OF LOGARITHM	-4.8901 ***
PESO-DOLLAR RATE	LOGARITHM	-1.7239
PESO-DOLLAR RATE	FIRST DIFFERENCE OF LOGARITHM	-4.0389 ***

*** Significant at the 1-percent level

Table 4

COINTEGRATION TEST

PERIOD: JANUARY 1987 - DECEMBER 1995

VARIABLE LIST	TRANSFORMATION	ADF T-STATISTIC
CPI, M3, PESO-DOLLAR RATE	LOGARITHM	-2.6408 *

* Significant at the 10-percent level

Tests 2 and 3 show, however, that M3 is not influenced by prices and the peso-dollar rate; and neither is the peso-dollar rate by prices and M3.

On the whole, the implied linkages among the 3 variables is as follows: M3 causes inflation but not vice versa; and, there is a two-way causation between prices and the peso-dollar rate.

3.3.4 Decomposition of Variance of Forecast Error

The relationship among the 3 variables is also analyzed through a procedure called variance decomposition. Such decompositions were computed 10 periods ahead and the results are shown in Tables 7.

In Table 7, line 2 shows that 30.9 per cent of the variation in prices is from its own innovations, while a share of 59.9 per cent is from the average peso-dollar rate. A small share of 9.3 per cent is accounted for by M3. Although the block exogeneity test showed that M3 is not significantly influenced by prices and the peso-dollar rate, and the peso dollar rate by prices and M3, line 2 shows that 87.9 per cent comes from M3's own innovations and 10.7 per cent from the peso-dollar rate. Meanwhile, line 3 indicates that 98.9 per cent comes from foreign exchange own innovations, 0.7 per cent from M3 and 0.4 per cent from prices.

On the whole, the decomposition of variance shows that the peso-dollar rate accounts more significantly than M3 in explaining inflation. Movements in the peso-dollar rate meanwhile would be accounted more by M3 than inflation.

3.3.5 Impulse Response Functions

An impulse response function is useful in tracing the response on current and future values of endogenous variables to one standard deviation shock of one variable. The Choleski decomposition was used. Charts 4 and 5 would indicate the effect of one-standard deviation shock of M3 changes, exchange rate changes and inflation, respectively on the three variables.

Table 5

TEST FOR LAG LENGTH

3-VARIABLE CASE : CPI, M3, PESO-DOLLAR RATE
(IN LOGARITHM)

PERIOD : JANUARY 1987 - DECEMBER 1995

LAGS	AKAIKE INFORMATION CRITERION	SCHWARZ BAYES. INFORMATION CRITERION
1	-15.8734	-24.089
2	-15.917	-23.9091
3	-15.9949	-23.7635
4	-15.8986	-23.4437
5	-15.8545	-23.1761
6	-15.7783	-22.8764
7	-15.8089	-22.6835
8	-15.7765	-22.4275
9	-15.6966	-22.1241
10	-15.5952	-21.7992
11	-15.5831 *	-21.5636 *
12	-15.6622	-21.4192

* LOWEST VALUE, IMPLYING THAT 11 TO 12 MONTHS IS
THE OPTIMAL LAG LENGTH

Table 6

BLOCK EXOGENEITY TEST

3-VARIABLE CASE : LCPI, LM3, LFOREX

PERIOD : JANUARY 1987 - DECEMBER 1995

DEPENDENT VARIABLE : LCPI

LAGS	F-STATISTIC	PROBABILITY
11	2.1603	0.007 ***
12	2.00074	0.013 ***

DEPENDENT VARIABLE : LM3

LAGS	F-STATISTIC	PROBABILITY
11	0.933441	0.554
12	1.45793	0.113

DEPENDENT VARIABLE : LFOREX

LAGS	F-STATISTIC	PROBABILITY
11	0.846997	0.659
12	0.925216	0.569

*** Significant at the 1 to 5 % level therefore M3 and FOREX are block exogenous with respect to prices.

This implies that lag values of M3 and FOREX explain the variation in PRICES.

Table 7

**PERCENTAGE OF VARIANCE EXPLAINED BY
INNOVATIONS OF PRICES, MONEY AND FOREX RATE**

(10 PERIODS AHEAD)

DEPENDENT VARIABLE		LCPI	LM3	LFOREX
1	LCPI	38.1	4.2	57.7
2	LM3	2.5	83.7	13.8
3	LFOREX	0.4	3.8	95.8

- 1 Implies that 38.1 percent of the variation in prices is from its own innovations while 57.7 percent is from the forex rate.
- 2 Implies that only 2.5 percent of the variation in money is caused by prices while a big portion of 83.7 percent comes from money's own innovations.
- 3 Implies that only 0.4 percent of the variation in the forex rate is caused by prices while a large portion of 95.8 percent is caused by its own innovations.

(i) *Response to 1 Std. Dev. Shock in LM3 (Chart 4A)*

A one standard deviation shock in the first period results in a significant increase in itself and dies gradually onwards. There is no significant impact on prices while the forex slightly depreciates in the second period onwards.

(ii) *Response to 1 Std. Dev. Shock in LForex (Chart 4B)*

A one standard deviation shock in forex would result to a significant increase in itself in the first period, then gradually increases from the first to the fourth period. The increase is maintained up to the ninth period. There is significant change in prices but for money there is a slight decrease during the fourth period and onwards.

(iii) *Response to 1 Std. Dev. Shock in LCPI (Chart 4C)*

A one standard deviation shock in LCPI in the current period results to increase in itself in the current period and dies in the third period and onwards. For M3, no significant change in the first period was noted but slight increases were observed in the sixth and ninth periods. There was no change in forex in the first period but it gradually rose from the second to the eighth periods.

The ordering of the variables was next changed, such that money came before prices and the exchange rate. The impulse response function yielded similar results.

IV. Conclusion and Policy Implication

Causality tests show strong causation from M3 to inflation and from peso-dollar rate changes to inflation. However, changes in peso-dollar rate rather than M3 changes contribute more to inflation as indicated in the variance decomposition results.

Although the exogeneity test showed that M3 does not affect the exchange rate, variations in M3 and in prices also explain variation in the peso-dollar rate to a smaller extent. M3 growth shows a higher impact, however, than inflation on the peso-dollar rate as shown in the variance decomposition results.

CHART 4A
RESPONSE TO 1 STD. DEV. SHOCK OF M3

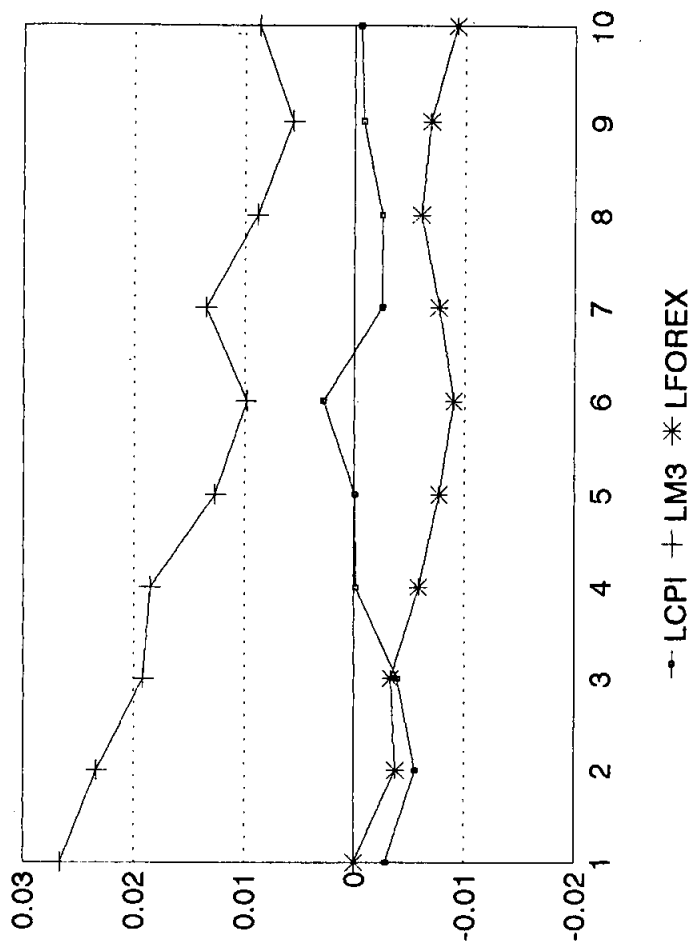


CHART 4B
RESPONSE TO 1 STD. DEV. SHOCK OF FOREX

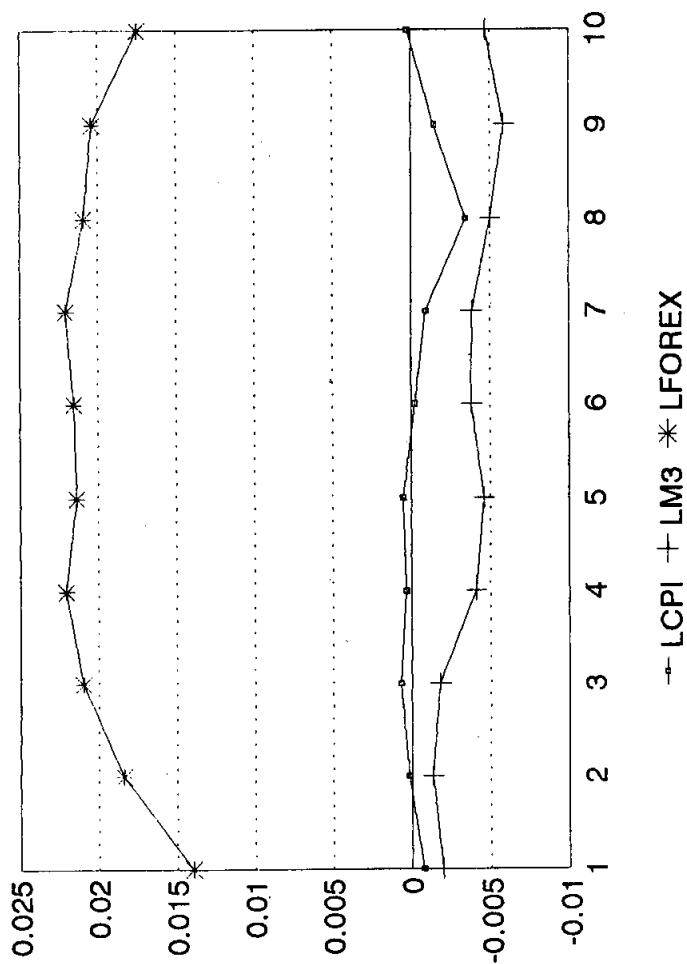
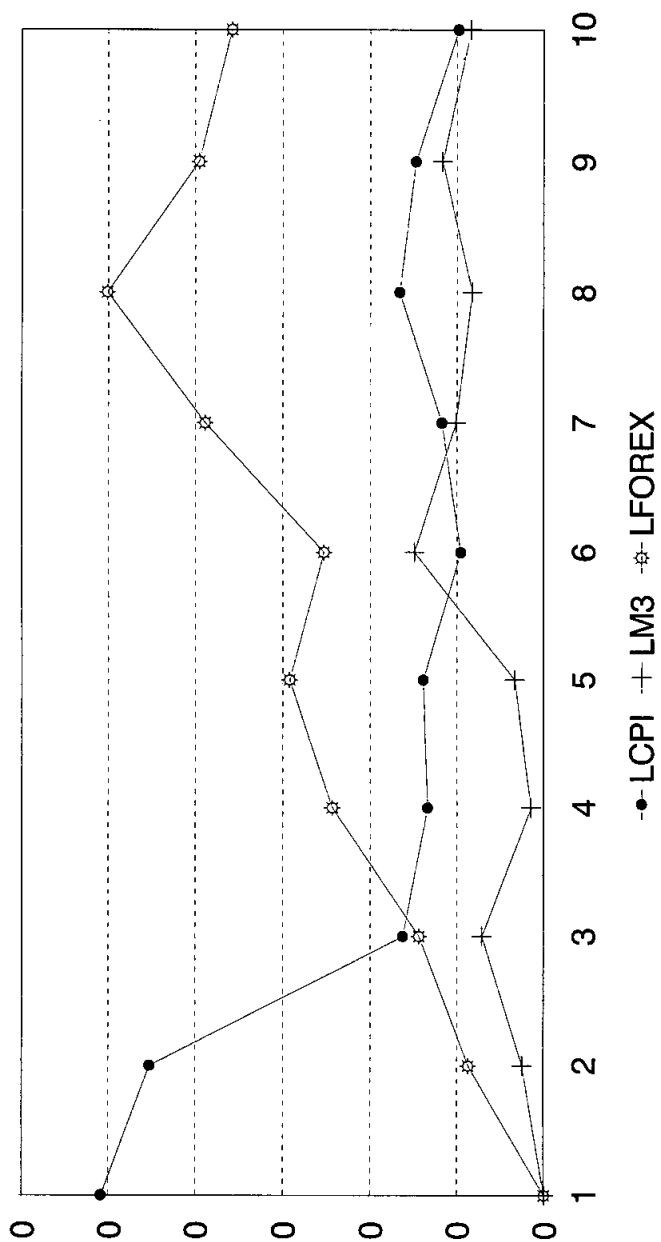


CHART 4C
RESPONSE TO 1 STD. DEV. SHOCK OF LCPI



The causality tests indicate that M3 growth must be more carefully determined considering that M3 affects the inflation rate. The results also imply that a stable exchange rate contribute largely to a stable inflation rate. Thus a declining current account deficit ratio to GNP and sustained capital inflow would be positive developments in the country's rein on inflation. In the longer term, however, M3 could be a more significant factor in affecting inflation as shown in the results of the variance decomposition.

It may be emphasized too that the results are very preliminary. First, the number of observations did not include the 70's and early 80's, and the explanatory variables on output were not included. Likewise, there is a need to refine the results of the variance decomposition and impulse response functions which did not reinforce each other.

Chapter 12

INFLATION IN SINGAPORE: ITS CAUSES AND MANAGEMENT

by

Lian Chia Liang

I. General Macroeconomic Setting, 1960-95

In the three decades following the attainment of self-government from British rule in 1959, Singapore has transformed itself from an entrepot-based country to a newly-industrialised economy (NIE). The key elements in Singapore's economic development have been a competitive environment, openness to capital and technological know-how from abroad as well as an honest and efficient government. Equally important has been a set of sound macroeconomic policies directed at achieving non-inflationary economic growth. Over the period from the early 1960s to 1995, annual growth was 8.6 per cent p.a. on average. (See Chart 1) On the other hand, consumer price inflation averaged a low 3.3 per cent.

The structural transition of the Singapore economy can be broadly classified into four industrialisation phases which reflected underlying changes of its policy direction and emphasis. A policy of import-substitution, designed to promote industrialisation through the protection of a common market established within Malaya, was briefly pursued over a brief period (1960-65). Following Singapore's departure from the Malaysian Federation, export-promoting measures to attract labour-intensive industries were undertaken between 1966 and the early 1970s to counter the unemployment problem, which then plagued the economy. Given the initially weak entrepreneurial base, Singapore had to depend heavily on foreign direct investments (FDI). The export-promoting strategy proved successful in eradicating the unemployment problem. The jobless rate fell markedly from 14 per cent in the early 1960s and 8 per cent in 1965-69 to 4.8 per cent in the early 1970s. The unemployment rate in Singapore has remained relatively low since then. Indeed, wage pressures have begun to surface by the mid-1970s. (See Chart 2)

As a result, Singapore embarked on a new phase in its development strategy toward attracting high technology-based industries. Policies were tailored to encourage FDI in capital-intensive manufacturing, in order to generate higher value-added from the same amount of labour. These sectors included electronics, industrial chemicals and pharmaceuticals.

The continued dependence on foreign multinational corporations in Singapore's industrialisation programme necessitated an open trading and financial regime. Import quotas were eliminated and tariffs reduced¹. All capital controls were abolished by 1978, allowing for free repatriation of profits. In addition, the government offered generous fiscal incentives², and undertook large investments to develop physical infrastructure, such as the construction of industrial estates and the upgrading of air and sea port facilities. The education system was reoriented toward the provision of skilled, technical and professional labour.

The results were manifestly positive: net investment commitments in Singapore surged from the late 1970s onwards. The share of foreign investment commitments continues to remain significant. Even in the 1990s, foreign investment commitments constitute over 70 per cent of total investment commitments. (See Chart 3)

Today, Singapore's competitive edge, particularly in standardised manufacturing, is being eroded by increased competition from countries in the region. Nevertheless, the regional economies also complemented one another through an integrated production network that allowed each country to capitalise on its comparative advantage. Indeed, a growth triangle, comprising Singapore, Johore and Batam, was established in 1989. This arrangement would facilitate foreign MNCs in Singapore to maintain their skill-intensive and headquarter operations here, while shifting their labour-intensive manufacturing to areas with relatively lower wages. Unlike Hong Kong which has the advantage of China as its hinterland, Singapore can scarcely afford to rely on an exclusively service-oriented strategy. As a result, while efforts have been directed at diversifying the production base into the financial and

1. The number of goods subject to tariffs was reduced from 398 in 1967 to 197 in 1973, while the number of import quotas was slashed from 230 to just 3.

2. These include the Pioneer Status, Expansion Incentive Scheme and Export Incentive Scheme.

Chart 1
Real GDP Growth in Singapore

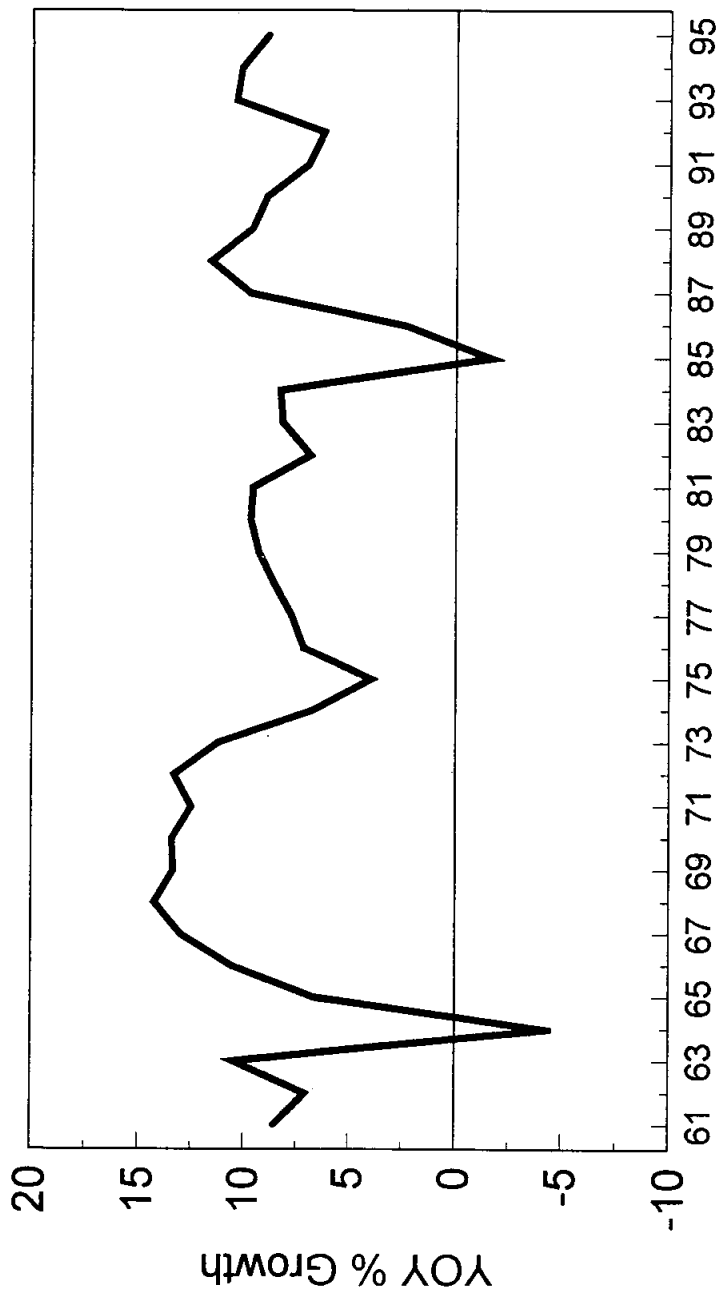
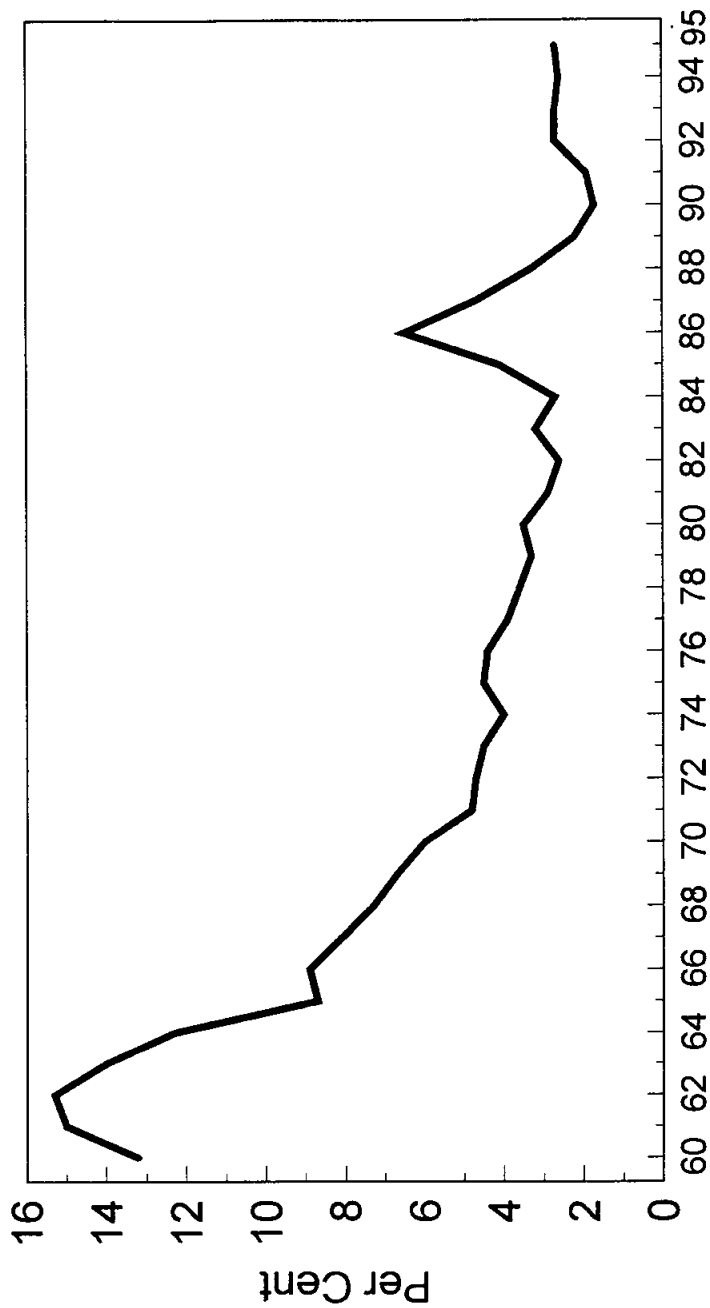


Chart 2
Unemployment Rate in Singapore



business services sector, Singapore continues to take steps to attract MNCs to locate their high-technology manufacturing operations here.

Singapore is a small country. Its future source of growth will necessarily stem from further improvements in the education and skill levels of the workforce. Extensive worker-retraining programmes would have to be implemented, if structural unemployment is to be avoided as less educated workers are displaced by rapidly changing technology. Given our domestic resource constraints, attention will also need to shift toward encouraging outward investments and exploring the growing opportunities in the region in particular. The main locomotive of growth of Singapore's external economy would have to be the private sector. The role of government would be catalytic, such as spearheading major overseas investments through government-linked companies - for example, the Suzhou industrial township project - and facilitating outward investments by organising trade missions for businessmen. In addition, fiscal incentives would be offered to promote outward investments abroad³.

II. Review of Singapore's Inflation Experience

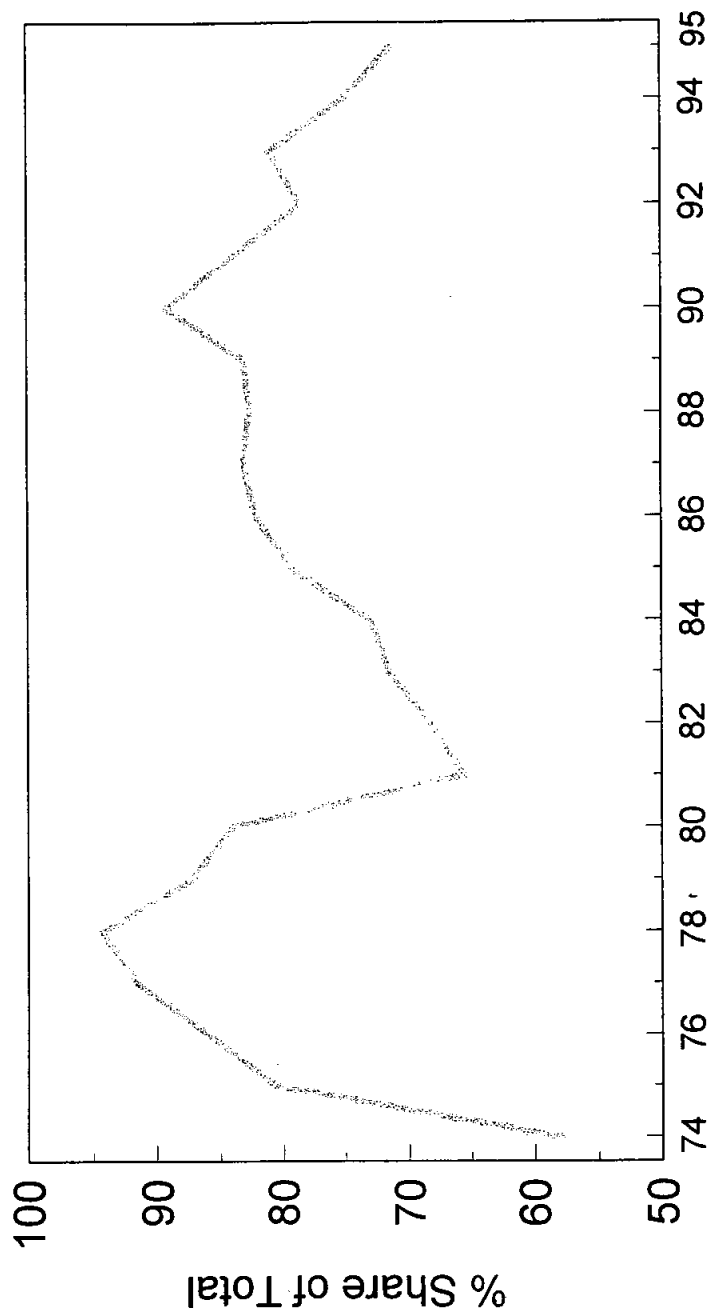
Consumer price inflation in Singapore averaged 3.3 per cent p.a. in 1961-95. (See Chart 4) Over this period, four broad phases can be identified:

2.1 1961-70: From Import-Substitution Strategy to Export-Promoting Industrialisation

Inflation in Singapore was generally under control through the 1960s, averaging 1.3 per cent. Domestic labour cost pressures were virtually non-existent during this decade. This largely reflected the huge pool of unemployed workers who were not absorbed into the labour force until the early 1970s. It is also noteworthy that Singapore underwent a brief period of economic recession in 1964, reflecting the adverse effects of the Confrontation.

3. These include the Overseas Enterprise Incentive and Overseas Investment Tax Incentive.

Chart 3
Foreign Investment Commitment



2.2 1971-80: A Decade of Strong Foreign Inflationary Pressures

Inflationary pressures resulting from a surge in oil prices plagued the global economy in the mid-1970s. The impact of higher oil prices on Singapore's inflation was evident, given our heavy dependence on imports, both for intermediate inputs and consumer items. Annual inflation rate reached an all-time high of 22 per cent in 1974, considerably higher than the average 13 per cent recorded in industrial countries in that year. In the wake of the first oil crisis, GDP growth slowed to under 4 per cent in 1976, before recovering towards the end of the decade. By then, external inflationary pressures surfaced once again, reflecting the effects of the second oil crisis. Nevertheless, the impact of the second oil crisis on inflation was less substantial than the first: prices grew by 8.4 per cent in 1980-81.

2.3 1981-89: Exchange Rate-Centred Monetary Policy

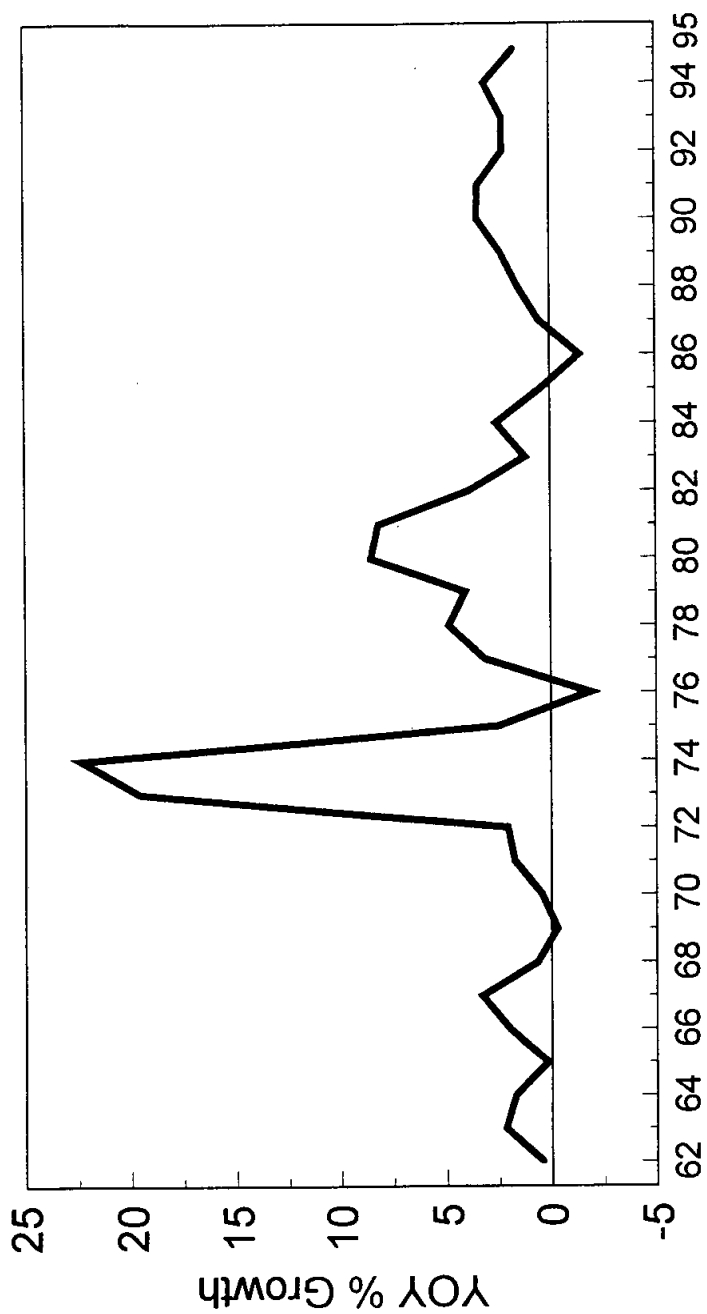
The shift in the conduct of monetary policy in Singapore toward exchange rate targeting in 1981 took place in an inflationary global environment. The rationale for the new policy regime was clearly outlined in ***MAS Annual Report 1981-82***:

*Monetary policy... differed somewhat in 1981 in that the policy direction was aimed largely at maintaining a strong exchange rate for the Singapore dollar, while ensuring sufficient liquidity to accommodate real economic growth. **Underlying this shift in emphasis away from targets for interest rates and money supply growth in the conduct of monetary policy is the view that the exchange rate is a relatively more important anti-inflation instrument in the context of the small and open Singapore economy.** Price stability, then, continues to be the prime objective. The emphasis given to a strong exchange rate policy also facilitates the policy of upgrading and restructuring the domestic economy.*

The policy move could be viewed as an attempt to prevent the same degree of import price pass-through as was experienced during the two oil crises. In this regard, Singapore was successful. Annual inflation rates moderated noticeably to under 3 per cent in 1982-83. By then, world inflation had largely receded. Inflation in Singapore stemmed chiefly from domestic unit labour cost increases⁴.

4. Wage costs continued to escalate after 1981, due to increased rates of Central Provident Fund (CPF) contributions as well as a tight labour market caused in part by the construction sector.

Chart 4
CPI Inflation in Singapore



The effects of the Singapore's economic recession in the mid-1980s, together with the series of cost and tax-cutting measures introduced by the government, effectively eliminated domestic inflationary pressures from 1985 onwards. At the same time, the worldwide decline in oil and commodity prices also reduced global inflation. In 1986, Singapore recorded its third negative annual inflation rate since the 1960s, at -1.4 per cent. Inflation remained subdued at 0.5 per cent in 1987. Even with stronger external and domestic demand towards the end of the 1980s, inflation averaged below 2 per cent p.a. in 1988-89.

2.4 1990-95: The Emergence of an Overheated Economy

Renewed inflationary pressures, both on the domestic and external front, surfaced again in the early 1990s. The 8 per cent p.a. growth in unit labour cost growth over 1989-91 imparted significant upward pressures on inflation. Foreign inflationary pressures also increased, particularly in 1994⁵. However, the appreciation of the Singapore dollar served to offset these pressures. The stronger exchange rate also had an indirect effect of cooling the labour market and the economy, without which domestic inflationary pressures would have been even higher. The introduction of the Certificate-of-Entitlement (COE) for car purchases⁶ since the middle of 1990 also led to further upward pressure on prices. Average inflation was higher at 3.4 per cent in 1990-91, before moderating to 2.3 per cent in the next two years.

Inflation rebounded to 3.1 per cent in 1994, reflecting the effects of the implementation of the 3 per cent Goods and Services Tax (GST) in April 1994 on the one hand, and higher imported inflation on the other. Nevertheless, the inflation rate in 1994 was lower than widely anticipated. Among other reasons, intense competition among retailers and wholesalers has led to the partial absorption of the GST and foreign price increases. In addition, pressures in the labour market

5. Prices of food commodities like coffee, rice, sugar and palm oil saw significant increases during the year, as a result of a combination of factors such as poor harvests and unusually strong demand.

6. A car buyer must first obtain a COE, through competitive bidding, before he purchases the car.

were partly relieved by an increased intake of foreign workers. Inflation moderated further to 1.7 per cent in 1995, reflecting in large part declining COE premiums for car purchases during the year.

2.5 The Structure of the Consumer Price Index

Before we move to the empirical exercise, we examine briefly the available indicators of price movements in Singapore. As in most countries, the inflation rate in Singapore is measured primarily by the consumer price index (CPI)⁷.

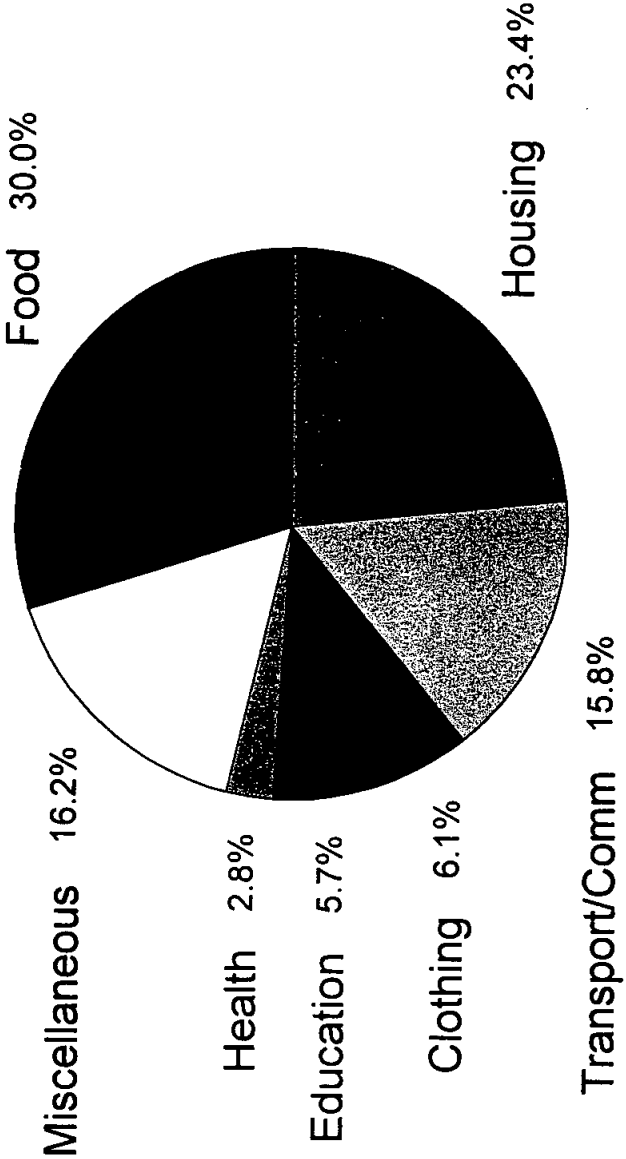
The CPI basket is divided into seven main categories: Food, Housing, Clothing, Transport & Communications, Education, Health and Miscellaneous. The weights assigned to these categories, based on the expenditure pattern⁸ of households with monthly spending between \$820 and \$8,300⁹ during the base period from October 1992 to September 1993, are given in Chart 5.

The CPI tracks prices of 3,296 items, including government fees, rates and charges for specific goods, properties and services. For example, COE premiums for car purchases, which have risen significantly in recent years, are included. Over the years, new items have been added to the list of goods and services, as their consumption had become significant. Some of the new items recently added to the CPI basket include laser discs, laser disc players, mobile phones, pagers and nursing care services.

Data are collected personally by field staff from the Department of Statistics at the Ministry of Trade and Industry, who visit the places where households purchase the goods and services. Postal surveys are also carried out to gather information for some items such as rental rates for housing and cars.

-
7. Other price indicators compiled by the Department of Statistics include the manufactured products, domestic supply, export and import price indices.
 8. The household expenditure pattern is obtained from the household expenditure survey conducted by the Department of Statistics once every five years.
 9. These households constituted 90 per cent of all households surveyed.

Chart 5
Structure of the CPI Basket



The frequency of price collection depends on the type of goods and services. Generally speaking, prices of perishable items such as raw food items tend to fluctuate more widely, and are therefore obtained more frequently (thrice weekly) from market stalls. Prices of most sundry goods and services are collected twice a month. For items with standard rates, price changes are incorporated into the CPI as and when rates are revised. These items include bus and MRT fares, postal costs, telecommunication charges, hospital charges, foreign maid levy and utilities charges.

The prices used in calculating the CPI are the actual amount borne by the consumer for the purchase of goods and services. As such, any sales or excise taxes attached to these items are included. Short-term discount or special promotional prices are not taken into consideration, however.

Like in most other countries, the computation of the CPI is based on the Laspeyres formula, i.e. the CPI weights the prices by quantities in the base period. It is therefore a measure of the changes in the prices of a fixed basket of goods and services. The index calculations use the general formula:

$$\begin{aligned} \text{CPI}_i &= \frac{\sum P_i Q_0}{\sum P_0 Q_0} \times 100 \text{ per cent} \\ &= \frac{\sum \left(P_0 Q_0 \times \frac{P_i}{P_0} \right)}{\sum P_0 Q_0} \times 100 \text{ per cent} \end{aligned}$$

where CPI_i represents index numbers for period i

P_i represents prices in period i

P_0 represents base period prices

Q_0 represents base period quantities

$P_0 Q_0$ represents base period expenditure weights

2.6 Other Indicators of Inflation

The Department of Statistics also releases twice a year, data on CPI for three separate income groups. These three income groups are as follows:

- (1) **Top 20 per cent income earners** - average monthly household income of about \$9,200.
- (2) **Middle 60 per cent income earners** - average monthly household income of just under \$3,000.
- (3) **Lowest 20 per cent income earners** - average monthly household income of under \$1,100.

The latest figures suggest that Singapore's high-income households enjoyed the lowest increase in consumer prices in 1995. The sharp moderation was due in large part to lower COE premiums¹⁰. Inflation for the top 20 per cent income group was a mere 1 per cent last year, markedly lower than the 6.4 per cent rate in 1994. Inflation for the middle 60 per cent and the lowest 20 per cent income also moderated to just under 2 per cent, from 2.5 per cent and 2.4 per cent respectively in 1994. (See Chart 6)

Changes in the CPI have been frequently cited by MNCs as a gauge for business cost increases. Indeed, in recognition of the different expenditure pattern and tastes of a typical expatriate household, the Singapore International Chamber of Commerce (SICC) began to compile independently the *Expatriate Consumer Price Index (ECPI)* in 1975. Chart 7 shows the rate of change in the ECPI over the last two decades. Given that the ECPI basket has larger weights for transport and housing, and less for food, inflation as measured by the ECPI averaged a higher 5.0 per cent in 1975-95, compared with 2.7 per cent as measured by the CPI.

10. Average COE premiums fell by 17 per cent in 1995, compared with a 113 per cent surge in 1994.

III. Methodology, Analytical Framework and Empirical Results

3.1 Conceptual Issues

CPI inflation can be analyzed in basically two ways: by **sectors** (as described in Section 2.6.2) or by **sources**. This section focuses on the latter. The sources of inflation are broadly classified into external and domestic sources. Given that the bulk of consumption goods in Singapore are imported, external inflationary pressures are likely to be significant. Domestic sources comprise mainly unit labour cost increases and changes in fiscal charges.

For our empirical study, the following published data are used as independent variables:

1. Import Price Index (IMP)
2. Wages (WAGES)¹¹
3. Productivity (PRODUCT)
4. Prime Lending Rate (PLR)

3.2 Test for Unit Roots

Since the paper by Granger and Newbold (1974) cautioning against the danger of spurious regressions, there has been quite a lot of work ascertaining the non-stationarity, or more specifically, unit root processes, of most time-series data. Wrong inferences may be made between unrelated, non-stationary variables. This points to the need to check for the presence of unit roots before any specification and estimation.

A widely-used method of testing for unit roots is the Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) tests. The ADF test differs from the DF test in that extra terms of lagged values of ∂Y are introduced to "mop-up" autocorrelation. Like in most applications, the ADF is used in this study. In addition, the lag length specified for the ADF test is chosen based on the Schwartz Information Criterion (SIC). The SIC is computed as:

11. Derived from annual data.

Chart 6
CPI Inflation Across Different Income Groups

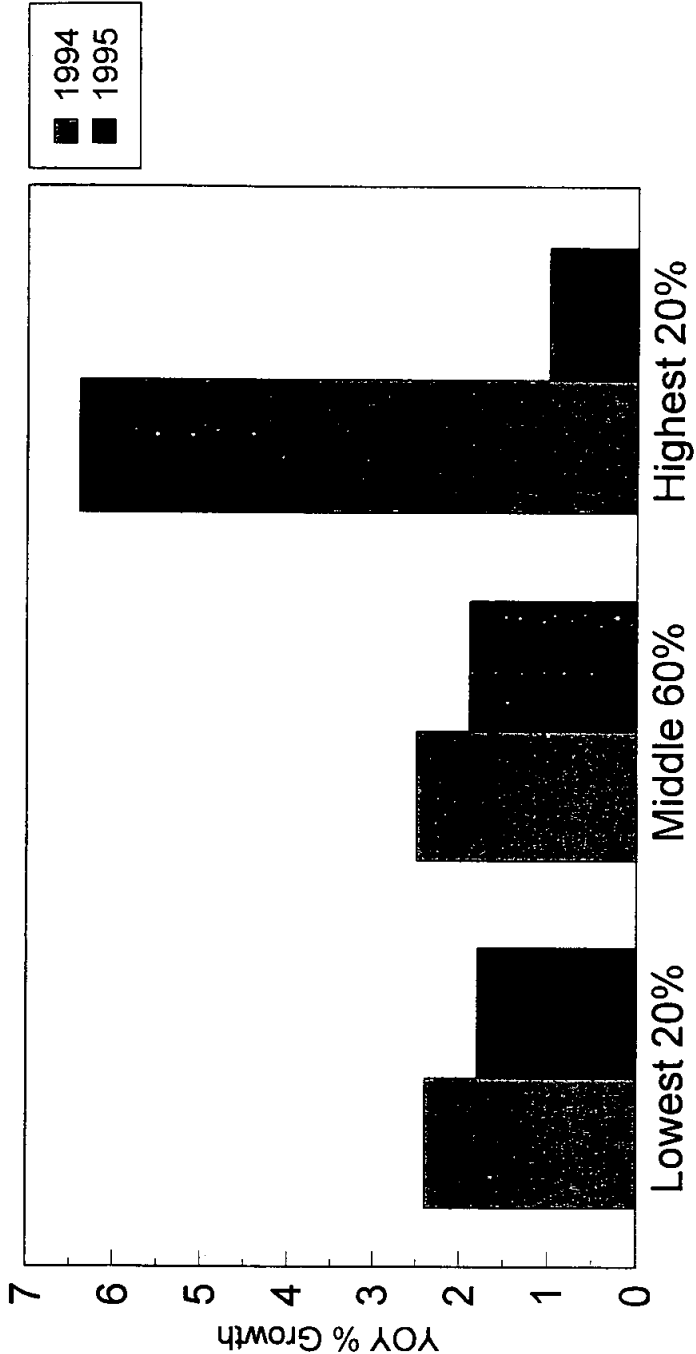
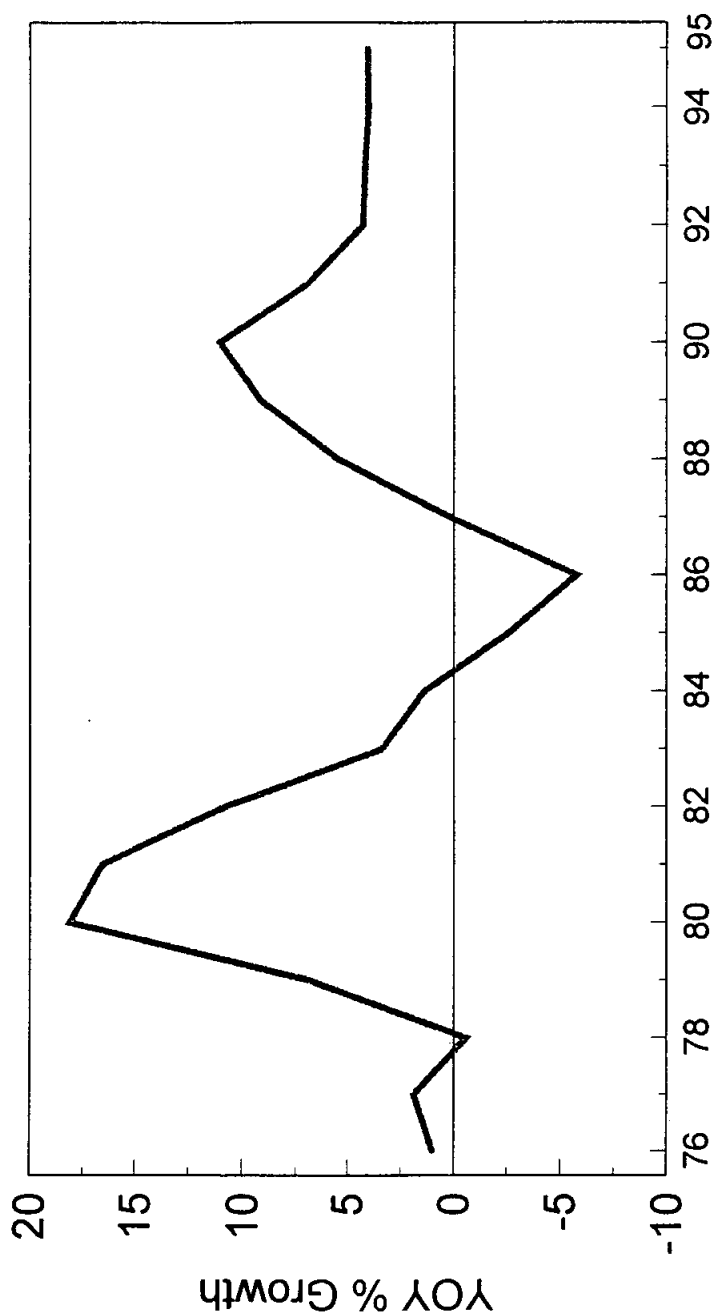


Chart 7
Expatriate Consumer Price Index



$$\text{SIC} = \text{LLF} - k \cdot \ln(T)/2$$

where LLF = model likelihood function

k = number of estimated parameters

T = number of observations

The model is chosen at the lag length that minimises the SIC. Table 1 gives the "optimal" lag length for each series¹².

The results of the ADF test are tabulated in Table 2. The test statistics are given for all three models (with constant and trend term, with constant only and without constant and trend).

Table 1

LAG LENGTH CHOSEN BASED ON SIC

Notation	Lag length (no. of quarters)
CPI	6
IMP	2
WAGES	2
PRODUCT	5
PLR	4

12. It is clear that from the formula, the SIC penalises the model as the lag length k increases. It thus leads to a more parsimonious model than the AIC which is computed as $\text{AIC} = \text{LLF} - k$.

Table 2

ADF TEST RESULTS

Series	Constant & Trend	Constant	No Constant & No Trend	H ₀ : Series has unit roots (5% significance level)
CPI	-2.0717	-0.1327	1.3899	Do not reject
IMP	-2.7394	-1.8546	-1.7039	Do not reject
WAGES	-1.0812	1.5425	2.5517	Do not reject
PRODUCT	-0.6770	1.4194	2.9234	Do not reject
PLR	-1.7945	-1.8099	-1.1561	Do not reject

For all the series, the null hypothesis of the existence of unit roots is accepted¹³. This means that the series are all found to be non-stationary.

3.3 Analytical Framework

The analytical framework follows a linear structural equation, based on an error-correction model:

13. There are inherent weakness in the ADF test. Specifically, this test has been found to be biased toward the non-rejection of the null hypothesis. It may well be enough just to know that the series that we are dealing with are non-stationary and have high persistence. In any case, a visual inspection of the correlogram would serve a roughly similar purpose. Indeed, the correlograms for all six series show a great deal of persistence.

$$dCPI = C_0 \cdot dCPI_{-1} + C_1 \cdot dIMP + C_2 \cdot dPRODUCT + C_3 \cdot dWAGES + C_4 \cdot dPLR - C_5 (CPI_{-2} + C_6 \cdot IMP_{-1} + C_7 \cdot PRODUCT_{-1} + C_8 \cdot WAGES_{-1} + C_9 \cdot PLR_{-1}) + C_{10} \cdot DUMMY + \text{Constant}$$

The variables used in the above equation are those listed in Table

1. We used quarterly observations for the period Q1 81 to Q4 95.

The results of the analytical finding, together with the diagnostics of the regression, are as follows:

Table 3

ESTIMATION RESULTS

Parameter	Estimates	Standard Error	Significance Level
C0	-0.3065	0.1515	0.0488
C1	0.0601	0.0205	0.0053
C2	-0.0003	0.0002	0.1486
C3	0.0116	0.0057	0.0474
C4	0.0345	0.1355	0.8004
C5	0.4621	0.1181	0.0003
C6	-0.1074	0.0187	0.0107
C7	0.0011	0.0002	0.0127
C8	-0.0238	0.0027	0.0001
C9	-0.4248	0.0757	0.0128
C10	0.6034	0.1585	0.0004

Regression Diagnostics

Adj R2 = 0.550 S.E. of Regression = 0.388 D.W. = 2.10

	<i>Significance</i>
LM (1) = 2.104	0.154
LM (4) = 1.888	0.130
ARCH (1) = 0.093	0.761
ARCH (4) = 0.345	0.846
Jarque-Bera = 4.95	0.084

The results of the regression appear encouraging. The fit of the equation is reasonably good, with satisfactory diagnostic test results. The exception is the estimated parameter for PLR, which has the wrong sign. All other key parameters are significantly different from zero at the 5 per cent level of significance or less. The plot of the actual and fitted values as well as residuals, is shown in Chart 8.

IV. Analysis of the Causes of Inflation

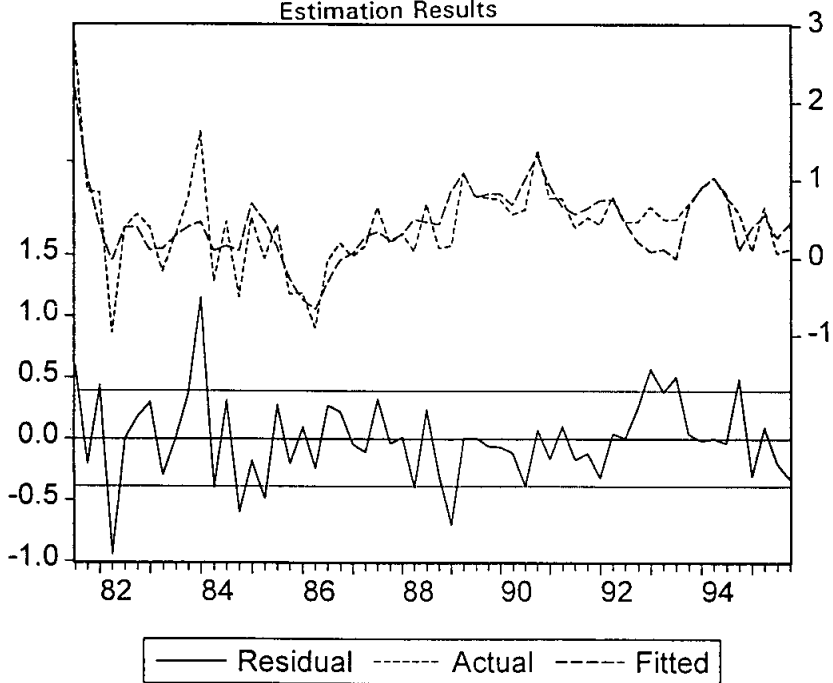
Both the external and domestic influences of CPI inflation in Singapore are fairly captured by the regression. The external influence, as represented by IMP, is relatively large. Specifically, a one-unit increase in IMP would induce a 0.11 unit rise in CPI. In terms of domestic labour market pressures, the impact of WAGES on CPI dominates, although its impact is substantially lower than that of IMP. A one-unit increase in WAGES causes an estimated 0.02 rise in the CPI. Improvements in productivity helps to dampen CPI growth, as indicated by the inverse relationship between CPI and PRODUCT.

The findings lend support to the emphasis on exchange rate policy to promote price stability in a small open economy. Specifically, a strong domestic currency does two things - direct and indirect. First, it reduces imported inflation of both intermediate and final goods. Second, a strong currency dampens the overheating of the export-oriented economy, at least in the short term, and alleviates the labour market tightness. Consequently, domestic wage cost would therefore not rise as fast as it otherwise would.

V. Towards a More Effective Management of Inflation

Singapore's experience over the last one and a half decades gives credence to exchange rate management as the most effective means to maintain domestic price stability in a small open economy. The high import content of both consumption and production means that the exchange rate has a powerful influence on prices, either directly and indirectly. On the other hand, a weak currency would merely lead to a temporary improvement in export competitiveness. Over the medium-to-long term, wage increase in response to higher CPI increases and a tighter labour market would negate any short-term gains in competitiveness.

Chart 8.
Estimation Results



However, the pursuit of price stability could be heavily constrained by the conduct of the government's fiscal policy. Specifically, monetary policy, if subordinated to the role of financing the government's deficit, would not have yielded the desired results. In this regard, Singapore was fortunate that the government has run fiscal surpluses rather than deficits in almost every year since the late 1960s¹⁴. The absence of deficits has given the MAS the freedom to concentrate on the primary objective of promoting price stability.

Inflation in Singapore has been tackled essentially with macro-instruments. Apart from the Price Control Act¹⁵ being applied to rice and pork prices, there have been very few instances of government intervention at the micro-level. Our free trade regime has meant that domestic shortages of goods would ultimately be self-correcting. As things stand now, there is little evidence to substantiate the need for micro-tools to restrain price increases of specific goods and services.

VI. Conclusion

Over the last thirty years, Singapore has experienced strong growth with fairly low rates of inflation. In the context of a small open economy like Singapore, foreign inflationary pressures exert a strong influence on the domestic economy, as was observed during the two oil crises of the 1970s. Managing exchange rates has, since the early 1980s, proven to be an effective means of promoting price stability in Singapore.

14. The only deficit was that recorded in 1987.

15. The Price Control Act allows the government to declare certain goods as controlled items and to fix their maximum prices.

Chapter 13

INFLATION IN THAILAND: ITS CAUSES AND MANAGEMENT

by

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Prasong Werakarnjanapongs
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I. Introduction

Over the past two decades, Thailand has been faced with three episodes of severe inflationary pressure, i.e. 1973-74, 1979-81, and 1989-91. The first two episodes were caused by the two oil crises leading to "a cost-push inflation" while the price pressure during 1989-91 followed the rapidly expanding economic activities. This led to demand-pull inflation augmented by speculation in the securities and real estate markets.

One of the primary objectives of macroeconomic management in Thailand throughout history and particularly during these past decades has been stability, especially of price as reflected in every national economic and social development plan. These concerns probably arose from four main reasons. First, inflation is detrimental to income distribution objective, particularly against those with fixed income which represents the majority of the labor force. Second, rapid inflation relative to trading partners as well as competitors would tend to erode Thai exports competitiveness which could affect the external balance of the country. Third, risks of inflation could retard business decisions and allocations of resources. Finally, inflation is a disincentive to save and encourage speculative holdings of real assets as against financial assets which are instrumental to financial development, domestic savings mobilization and thus investments.

This paper aims to analyse the causes and management of inflation using Thailand's experience from 1970 to the present, focusing on 3

1. Views opinions expressed in this paper are those of the authors and not necessarily of the Research Department, nor the Bank of Thailand. The authors would like to thank Mr. Teerapong Ratanaboon for data compilation and Dr. Parusan Chautanahom and Ms. Wattana Peiwcharoen, for computing and model estimation.

major inflation episodes in Thailand namely 1973-75, 1979-81 and 1989-91 when inflation rose to historic levels and a number of stabilization measures had to be introduced.

The paper is divided into six sections starting with a review of Thailand's economic development during 1960-72 as a background followed by the three inflation episodes in section two. In each episode, the inflation problem is studied in the context of general macroeconomic development followed by the policies and measures introduced to stabilize prices. An inflation model is postulated and estimated in section 3, the results of which are used to analyse the causes of inflation in section four. Some proposals and trends towards a better economic management are proposed in section five. The last section then provides a brief concluding statement based on Thailand's experience.

II General Economic Setting

This period 1960-72 was characterized by rapid growth (around 7 per cent per annum) and development driven by the adoption of an industrial strategy that was oriented to the private sector and by a rapid improvement in infrastructure.

After a brief — and generally unsuccessful — flirtation with state enterprises in the early 1950s, from 1959 the authorities adopted an industrial strategy based on the private sector. The Board of Investment (BOI) was created to administer a package of investment incentives designed to promote industries, first in import substitution and later in export promotion.

The rapid industrialization and growing linkages to export and world market have substantially improved the countries' growth potential. The rising dependence on energy and oil imports as well as the relatively slower advancement in agricultural technology, however, created a new source of instability as can be clearly seen during the two oil shocks and the Persian Gulf crisis. The weather-sensitive and relatively rigid agricultural supply also led to wild swings in domestic commodity prices in the face of drought or flood such as in 1972 and 1980. Due to these reasons control measures were imposed intermittently to help stabilize domestic commodity prices covering essential items such as food, textile (such as student uniforms) and petroleum products.

The rapid growth in importance of international trade and financial market, as well as the close links between baht and US\$ throughout history, have also made Thai commodity prices more closely related to that of the World, and particularly the US (Figures 1 - 3).

Up to 1973, the minimum wage in Thailand had been fixed at 12 baht per day. After the first oil shock, the first National Wage Committee was set up to determine the annual adjustment in the minimum wage. Since the terms of these committee members span for two years, there have been 11 Committees up to the present. The Committee members consist of representatives from employers and employees (minimum three each), senior government officials, and academics. The Committee decisions are usually based on consensus although disputes occasionally arose and majority voting (2/3) had to be used to determine the ultimate adjustments. For each Committee, a sub-committee is also established to conduct technical analyses, or detailed studies and propose alternatives as well as suggestions to the Committee. The annual (sometimes biannual) wage adjustments have since 1970 (appendix) been in line with inflation rates although other variables such as growth, private investments and foreign investments etc. are also taken into consideration.

Monetary policy in Thailand has been guided by targets for a range of monetary aggregates, determined on the basis of the authorities' objectives for inflation, growth, and the balance of payments. The chief monetary policy instruments have been open market operations in the repurchase market and lending by the Bank of Thailand. Besides, the Bank of Thailand also influenced monetary conditions through ceilings on deposit and lending interest rates (until 1990), and occasionally through intervention in the exchange market such as restrictions on commercial banks' net foreign liabilities. The increasing relaxation of controls on domestic interest rates, together with progress in reducing inflation, contributed to steady positive real interest rates from 1982 onward and to rapid increases in the monetization of the economy and in the growth of the domestic banking system. The M2/GDP ratio rose from around 20 per cent in 1960 to 40 per cent in early 1980s and to 80.4 per cent in 1993. Between 1970 and 1993, M2 grew steadily at 19.5 per cent per annum on average in line with an average real GDP growth rate of 7.6 per cent per annum during the same period.

Figure 1
Domestic and World Food Prices

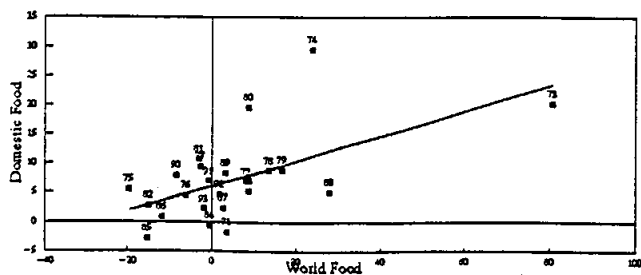


Figure 2
Domestic Food and Food Export Prices

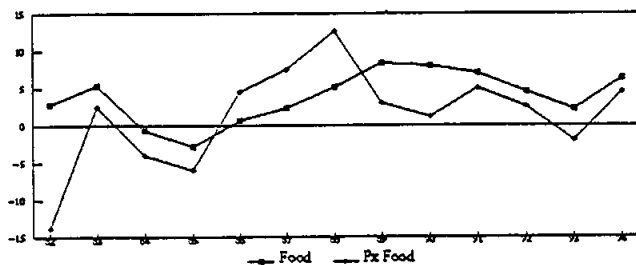
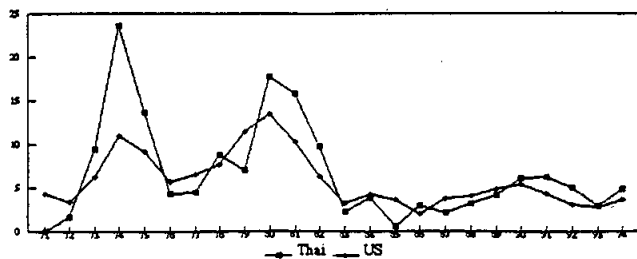


Figure 3
Thai & US Inflation Rates



III. Thai Experience on Inflation

3.1 Definition of Inflation

Inflation in Thailand has traditionally been measured by a weighted average consumer price index (CPI). The index is compiled by the Department of Business Economics, Ministry of Commerce, based on the National Statistical Office's Social Economic Survey. The Survey provides a set of weights, the latest ones of which are shown in Table 1 below, indicating basket of commodities consumed by households. The survey covers sampled households of two to ten members each with total income between 4000 and 11000 baht in all of the 76 provinces of the whole country. The data that are used to calculate monthly CPI, however, are derived from the Ministry of Commerce's sampling depots in 26 provinces — six in each of the Northern, North-eastern, Central regions, five from the Southern region, and Bangkok.

In general, inflation in Thailand may be attributed to both imported and domestically created or core inflation. While food prices have become increasingly related to the world commodity prices as the economy became more open over time (Figures 1 to 3), domestic fuel price has also been adjusted more flexibly in line with world oil price as a measure to use price mechanism to economise on fuel consumption (Figures 4-6). The residual i.e. non-food, non-fuel prices, which is termed the core inflation (Kahn 1994) reflects price movements from domestic demand and supply conditions and can perhaps be better managed with monetary policy. The separation of Thai inflation into these three components is shown in Figure 7.

3.2 Inflation Conditions During 1970-94

During 1972-93, inflation in Thailand averaged 7.1 per cent, largely due to the two oil shocks, i.e. 1973-74, and 1979-81, and the rapid economic expansion between 1989 and 1991. In fact, prior to 1972 inflation averaged only 4.8 per cent.

3.2.1 The First Oil Shock

Immediately following the first oil shock in October 1973, the year 1973 saw an unprecedented change in prices of commodities. Also partly due to drought in 1972, prices of goods and services which

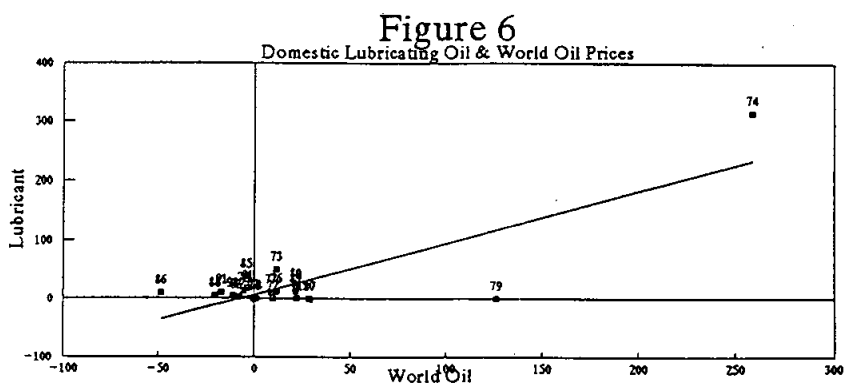
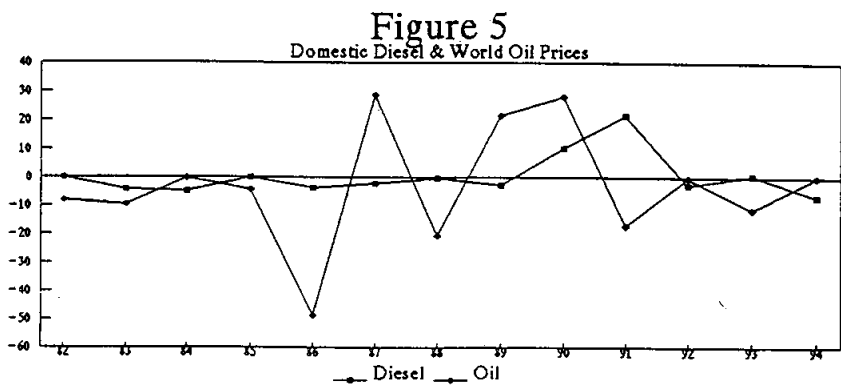
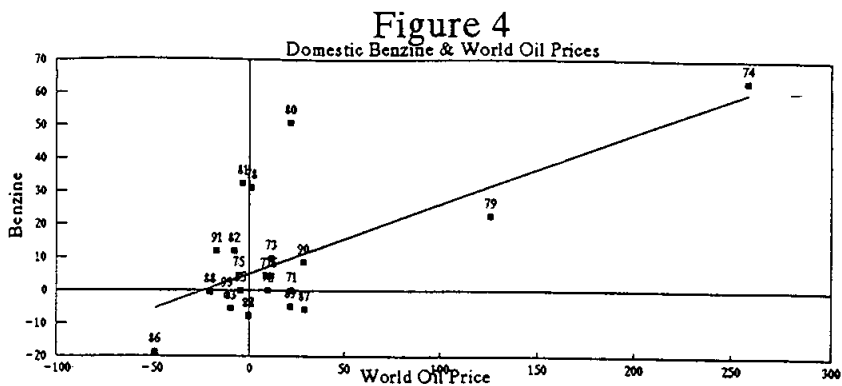
Table 1

CONSUMERS' BASKETS 1981 AND 1986

Items	Bangkok and metropolitan		Central		North		Northeast		South		Whole KINGDOM	
	81	86	81	86	81	86	81	86	81	86	81	86
I. Food	41.6	40.4	38.7	37.4	37.5	38.8	39.2	37.5	37.8	38.6	40.3	39.6
1. Rice & Flour	4.9	4.5	5.8	4.7	6.5	5.7	6.6	5.0	5.9	4.6	5.4	4.6
2. Meat	8.7	8.0	9.8	8.3	10.6	9.3	11.2	10.2	9.6	8.9	9.4	8.4
3. Fruits & Veg.	5.0	5.2	5.1	5.2	4.8	5.2	4.4	4.9	5.0	4.9	5.0	5.1
4. Eggs & Milk	1.9	2.0	1.6	1.9	1.6	2.8	1.9	2.2	2.2	2.3	1.8	2.1
5. Others ^{1/}	2.3	2.9	2.5	2.4	2.4	2.7	1.9	2.5	3.1	2.3	2.4	2.7
6. Non-alcohol Bev.	1.1	1.8	1.3	1.5	0.8	1.6	1.0	1.1	1.0	1.1	1.1	1.6
7. Ready-made ^{2/}	17.7	16.1	12.7	13.5	10.9	11.5	12.3	11.5	10.9	14.4	15.3	14.9
II. Non-Food	58.4	59.6	61.3	62.6	62.5	61.3	60.8	62.6	62.2	61.4	59.7	60.4
1. Clothing	6.6	4.8	6.2	4.9	6.1	6.5	6.5	6.2	8.8	5.9	6.7	5.2
2. Housing	24.2	24.8	25.8	27.9	26.4	26.0	22.0	24.1	22.1	24.5	24.1	25.1
3. Health Care	5.5	5.1	5.4	6.0	5.9	5.5	5.2	5.2	5.4	4.8	5.5	5.2
4. Transport & Telecom	8.3	8.9	10.6	11.0	9.5	9.7	13.1	12.0	12.1	11.3	9.5	9.7
5. Entertainment	10.1	11.7	10.1	9.2	11.3	10.6	11.0	11.7	9.9	11.5	10.3	11.4
6. Tobacco & Alcoholic Bev	3.8	4.3	3.2	3.6	3.2	3.0	3.1	3.3	4.0	3.4	3.6	4.0

1/ Includes cooking accessories that can be purchased from the markets e.g. lard, vegetable oil, soy sauce, vinegar, etc.

2/ Includes rice and curry, pork noodles & fried rice.



began to rise in the second half of 1972 rose steadily throughout 1973 fueled by rapid expansion of private credit of some 42.9 per cent. As the petroleum exporting countries (OPEC) twice increased the price of oil in late 1973, the import cost of crude oil in early 1974 jumped almost three times as high as in 1972. CPI which rose from 4.9 per cent in 1972 to 15 per cent in 1973 accelerated to 24.4 per cent in 1974.

On trade account, foreign exchange spending on energy import rose from 10 per cent of total imports in 1972 to 20 per cent in 1974. Yet, the primary concern of Thai policy makers at the time was to restore past rates of economic growth as reflected by sharp increases in public expenditures, particularly in infrastructure investments and outlays on defense. A substantial fiscal deficit emerged, financed increasingly through foreign borrowing. Nevertheless, as the world oil prices and inflation stabilized, Thailand's domestic inflation also returned to a normal range of 4-5 per cent during 1975-76.

3.2.2 The Second Oil Shock

In 1979, three rounds of oil price hike were once again announced by the Organization of Petroleum Exporting Countries (OPEC), bringing oil prices some 60 per cent higher than those in 1978. This in turn prompted price rises, particularly of food items (Figure 8). The situation was also exacerbated by prices of rice, fruits and vegetables which rose due to unfavourable climate (drought at the beginning of 1980 followed by flood at the end of the year). As a consequence, price accelerated further to 19.7 per cent in 1980 aggravated by a further adjustment of over 50 per cent in petrol retail price.

For 1979-81 period, inflation averaged 14.1 per cent per annum as the effects of the second oil crisis in 1979 permeated into domestic wage adjustments (of 28.3 per cent in 1980) to protect workers' standard of living, followed by adjustments in the prices of public utilities to maintain their financial viability.

Faced with rising interest rates and declining demand as well as falling prices of exports, Thailand's external debt outstanding and service rose while foreign reserves were depleted at an alarming rate. As inflation rate rose to above 20 per cent during the early 1980s, Thailand's economic growth rates slowed down dramatically (to 3.5 per cent in 1984) while trade and current account deficits rose sharply.

Figure 7

Sources of Inflation in Thailand 1971-94

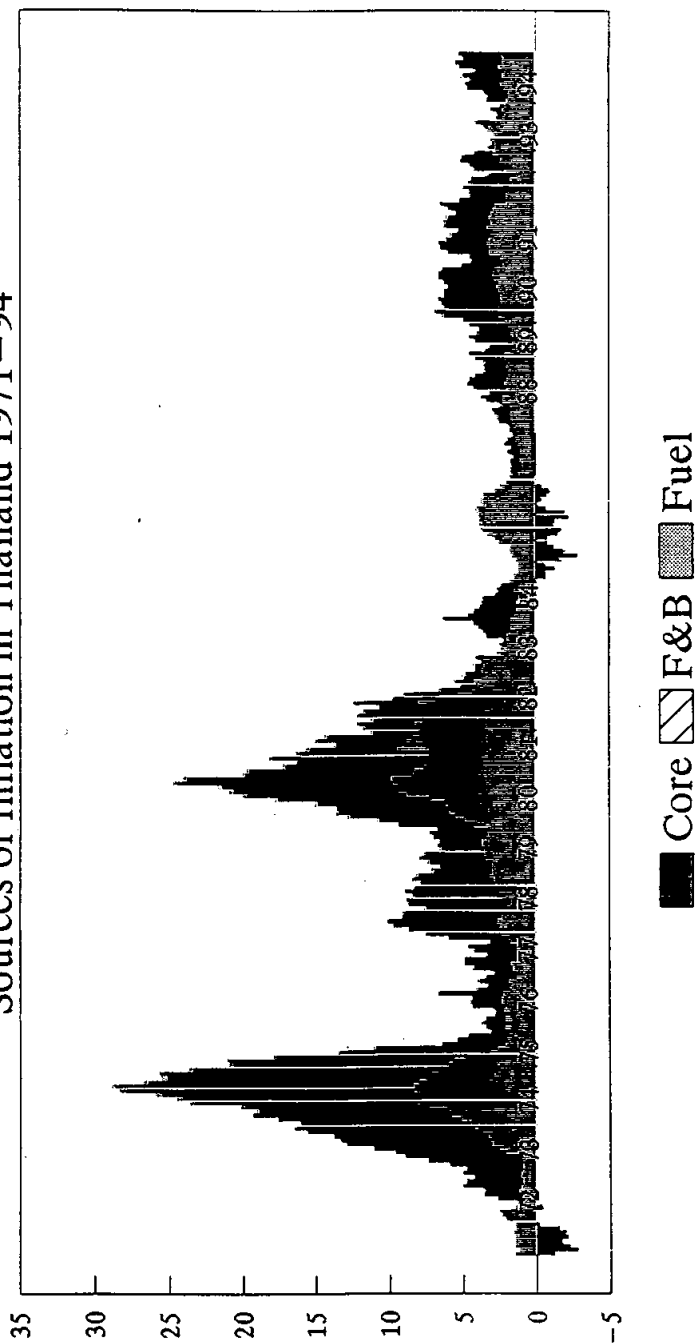
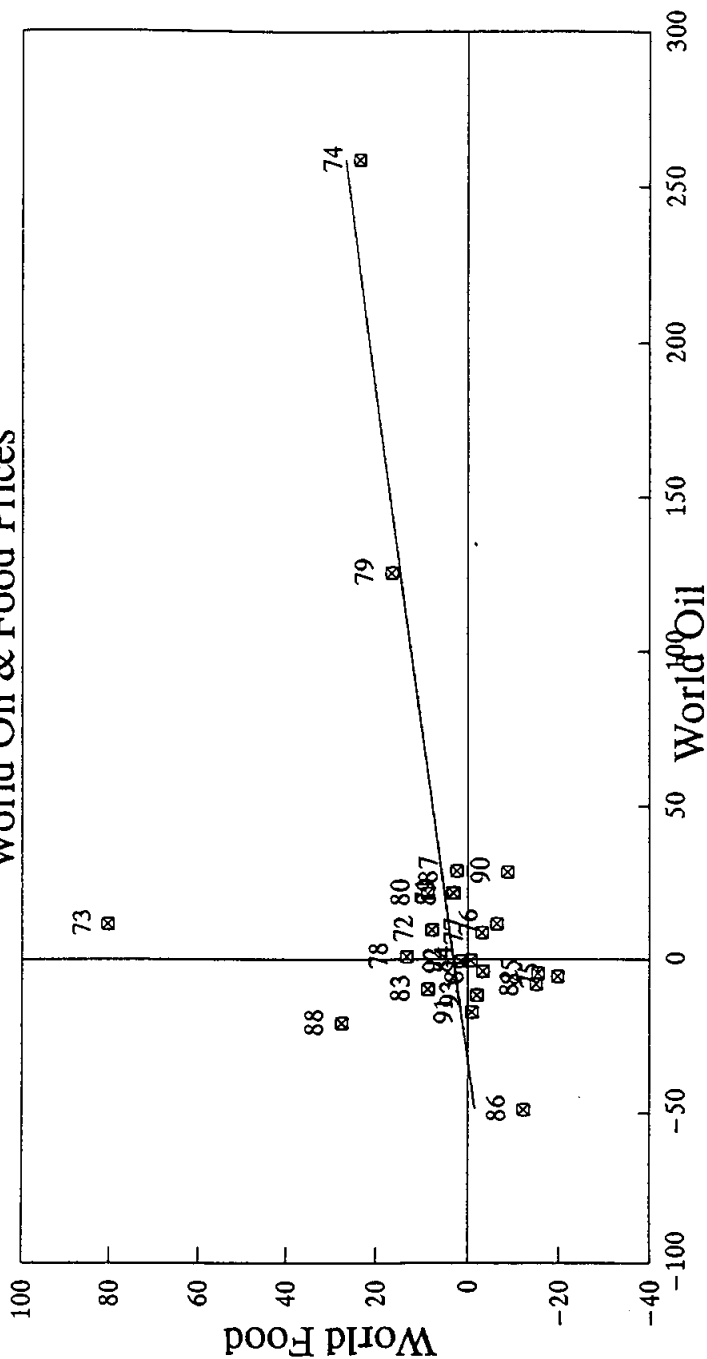


Figure 8

World Oil & Food Prices



This trend continued into 1981 although at a somewhat decelerated pace, with CPI rising approximately 12.7 per cent. Apart from fiscal and monetary restraint, factors responsible for the slowdown in price pressures were the lower rate of increase in oil import price and declining agricultural prices due to supply surplus.

To maintain external balance, the baht was devalued twice by 8 per cent in 1981 and by 14 per cent in 1984. The second devaluation in November 1984 was followed by a sharp depreciation of the US dollar, resulting in some 30 per cent depreciation of the real effective exchange rate during 1984-87. So, between 1984 and 1987, the terms of trade had risen and contributed significantly to the improvement in the trade and current account balance during the second half of 1980s.

After the second oil shock, domestic prices were stabilized with inflation staying in between 0.9 to 2.5 per cent during 1984-87. This was due to the decline in world oil and primary commodity prices. While the world economy recovered, the rapid appreciation of the yen has forced the Japanese firms to relocate their factories to alternative sites overseas to maintain their cost competitiveness. At the same time the Newly Industrialized Economies (NIEs) were also relocating some of their industries to the third countries as a means to increase their implicit export quotas to the US market.

Thailand was among these recipient countries and thus experienced rapid expansions in investments and exports. The rapid growth of over 10 per cent per annum, nevertheless, put a strain on the resources and productive capacities of the country, increasing pressure on domestic prices. The rapid growth in expenditures followed earnings, which also rose in all income groups, augmented by the wealth effects of sharp increases in securities and land prices.

3.2.3 The Persian Gulf Crisis

Moreover, shortages of meat, vegetables and fresh fruits also arose from unfavorable climate and an epidemic. This pressure was worsened further by the oil price increases of almost 30 per cent following the Persian Gulf crisis. On the whole, inflation rose from 3.8 per cent in 1988 to an average of 5.7 per cent during 1989-91, a mild and yet significant level by historical standards.

Meanwhile, following the Plaza Accord of 1985 and the subsequent currency realignments, during which the values of the Japanese yen and the NICs' currencies appreciated significantly, investors from these countries relocated parts of their production facilities to Southeast Asian countries with relatively low-cost labor including Thailand. As a consequence, Thai manufacturing sector grew 16-18 per cent during 1987-1990. Manufactured exports as a share of total exports rose dramatically from 54 per cent in 1986 to 72 per cent in 1991, while GDP registered double-digit growth for a few years in the late 1980s. Land prices in some areas and particularly in the new economic zone like the Eastern Seaboard, however, became artificially high because of speculation.

Hence, CPI began to accelerate to 5.4 per cent in 1989 from 3.8 per cent in 1988, partly as a result of increased demand from the wealth effects of higher securities and real estate prices. Moreover, continued rapid expansion of export and investment put some pressure on production capabilities in certain industries, while the costs of production particularly those of labor and imported oil and raw materials had also begun to rise. The upward adjustments in the salaries of Government and state enterprises employees as well as the minimum wage led CPI to increase further by 6 per cent in 1990. Nevertheless, it should be noted that since 1988, Thailand has implemented a number of trade and financial liberalization measures making excess demand more closely linked to current account deficit rather than to inflation.

Restrictive policies consequently had to be introduced to moderate the rate of economic expansion to avoid excessive pressure on real resources while encouraging exports and private savings. As the effects of these fiscal and monetary policies began to improve the balances between production and domestic purchasing power, inflation decelerated to 5.7 per cent in 1991.

3.3 What has been done?

3.3.1 Monetary Policy

Internationally, immediately following the first oil shock, industrial countries adopted a number of policies to combat inflation depending on their economic and social backgrounds. In general, however, restrictive monetary and fiscal policies were taken, as evidenced by the high interest rates throughout the world from mid-1973 to mid-1974.

In Thailand, the 43.4 per cent private credit expansion in 1973 (28.3 per cent share of which to trading sectors) prompted the authorities to increase the ceiling loan rate by 1 per cent (see Appendix 1). Moreover, the cash reserve requirement, was temporarily raised from 7 to 8 per cent while commercial banks were required to report on their lending activities to 'strategic industries'. Nevertheless, it was ensured that short-term liquidity was adequately provided through the Bank of Thailand's loan and rediscount windows, particularly for exports, imports, agriculture, and manufacturing. Hence, as world inflation began to moderate in 1975, Thai CPI also decelerated to 5.3 per cent.

The initial response of the Bank of Thailand to the second oil shock, on the other hand, had been to use moral suasion to slow down private credit expansion. As inflation pressure mounted and exacerbated by drought and epidemic, the Bank introduced the Financial Institution Lending Interest Rate Law in 1980 superseding the Commercial Code of 1962 which specified the maximum lending rate at 15 per cent. As a consequence, the ceiling loan rate was increased to 18 and 19 per cent in 1980 and 1981, respectively. The ceiling on deposit rates was also raised from 8 to 9 per cent in 1979 and further to 12 and 13 per cent in 1980 and 1981, respectively.

Most recently during 1989-91, the rapid economic expansion, rising speculations on property and securities led the Bank to issue a warning to commercial banks on lending to non-productive sectors as well as issuing a guideline for commercial banks' overall credit expansion in line with the country's productive capacity. The maximum overdrafts of 50 million baht per account was also reduced to 30 million while commercial banks were required to submit annual credit plans for the Bank's consideration six months ahead of the time. Moreover, the ceiling loan rate was also increased twice from 15 to 16.5 and 19 per cent in March and November 1990, respectively. Bank of Thailand's bonds were also issued to absorb excess liquidity from the financial system.

3.3.2 Fiscal Policy

During 1973-74, the Government lowered import tariffs on over 300 items of consumer goods, raw materials and capital goods to help lower the cost of production. In addition, a number of export taxes, including rice and sugar premiums were also introduced to curb export demand and stabilize domestic prices.

Following the second oil shock, the Government recognized the need for structural adjustment, and in 1981 embarked on a major programme consisting of strict fiscal measures-freezing real public wage rates, imposing ceiling on public foreign borrowing, postponing public investments, limiting the role of the public sector, and initiating a privatization programme. Moreover, the drought aspect was also addressed through an introduction of a rural job creation project with a budget of 3.5 billion baht. This project was financed by savings from the postponement of both current and investment expenditures in other programmes of the Government. As inflationary pressure built up again since 1989, the Government tightened its fiscal policy by reducing expenditures, particularly those on equipment, properties and construction as well as those on remuneration, services, and supplies. Land speculation was also discouraged through higher tax on improper or unused land up to complete withdrawals of land rights if unused for a prolonged period. In FY1991, the Government adopted a balanced budget approach for the first time which continued to the present. This has helped stabilize price and current account deficit significantly. As for commodities in shortages, customs tariffs were reduced, e.g., for imports of milk powder, cement, iron rods, feed, maize and fish meal while indirect taxes on some petroleum products were adjusted to stabilize retail prices. Import restrictions on some of these items were also lifted temporarily to alleviate supply shortages.

3.3.3 Price and Income Policy

On price policy, the Anti-Profiteering Act, B.E. 2490 (1947) and later the Price Fixing and Anti-Monopoly Act, B.E. 2522 (1979) empowered the authorities to impose measures ranging from reporting and displaying of prices to promote public awareness to requesting cooperation from producers and importers to maintain their prices for a period of time up to outright price ceilings. These measures were, as the names of the Acts indicate, aimed mainly to prevent profiteering and monopolized activities rather than direct price control as such. Therefore, the number of commodities subject to this Act has been gradually reduced to 22 items in September 1992 by the Ministry of Commerce. These include food and key factors of production such as liquefied petroleum gas and fertilizers, each to a different degree of price control.

During the first oil shock, price control was also imposed on a number of essential commodities. With the deterioration in the terms of trade and consequent slowdown in economic activities, however, prices of key imports, including oil, were maintained at well below world market levels; and tariffs and other trade barriers designed to protect domestic industries were increased markedly.

While this strategy resulted in a pickup in growth as GDP rose to an average annual rate of 7.5 per cent between 1973 and 1978 (with increases of 4.2 per cent and 12 per cent in agriculture and manufacturing, respectively), its limitations were rapidly exposed by the second oil shock in 1979.

As the aim of the policy was to limit the rate of increase to the actual increase in production costs, the authorities selected measures to protect the interest of consumers and, at the same time, ensure reasonable returns to producers and traders. Hence, during the second oil shock, the domestic retail prices of some petroleum products were adjusted to some extent in line with world prices, along with two adjustments in electricity rate (of 35.1 and 16 per cent). Prices of cement, sugar as well as minimum wages were increased.

A minimum 20 days notice was also imposed on a number of products (cars, tractors, water pumps, and construction materials) prior to price adjustments. Producers of 40 products subjected to price control were also asked to submit reports on their costs of production, expenses, production, and distribution process.

3.3.4 Other Measures

Domestic trading of some commodities, e.g. mixed and portland cement, palm oil were monitored more closely to prevent hoarding while items under price control were required to display prices more clearly. Producers and traders of necessities were requested to maintain their prices for at least 3 months after the oil price adjustment in September while necessary products are supplied at reasonable prices through government-run retailers marked with blue flags.

In addition to control, promotional measures were also introduced during the early 1980s to protect incentives for investment to increase long term production and supply, and prevent shortages. As the

number of items subject to price control was gradually reduced, the public sector stepped in to provide necessities (e.g., Osha rice) at reasonable prices to low-income group. Further, income policy (e.g., agricultural price support and rural job creation, government officials and state enterprise wages adjustments, and lower income tax burden on low and middle income groups) was also used to protect the living standard of the population.

Besides, import restrictions on certain types of products were relaxed to relieve shortages (e.g. raw soybean oil, soybean meal, maize, fish meal, logs, and raw silk thread, powdered milk, equipment, cement, iron rods and bars, scrap metal) during the second oil shock and on cement, fertilizers and pesticides in 1989.

IV. Inflation Models

Based on Thailand's experiences in inflation reviewed in Section 2, the following models have been specified and estimated for the period 1970 to 1993.

This model is designed to capture all of the domestic, international and policy factors affecting inflation in Thailand through either cost push, demand pull, imported or speculation mechanisms. Since prices of rice, pork, and student uniforms are subject to control, these items are included to capture the effects of domestic price control measures¹ (e.g., during the oil shocks). As milk powder has largely been imported, the tariff on this item was also occasionally varied, partly reflecting fiscal policy to stabilize prices. Since prices of these items have been closely related to the world prices, however, the effects of these first four variables will grossly be referred to as "commodity prices effects".

$$\begin{aligned}(1) \quad \ln \text{CPI} = & 0.034 + 0.063 \ln \text{RICE} + 0.058 \ln \text{PORK} + 0.154 \ln \text{UNIFORM} \\ & (11.7) \quad (6.3) \quad (5.9) \quad (16.8) \\ & + 0.142 \ln \text{MILK} + 0.064 \ln \text{BENZINE} + 0.030 \ln \text{LPG} \\ & (33.5) \quad (5.6) \quad (1.8) \\ & + 0.119 \ln \text{MINW} + 0.117 \ln \text{M2} \\ & (12.0) \quad (23.5)\end{aligned}$$

$$\text{Adj } R^2 = 0.999, \text{ S.E.} = 0.008, \text{ DW} = 0.044, \text{ N} = 1970:12-93:12$$

1. The choices of variables were somewhat limited by data availability required on monthly intervals from 1970 to 1993.

$$\begin{aligned}(2) \quad \text{dln CPI} = & 0.060 \text{ dln RICE} + 0.058 \text{ dln PORK} + 0.155 \text{ dln UNIFORM} \\ & (36.1) \quad (40.5) \quad (71.8) \\ & + 0.143 \text{ dln MILK} + 0.065 \text{ dln BENZINE} + 0.031 \text{ dln LPG} \\ & (167.3) \quad (31.8) \quad (10.9) \\ & + 0.117 \text{ dln MINW} + 0.117 \text{ dln M2} + 1.684 \text{ RES(1)} - 0.733 \text{ RES(2)} \\ & (69.0) \quad (123.7) \quad (42.4) \quad (-19.0)\end{aligned}$$

Adj R² = 0.999, S.E. = 0.140, DW = 2.071, N = 1972:2-93:12.

Dickey-Fuller t-statistic of Residual = -11.310 1 per cent significant.

where,

- CPI = Consumer price index,
- RICE = Prices of rice 5 per cent,
- PORK = Prices of red pork,
- UNIFORM = Girl student uniform prices,
- MILK = Powder milk prices,
- BENZINE = Retail prices of benzine,
- LPG = Prices of liquid petroleum gas for cooking purposes,
- MINW = Minimum wage rates,
- M2 = Money supply (broad definition),
- RES = Residuals of equation (1) used to approximate expectation effects in the short run (equation 2) around the long equilibrium predicted by equation (1).
- ln = natural logarithm,
- dln = delta log to calculate growth rates, and
- {t} = Lags of the designated variable by t periods, t = 1, 2

The domestic prices of benzine and liquefied petroleum gas (LPG) for cooking purposes are used to demonstrate the effects of world energy price movements on domestic inflation. Like commodity prices, domestic retail prices of petroleum products have in the past also been subject to control although to a lesser extent in recent years. Hence, a part of the "energy price effects" will also reflect government's use of controls to stabilize domestic prices.

The minimum wage rate is used to capture Government's "income policy" while M2 reflects both monetary policy and domestic demand movements. Further, in the short run formulation (equation 2), the

residual terms calculated from the differences between actual inflation and its long term trend predicted by equation (1) are also incorporated to capture "market expectation or speculation effects" when inflation diverges from its long term trend estimated by equation (1).

It should also be noted that all of these variables are 12-months moving averages to eliminate seasonal and irregular variations in the short run. Further, during estimation, real GDP growth, government deficit over GDP (GDF/GDP), net private capital inflows (CAPNET), non-fuel commodity prices, world food price, prime lending rate, Thailand's export prices in US\$ and exchange rate against the US\$ as well as a liberalization dummy variable (1 from 1990 onwards and 0 otherwise) were also tested but excluded from the models. The unit root test of variables included in equation (2) reveals that most of them are stationary at the 5 per cent level of significance.

V. Analysis of the Causes of Inflation

From equation (2), the effects of 'commodity prices', 'energy prices', 'income policy', 'monetary policy', and 'expectation' (residual terms) are shown in Figure 9 and Table 2, it may be seen that during 1972 and 1993, inflation in Thailand averaged 6.7 per cent per annum (this is a log-normal growth rate which is slightly lower than the 7 per cent proportional growth rate that is more commonly quoted). Of this, 2.8 per cent came from commodity prices, 0.7 per cent from energy prices, 1.2 per cent from income policy, and 2.1 per cent from domestic demand expansion and monetary policy. The 'expectation effects', on the other hand, cancelled themselves out over the long term although short term contributions up to nearly 2 percentage points (either up or down) could be noted in some years (e.g., 1979). The relatively short logs of the residual terms, however, probably reflect credibility of measures used such that speculation is usually dissolved within the same quarter.

Even with a number of price control measures, commodity prices contributed approximately half of the inflation pressure during the two oil shocks (Figure 9). The relatively marginal effects of direct contributions from oil price rises, however, have been due to both the relatively more stringent control over domestic oil retail prices up to 1990 as well as the small weights of energy in the CPI basket. Nevertheless, its contribution peaked at 3.3 per cent in 1974 and 3.9 per cent in 1980.

On effects of income policy, during 1972 and 1993, the minimum wage rate was adjusted upward on average by 10.2 per cent per annum (using log-normal growth rate). This contributed to some 1.2 percentage point to the 6.7 per cent annual inflation average of the period. The effects were even more apparent during the two oil shocks and the Persian Gulf crisis peaking at 3.9, 3.1 and 1.5 per cent in 1975, 1980 and 1991, respectively.

Finally, on domestic demand and monetary policy, the consistent economic expansion reflected in average annual monetary growth rate of 17.9 per cent during 1972-93 contributed on average 2.1 percentage point to the annual inflation of 6.7 per cent. This contribution has been relatively steady throughout the period showing only slight increases during the three inflation episodes indicating short run monetary accommodation (for external shocks and also fiscal policy) to ensure adequate liquidity in the domestic money market temporarily rather than sustained long term expansion that might have accelerated inflation even further.

Thailand being a small economy with relatively open trade and financial systems, the exchange rate, on the other hand, had probably never been used to address domestic price stability problems and thus shown little correlation with inflation. Some commodities e.g., milk import, however, might have already incorporated the effects of exchange rate into the commodity prices effects to a certain extent. The two major devaluations in recent economic history, however, were closely related to current account deficits rather than to the inflationary pressure itself.

Since the movements of interest rates in Thailand had been subject to control, their liberalization of was only a recent phenomenon. There is no evidence either to support the ex-post Fisher equation or the hypothesis that interest rate is an optimal instrument for controlling inflation. Nevertheless, it should be emphasized that positive real interest rate policy since 1982 appeared to have promoted substantial financial deepening in Thailand (Robinson, 1991). The consequently lower velocity of money (i.e. the reverse of the M2/GDP ratio which was used to measure financial deepening) implied a consistently rising appetite for money in the Thai economy which, in turn, lower the risks of excessive monetary expansion that could destabilize domestic prices in more recent years.

Since financial liberalization is a recent phenomenon in Thailand, and a number of supporting infrastructures remain to be put in place (e.g., the establishment of a secondary bond market), the full effects of financial liberalization on inflation have yet to be evaluated over the longer term.

VI. Policies

In general, policies and measures to control inflation vary with the causes of inflation. Naturally, cost-push inflation would require measures to lower the costs of production while demand-pull inflation can only be remedied by macroeconomic policies to curb speculative demand and contain aggregate demand in line with productive capacity. Of course, in the longer term context, structural policies must also be used to alleviate bottlenecks and enhance aggregate supply which will also contribute to the lowering of excess demand pressure.

6.1 Towards a More Effective Management of Inflation: What to do?

Thailand has undergone significant structural changes arising partly from financial liberalization. The major ones include (i) liberalization of interest rate, starting with the abolition of the interest ceiling on time deposit rates over one year in June 1989, and other types of deposits in March 1990 and January 1992, and complete removal of loan rate ceiling in June 1992; (ii) the relaxation of the portfolio constraints on financial institutions with the dissolution of the requirement that commercial banks must hold government bonds in order to open new branches, and adjusting the rural credit requirement to increase flexibility in lending to related activities; (iii) sequential liberalization of foreign exchange control starting from the acceptance of the IMF's Article VIII in May 1990, increasing progressively the volume of the baht transactions for border trade in April 1991 and March 1993 and February 1994, including permission to transfer and lend in foreign currencies (BIBF) in 1993; and, (iv) enlargement of scope of financial institutions' operations to increase competition and efficiency.

These structural shifts have led to an increasing need for both new monitoring methods and monetary policy tools. The usefulness of broad money supply (M2), for example, may soon become limited as an indicator for money market activities as finance and securities com-

Figure 9

Contributions to Inflation

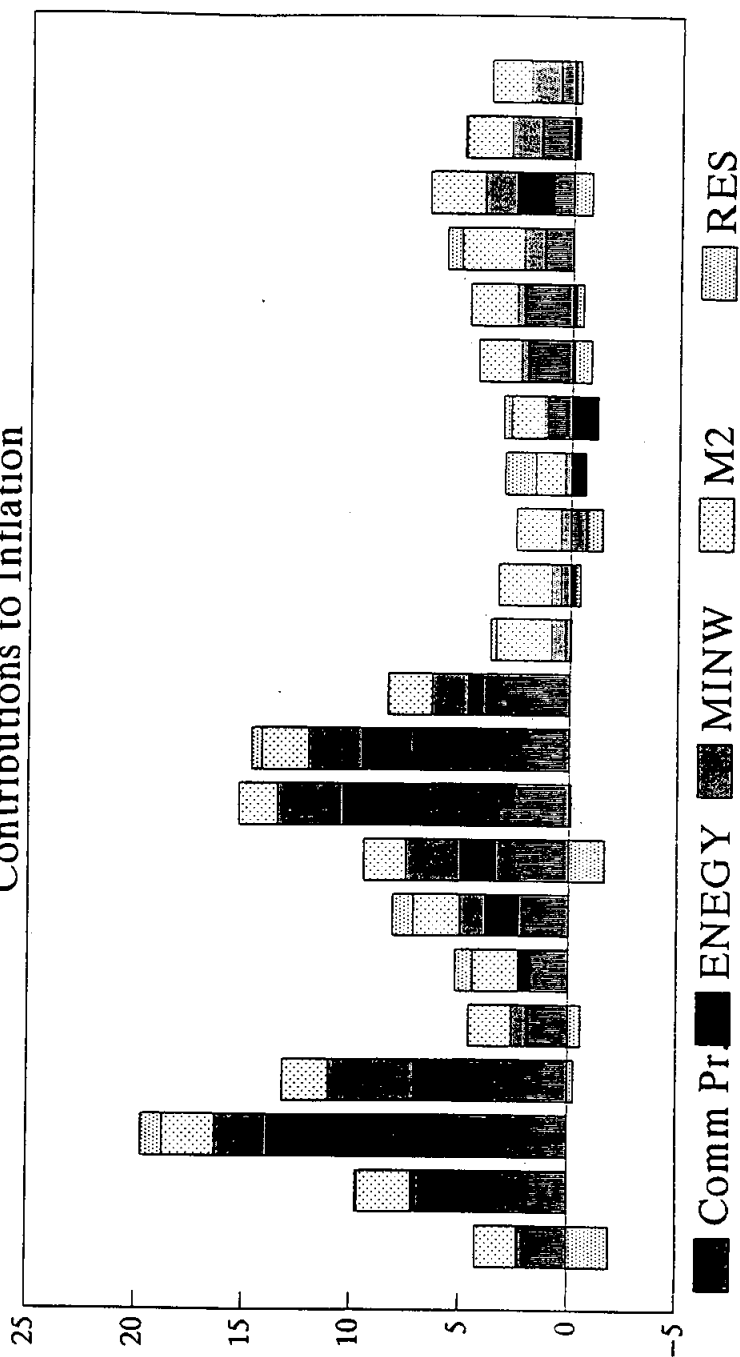


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Coefficient	CPI	(1)+.+(4) Comm Pr	(1) RICE 5%	(2) RED PORK	(3) STUDENT UNIFORM	(4) POWDER MILK	(5) + (6) ENERGY	(5) BENZINE SUPER	(6) LPG	(7) Income MINW	(8) M2	(9)+(10) Expect	(9) RES (1)	(10) RES (2)
1972	2.6	2.3	-0.2	0.1	0.8	1.6	0.1	0.0	0.1	0.0	1.9	-1.9	-3.5	1.5
1973	9.6	7.0	0.7	0.3	1.2	4.8	0.2	0.1	0.1	0.0	2.5	0.1	0.2	-0.2
1974	19.8	10.5	0.8	1.4	2.8	5.6	3.3	2.4	0.9	2.5	2.4	1.0	1.6	-0.6
1975	12.9	5.3	1.1	1.1	2.8	0.3	1.8	1.3	0.5	3.9	2.1	-0.3	-0.3	-0.0
1976	4.0	1.8	0.0	0.3	1.6	-0.0	0.1	0.0	0.1	0.8	1.9	-0.6	-1.2	0.6
1977	5.3	1.7	0.1	0.2	1.4	-0.0	0.5	0.3	0.2	0.1	2.1	0.8	1.3	-0.5
1978	8.1	2.3	0.4	0.1	1.8	0.1	1.5	1.1	0.5	1.2	2.1	0.9	1.9	-1.0
1979	7.7	3.4	0.7	-0.0	2.6	0.0	1.6	1.3	0.4	2.5	1.9	-1.7	-2.7	1.0
1980	15.2	6.5	0.4	1.0	4.2	1.0	3.9	2.8	1.1	3.1	1.8	-0.1	-0.7	0.6
1981	14.7	7.3	1.1	0.7	2.2	3.3	2.2	1.7	0.5	2.4	2.2	0.5	1.2	-0.7
1982	8.4	4.0	0.7	0.1	0.2	3.0	0.7	0.6	0.1	1.7	2.0	0.0	-0.1	0.1
1983	3.6	0.2	-0.4	0.2	0.1	0.3	-0.1	-0.1	0.0	0.7	2.5	0.3	0.5	-0.2
1984	2.8	0.5	-0.1	0.3	0.2	0.0	-0.2	-0.2	0.0	0.4	2.4	-0.2	-0.3	0.0
1985	1.0	-0.7	-0.1	-0.8	0.2	-0.0	-0.1	-0.1	-0.0	0.5	2.0	-0.7	-1.5	0.8
1986	2.4	-0.1	-0.0	-0.6	0.6	-0.1	-0.5	-0.5	-0.1	0.3	1.4	1.4	2.3	-1.0
1987	1.9	1.1	0.7	0.5	0.7	-0.0	-1.2	-1.2	-0.0	0.2	1.5	0.4	0.9	-0.5
1988	3.4	2.0	0.6	0.5	0.9	0.0	-0.1	-0.1	-0.0	0.4	1.9	-0.8	-1.4	0.6
1989	4.3	2.2	0.9	0.5	0.3	0.5	-0.2	-0.2	-0.0	0.4	2.2	-0.3	-0.7	0.4
1990	5.8	1.3	0.5	0.3	0.4	0.1	0.0	0.0	0.1	1.0	2.8	0.7	1.2	-0.5
1991	5.7	0.9	0.0	0.2	0.7	0.0	1.0	0.6	1.5	1.5	2.6	-0.8	-1.4	0.6
1992	4.8	1.5	0.3	0.7	0.5	0.0	-0.4	-0.4	0.1	1.4	2.1	0.1	0.1	-0.0
1993	3.4	0.6	-0.1	-0.1	0.7	0.0	-0.1	-0.1	-0.0	1.4	1.8	-0.2	-0.4	0.2
Average Contri.	6.7	2.8	0.3	0.3	1.2	0.9	0.7	0.4	0.2	1.2	2.1	-0.1	-0.1	0.1
Average Growth		25.5	5.5	5.6	7.8	6.6	14.2	6.8	7.3	10.2	17.9	-0.1	-0.1	-0.1

panies play increasingly more important roles in domestic and foreign savings mobilization in place of the commercial banks which solely accounted for M2.

Further, financial liberalization has also rendered a number of conventional policy tools ineffective. Direct commercial banks' credit control, for example, does not necessarily reduce liquidity and thus purchasing power of the non-bank private sectors as they can always switch their sources of funds overseas. The authorities are therefore increasingly looking more towards indirect measures along the line of open market operation in developed countries, starting with the current development of the secondary market for debt instruments.

In the meantime, the close link between the baht and the US dollar and the open current and capital accounts supports a close correlation between the Fed Fund rate and the short-term interest rate (Repurchase market rate). Hence, the effectiveness and seriousness of the Fed in controlling inflation would also directly affect Thailand's price stability. In recent years, however, the trade linkages between Thailand and the US appear to be weakening marginally, i.e., the share of exports to the US over total exports has been declining from 20 per cent in 1990 to 18 per cent in 1993. Hence, Thailand experienced an economic growth of 8.1 per cent in 1991 while the US entered a recession with a growth rate of merely -0.7 per cent. The long term appropriateness of current exchange rate arrangement will depend on whether these economic linkages between Thailand and the US are weakening temporarily or permanently.

VII. Lessons and Conclusions

Inflation in Thailand may be attributed to both imported and domestically created or core inflation. While food prices have become increasingly related to the world commodities prices as the economy became more open over time, the domestic fuel price has also been adjusted more flexibly in line with the world oil price as a measure to use the price mechanism to economise on fuel consumption. The residual, i.e., non-food, and non-fuel prices which comprise 'core inflation', reflects price movements from domestic demand and supply conditions and can perhaps be managed better with monetary policy.

Strategies to tackle inflation problem must, however, be considered in a broader context including social and income distribution effects. Further, if economic development efforts were to be sustained over time, balance between stability, equity and feasibility (i.e., market-oriented measures to ensure business viability) is obviously essential for the success of an anti-inflationary package judging from the experience of Thailand.

The stabilization efforts that were generally timely, gradual, and market-oriented with a broader objective than mere price stabilization taking into account the social impacts of income distribution and standard of living seem quite successful. Proper balance between deliberation and cooperation also appears essential in maintaining sustainability of the measures.

Restrictive fiscal and monetary policies have, nevertheless, been quoted in every episode of inflation problem in Thailand. The primary objective was probably to prevent the imported inflation (predominantly from oil and commodities prices) from spilling over into inflationary expectation and speculation or inflationary spiral which could exacerbate the situation further, rather than reducing food or fuel inflation itself.

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Inflation - Related Measures 1970 - 94

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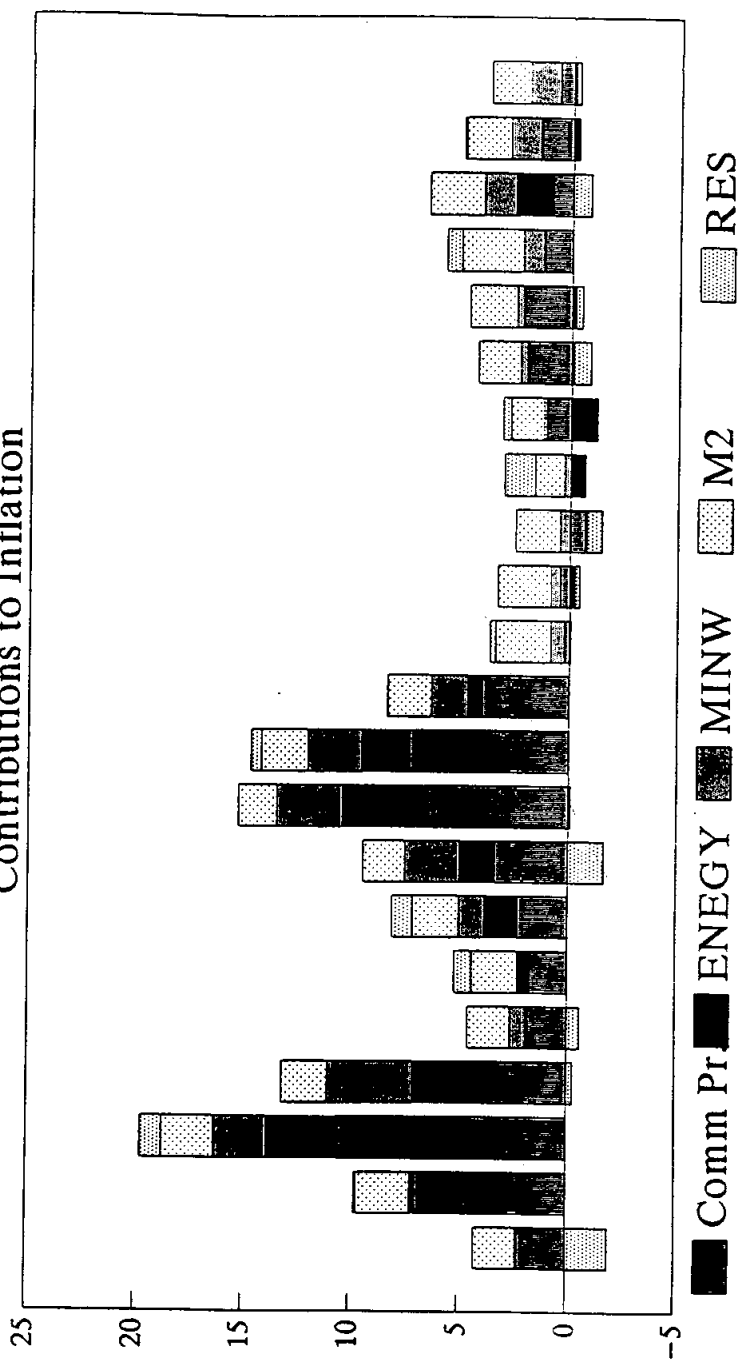


Table 2

CONTRIBUTIONS TO INFLATION

Coefficient	CPI	(1)+..+(4) Comm Pr	(1) RICE 5%	(2) RED PORK STUDENT UNIFORM	(3) 0.155	(4) 0.143	(5)+(6) ENERGY	(5) BENZENE SUPER	(6) LPG	(7) Income MINW	(8) M2	(9)+(10) Expect	(9) RES (1)	(10) RES (2)
1972	2.6	2.3	-0.2	0.1	0.8	1.6	0.1	0.0	0.1	0.0	1.9	-1.9	-3.5	1.5
1973	9.6	7.0	0.7	0.3	1.2	4.8	0.2	0.1	0.1	0.0	2.5	0.1	0.2	-0.2
1974	19.8	10.5	0.8	1.4	2.8	5.6	3.3	2.4	0.9	2.5	2.1	1.0	1.6	-0.6
1975	12.9	5.3	1.1	1.1	2.8	0.3	1.8	1.3	0.5	3.9	2.1	-0.3	-0.3	-0.0
1976	4.0	1.8	0.0	0.3	1.6	-0.0	0.1	0.0	0.1	0.8	1.9	-0.6	-1.2	0.6
1977	5.3	1.7	0.1	0.2	1.4	-0.0	0.5	0.3	0.2	0.1	2.1	0.8	1.3	-0.5
1978	8.1	2.3	0.4	0.1	1.8	0.1	1.5	1.1	0.5	1.2	2.1	0.9	1.9	-1.0
1979	7.7	3.4	0.7	-0.0	2.6	0.0	1.6	1.3	0.4	2.5	1.9	-1.7	-2.7	1.0
1980	15.2	6.5	0.4	1.0	4.2	1.0	3.9	2.8	1.1	3.1	1.8	-0.1	-0.7	0.6
1981	14.7	7.3	1.1	0.7	2.2	3.3	2.2	1.7	0.5	2.4	2.2	0.5	1.2	-0.7
1982	8.4	4.0	0.7	0.1	0.2	3.0	0.7	0.6	0.1	1.7	2.0	0.0	-0.1	0.1
1983	3.6	0.2	-0.4	0.2	0.1	0.3	-0.1	-0.1	0.0	0.7	2.5	0.3	0.5	-0.2
1984	2.8	0.5	-0.1	0.3	0.2	0.0	-0.2	-0.2	0.0	0.4	2.4	-0.2	-0.3	0.0
1985	1.0	-0.7	-0.1	-0.8	0.2	-0.0	-0.1	-0.1	-0.0	0.5	2.0	-0.7	-1.5	0.8
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3. Adjust ceiling on CBs' Lending rate upward by 1 per cent.
4. Exempt CBs' discount of export bills or L/C from cash reserve requirement and expand rediscount facility (both in

cash and time period) for textile and chemical industries, fertilizer imports as well as other labor intensive industries. Crops and livestock production.

- 1975**
1. Lower bank rate from 11 to 10 per cent in April 1975.
 2. Expand amount (from 50 to 90 per cent par) and terms of rediscount facility for textile industries until June 1976.
 3. Request CBs to report their lending activities for production and trade of 15 commodities i.e. maize, iron rods, sugar, fertilizer, paper, cement, rice, jute bags, condensed and evaporated milk, vegetable oil, nail, monosodium glutamate, rubber plywood, LPG to prevent hoarding.
- 1976**
1. Develop treasury bill market by issuing 7, 28 and 182 days bills in addition to the 63 days. The 7 per cent ceiling on treasury bill rate was also abolished, while regulation on BOT repurchase rate (of weekly rate + 0.25) was also lifted.
- 1977**
1. Reintroduce 10 per cent tax rate on interest income derived from CBs' deposits.
 2. Continued supports with close monitoring of textile, jute bags, and sugar through rediscount facility. Increased BOT lending to Bank for Agriculture and Agricultural Cooperatives from B 1,000 million to B 1,550 million.
- 1978**
1. Raised bank rate twice from 9 to 10.5 per cent in February and 12.5 per cent in December.
 2. Request cooperation from CBs and FCs to restrict their lending according to plans submitted. Restrict lending for leasing especially of private automobiles, van and pickup trucks, as well as other luxury purchases.
 3. Impose 5 per cent reserve requirements for FCs from November 1978, and restrict FCs' investments in stock or private equities to no more than 60 per cent of capital fund.

4. Increase government bond holding requirement for CBs' branches from 15 to 16 per cent of deposits, and increase bond yield from 7 to 9.25 per cent.
- 1979**
1. Raise FCs' reserve requirement from 5 to 6 per cent in February 1979.
 2. Establish Repurchase Market to facilitate domestic money market development.
 3. Raise ceiling on CBs deposit rates by 1 per cent in October and abolished ceiling on foreign deposit rate, and lending rates to industry and mining.
 4. Lower minimum amount of FCs' rates (deposits) from 50,000 to 10,000 baht.
- 1980**
1. Restructuring of interest rates led to a severely tight money situation.
 2. Deposits up by 3 per cent while the maximum loan rate charged by finance companies by 5 per cent.
 3. Mid-March - increase in bank rate on borrowing in excess of the prescribed ceiling to 14 per cent for the first tier; End-March - for the second tier to 17.5 per cent.
- 1981**
1. January - revised BOT's loan rates;
July - 1 per cent upward adjustment of interest rates on deposits and loans - to mobilise domestic savings and to relieve the tight money situation in the first three quarters.
 2. Temporary exemption of withholding tax for foreign loans until year-end - to induce capital inflows and ease domestic liquidity.
 3. Mid-September - an exchange rate swap arrangement introduced. Development of repurchase market for government bonds.
- 1982**
1. Withholding tax rate on interest income received raised to 12.5 per cent on February 27.

2. Increased 2nd tier Bank Rate to 17 per cent, bond rates 17 per cent and rediscount rate on promissory notes of finance companies 15 per cent on April 22.
 3. Bank Rate reduced to 14 per cent and 16 per cent on August 10.
 4. Bank Rate reduced to 13.5 per cent and 15 per cent on August 24.
- 1983**
1. Reduction of domestic interest rates and on ceiling loan rates in response to high domestic liquidity and relatively lower foreign interest rates.
 2. Reduced Capital-risk asset ratio of commercial banks from 8.5 to 8.0 per cent on May 1.
 3. Increased Bank Rates - to restrict liquidity on December 1.
- 1984**
1. Continued restrictive monetary policy to slow down expenditure and to alleviate trade and current account deficits during the first three quarters.
 2. Introduced measure to promote priority sectors in the fourth quarter.
 3. Increased ceiling rates of loans by 1.5 per cent on March 6.
 4. Reduced Bank Rates by 1 per cent on November 14.
- 1985**
1. Shifted priority to - Stability and flexibility of the financial system.
 2. [Reduce, Lessen] restrictive policy
 - change in loan policies of financial institution
 - adapting the interest rate structure to economic circumstances
- 1986**
1. Objectives
 - boost growth and investment through financial assistance to priority economic sectors

- improve stability and financial position of financial institution thru a less restrictive policy :
- a. Interest rate measures
 - reduced Bank Rate three times - March 4, July 9, and September 1
 - to boost investment
 - lowering refinancing rate on promissory notes three times
 - lowering interest rate ceiling
- b. Strengthen financial institutions
 - banks are required to contribute 0.1 per cent of deposits into Financial Institutions Development Fund
- c. Reduce excess liquidity
 - increase amount of a bank's foreign assets allowed
 - added 2 more maturities for bond repurchases
- d. Promote exports
 - improvement in refinancing facilities, including refinancing rates

- 1987**
1. Credit diversification and assistance to priority sectors eg. agriculture reduced interest rates, increase penalty rate, increase promissory notes refinancing rate.
 2. Counter measures to the excess liquidity situation
 - April 7 - relaxed regulations on export refinancing facilities to permit commercial banks to jointly extend credit under the scheme
 - May 26 - B 2,000 million worth of bonds issued and sold
 - absorb B 100,000 excess liquidity. Banks allowed to participate in low interest joint credit extension scheme for traders of agricultural products.
- 1988**
1. Promote rural development.
 2. Provide assistance to agricultural sector.
 3. Measures to support exporters of rice and other agri-products.

4. Improve financial assistance to priority economic sectors lower refinancing rates for small exporters and small industries reduce penalty rate.
 5. Counter-measures to excess liquidity issue bonds worth B 2,000 million with 1 year maturity and 6 per cent interest rate regulations to restrict loan of funds to non-productive areas.
- 1989**
1. Expanded coverage of rural credits to include savings co-operatives and credit unions, Credits to Thais working abroad (travelling expenses), credits for rural investment projects approved.
 2. Maximum amount of credits to small scale rural industries raised.
 3. B 1,250 million special scheme for banks to refinance promissory notes from paddy farmers and exporters of agri-products. Banks required to contribute 50 per cent. Maximum rates at 10 per cent.
 4. Regulation on credit allocation especially to non-productive sectors and for hoarding or speculative purposes.
 5. Removal of time deposits rates (1 year or more) as of June 1 - to mobilize savings.
- 1990**
1. Inflation measures
 - raised interest rates twice
 - reduced credit line to individuals under overdraft facility
 - increase credits to priority sectors
 - curb credits to economically unproductive sectors
 2. Absorb liquidity
March 23 - issue bond worth B 13.5 billion at coupon rate of 9.125 per cent with 1-year maturity.
- 1991**
1. Regulation on credit allocation - to promote priority sectors.
 2. B 5,800 million bonds auctioned March 1 to absorb liquidity.

3. September - Bank Rate reduced from 12 to 11 per cent.
 4. December 13 - issue guidelines - to expand scope of activities of financial institutions.
 5. Savings rate ceilings to be removed January 8, 1992.
- 1992**
1. Savings rate ceilings removed January 8, 1992.
 2. Relaxation on bank branch openings.
 3. June 1 ceiling rates on financial companies' and credit foncier of financial institutions.
 4. March 24 bank permitted 3 new types of business
 - i. management, issuance, underwriting and trading of debt instruments and sale of mutual funds, secured debentures, securities.
 - ii. providing economic, financial and investment information services.
 - iii. providing financial advisory services
- 1993**
1. Lower bank rate and discount rate for Finance Companies by 2 per cent (1 per cent in June and 1 per cent in September).
 2. Introduce MRR (Minimum Retail Rate) as a benchmark for lending rates to non-prime customers. MRR is, in turn, related to fixed deposit rate.
 3. Further financial liberalization including
 - i. relax capital adequacy and cash reserve requirements for BIBF businesses by foreign bank branches.
 - ii. abolish bond holding requirements for CBs' branch opening.
 - iii. increase maximum foreign exchange to be taken or sent out to neighboring countries to B 250,000 from March 1993.
 4. Request CBs' to submit credit extension plans for 1993 and 1994.

- 1994**
1. Increased the bank rate and the discount rate for finance and finance and securities companies from 9 to 9.5 per cent (September).
 2. Amended the regulation on finance companies' capital adequacy standard in line with the guidelines of BIS (July).
 3. The BOT has required :
 - i. Commercial banks to maintain net foreign exposure limit on net overbought of 20 per cent and net oversold of 15 per cent of total capital funds.
 - ii. Finance and securities companies to maintain net foreign exposure limit on net overbought of 25 per cent and net oversold of 20 per cent (November).
 4. Requested commercial banks to provide reserve for doubtful debt in two steps : increasing from 50 per cent to 75 per cent of doubtful assets from the accounting period ending June 30, 1994 and increasing to 100 per cent from the accounting period ending December 31, 1995.
 5. To facilitate the conduct of monetary policy in the period ahead, BOT requested commercial banks to submit their 1994 credit plans for priority sectors.
- 1995**
1. BOT has required commercial banks, finance companies, foreign bank branches, and BIBF businesses to submit their credit plans in every six month.
 2. Increased the bank rate from 9.5 to 10.5 per cent (March).
 3. Increased the minimum amount lending of BIBF from US\$ 500,000 to US\$ 2 million (Effective October).

Table A
CONSUMER PRICE INDEX
(1986 = 100)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Average
1970	30.5	30.7	30.6	30.4	30.5	30.5	30.6	30.3	30.4	30.5	30.3	30.3	30.5
1971	30.5	30.3	30.3	30.4	30.2	30.4	30.6	30.7	31.1	31.1	31.1	30.7	30.6
1972	31	31.1	31.4	31.5	31.7	31.9	31.9	32.3	32.6	33.1	33.3	33.5	32.1
1973	33.9	34.6	35.4	35.7	36.1	36.9	37.1	37.5	38.3	39.4	39.8	40.2	37.1
1974	41.9	43.1	44.7	45.8	40.5	46.8	46.6	47.1	47.4	47.7	48.1	47.4	46.1
1975	47.6	47.9	47.6	48.3	48.8	48.3	48.2	48.9	49	49.1	49.5	49.5	48.6
1976	49.6	49.9	50.7	50.2	50.4	50.1	49.9	50.3	51.1	51.5	52	51.2	50.6
1977	51.8	52.3	52.5	53.3	54.2	54.6	54.8	55.5	55.9	56.4	56.1	55.7	54.4
1978	56.3	56.6	57.2	57.8	58.5	59.1	59.3	59.5	59.7	60.4	60.5	60.1	58.8
1979	60.2	60.7	61.2	61.9	62.7	63.2	65	65.9	67.3	68.6	68.7	69.1	64.5
1980	70.9	73	74	75.4	78.1	78.3	77.9	78.9	79	80	81.1	80.4	77.3
1981	82.1	83.1	85.4	86.3	86.9	87.4	87.4	87.7	88.7	89.4	89.8	90.3	87
1982	90.1	90.5	91	90.7	91.6	91.9	91.5	91.3	92.3	92.7	93.4	92.7	91.6
1983	92.1	92.8	93	93.8	95	95.3	95.4	96.2	96.7	96.8	97.2	96.2	95
1984	95.6	95.5	95.5	96.1	96.5	95.9	95.8	95.9	96	96.3	95.6	95.9	95.9
1985	96.1	97	97.4	97.6	98.2	98.3	98.3	98.6	99	99.5	99.1	99	98.2
1986	98.9	98.9	99.3	99.5	100	99.9	99.9	100.3	100.7	101	100.9	100.7	100
1987	100.9	100.8	100.9	101.3	101.8	102.4	102.5	103.1	103.6	103.5	104.4	104.4	102.5
1988	104.1	105.1	105.5	105.8	106	106.1	106.2	106.7	107.7	108.2	107.9	107.7	106.4
1989	108.4	109.7	109.7	110	110.8	111.3	112.9	114	114.5	115	114.9	114.3	112.1
1990	115	116.2	116.6	117.3	118.1	118.4	118.7	119.1	119.6	122	122.5	121.9	118.8
1991	122.1	122.9	122.9	124.6	125.5	125.7	125.2	126.2	127.5	128.4	128	127.6	125.6
1992	128.2	128.7	128.3	128.8	130.7	131.3	131.6	132.7	132.8	132.6	131.9	131.4	130.8
1993	131.9	132.9	132.9	134	134.4	134.9	135.6	136	137.2	137.1	136.7	137.5	135.1

Table B
CPI BY COMPONENTS
(1986 = 100)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
CPI	32.1	37.1	46.1	48.5	50.6	54.4	58.7	64.5	77.2	87.1	91.6	95.0	95.9	98.2	100.0	102.5	106.4	112.1	118.8	125.6	130.8	135.1
Food and Beverages	32.5	39.1	50.6	53.2	55.6	60.8	66.2	72.2	86.3	95.4	98.1	103.1	101.9	99.4	100.0	102.3	107.5	116.4	125.7	134.4	140.5	143.5
Rice, Flour and Flour Products	31.9	36.6	51.7	53.8	54.7	62.2	64.5	70.3	87.2	93.1	96.5	104.1	104.6	97.9	100.0	103.6	108.7	116.2	119.9	129.0	137.6	133.9
Meat, Poultry and Fish	34.6	42.6	50.3	57.8	62.2	66.3	75.6	82.3	98.1	100.2	102.3	116.9	104.1	102.4	100.0	108.7	109.4	115.4	131.9	153.2	163.5	164.5
Fruits and Vegetables	43.2	57.9	71.7	65.6	70.5	70.9	77.3	83.7	88.9	103.2	107.8	107.5	100.4	104.5	100.0	96.9	108.1	117.6	124.0	125.0	122.7	128.5
Eggs and Milk Products	40.1	45.9	61.9	63.5	63.4	67.7	69.5	77.1	98.6	103.4	103.1	107.9	116.3	107.4	100.0	100.8	108.1	112.5	112.8	117.1	119.2	120.6
Cooking accessories	30.6	32.3	37.1	39.4	40.4	46.1	49.1	53.8	69.2	77.4	88.0	93.3	92.4	94.0	100.0	100.9	102.0	106.3	114.8	117.7	119.3	120.3
Non-alcoholic Drink	29.3	33.9	41.9	45.2	49.4	55.5	60.1	67.8	78.0	86.2	91.9	94.4	96.1	98.4	100.0	101.0	102.4	113.7	127.2	135.0	140.4	149.5
Other Ready-made Food																						
Non-Food and Beverage	33.9	37.3	43.9	46.3	48.2	50.6	54.0	59.7	71.5	81.7	87.6	90.0	92.1	97.5	100.0	102.6	105.9	109.7	114.7	120.2	124.8	130.0
Clothing	34.0	39.4	46.9	49.5	51.0	53.2	55.9	63.6	76.5	84.1	88.7	92.1	94.0	97.7	100.0	102.5	105.4	111.0	118.6	125.4	131.9	139.7
Housing, and Furniture	33.5	37.3	43.3	44.9	46.3	48.8	51.5	56.5	67.5	76.4	81.9	85.5	88.8	95.0	100.0	103.5	106.3	109.9	113.7	117.2	119.8	122.6
Health and Personal Services	40.2	41.8	47.2	50.9	51.5	54.8	59.3	63.3	76.4	84.2	89.6	92.5	95.6	99.1	100.0	101.6	102.6	106.2	112.3	118.0	124.1	131.2
Vehicles, Transport and Telecommunication	23.6	25.6	35.4	37.6	41.2	42.5	48.8	56.9	70.7	90.9	95.3	95.8	96.0	102.5	100.0	100.6	103.2	105.6	111.0	119.9	123.9	131.4
Entertainment, Reading and Education	39.5	42.6	48.5	52.1	54.5	56.1	59.7	65.9	78.7	86.6	93.8	95.8	97.1	99.2	100.0	101.2	107.4	112.7	117.8	123.8	133.5	141.6
Tobacco and Alcoholic Drinks	41.3	42.5	49.2	51.2	53.8	57.6	59.1	60.8	67.4	75.1	88.4	85.9	83.8	96.0	100.0	106.1	110.1	111.4	118.4	125.4	125.8	126.3

Table C
CPI BY COMPONENTS
(Per Cent Changes)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
CPI	4.8	15.5	24.3	6.3	4.2	7.6	7.9	9.9	19.7	12.7	5.2	3.8	0.9	2.4	1.9	2.5	3.8	5.4	6.0	5.7	4.1	3.3
Food and Beverages	7.0	20.3	29.4	5.2	4.5	9.4	8.9	9.0	19.6	10.6	2.8	5.0	-1.1	-2.5	0.6	2.3	5.1	8.3	8.0	6.9	4.5	2.1
Rice, Flour and Flour Products	7.7	41.3	28.6	0.6	2.1	8.4	8.8	4.5	16.7	26.6	-4.1	-3.0	-0.1	-5.1	1.5	0.6	21.9	7.8	2.9	4.5	4.8	-1.1
Meat, Poultry and fish	6.5	14.8	41.1	3.7	2.0	13.8	3.7	8.9	24.1	6.7	3.7	7.9	0.5	-6.4	2.1	3.6	4.9	6.9	3.2	7.6	6.7	-2.7
Fruits and Vegetables	14.1	16.4	18.1	14.9	7.6	6.7	14.0	8.8	19.3	2.1	2.1	14.3	-11.0	-1.6	-2.3	8.7	0.6	5.6	14.3	16.1	6.7	0.6
Eggs and Milk Products	2.3	28.0	23.8	-8.5	7.5	0.6	9.0	8.3	6.2	16.0	4.5	-0.3	-6.6	4.1	-4.3	-3.1	11.4	8.7	5.4	0.8	-1.8	4.7
Cooking Accessories	6.2	14.6	34.7	2.7	-0.2	6.7	2.7	10.9	27.9	4.9	-0.3	4.7	7.8	-7.7	-6.9	0.8	7.3	4.0	0.3	3.8	1.8	1.2
Non-alcoholic Drinks	2.3	5.6	14.8	6.4	2.4	14.1	6.6	9.6	28.6	11.9	13.6	6.1	-10.0	1.7	6.4	0.9	1.0	4.2	8.0	2.5	1.4	0.8
Other Ready-made Food	3.4	15.6	23.9	7.8	9.3	12.2	8.4	12.8	15.1	10.4	6.7	2.7	1.8	2.4	1.6	0.9	1.4	11.1	11.9	6.1	4.0	6.5
Non-Food and Beverages	2.3	9.9	17.8	5.5	4.0	4.9	6.8	10.5	19.8	14.2	7.2	2.7	2.4	5.8	2.6	2.7	3.1	3.6	4.6	4.8	3.8	4.2
Clothing	2.4	15.8	18.9	5.6	3.2	4.3	5.1	13.7	20.3	10.0	5.5	3.8	2.1	3.9	2.4	2.6	2.8	5.3	6.8	5.7	5.2	5.9
Housing and Furniture	2.1	11.5	16.0	3.5	3.1	5.5	5.3	9.8	19.3	13.3	7.2	4.4	3.9	6.9	5.3	3.5	2.7	3.4	3.5	3.1	2.2	2.3
Health and personal Services	4.2	3.8	12.9	8.0	1.2	5.5	9.0	6.9	20.6	10.2	6.5	3.2	3.3	3.7	0.9	1.6	1.0	3.5	5.7	5.1	5.2	5.7
Vehicles, Transport and Telecommunication	1.7	8.3	36.3	6.4	9.5	3.1	14.8	16.7	24.2	28.5	4.8	0.6	0.2	7.1	-2.8	0.6	2.6	2.3	5.1	8.0	3.3	6.1
Entertainment, Reading and Education	2.9	7.7	14.2	7.1	4.6	2.9	6.4	10.4	19.4	10.1	8.2	2.1	1.3	2.2	0.8	1.3	6.1	5.0	4.5	5.1	7.8	6.1
Tobacco and Alcoholic Drinks	0.4	3.0	15.4	4.2	5.1	7.0	2.8	2.7	10.8	11.4	17.8	-2.7	-0.1	11.8	4.2	6.0	3.9	1.2	6.3	5.9	0.3	0.4

Table D
SOME INFLATION - RELATED KEY ECONOMIC INDICATORS OF THAILAND

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1981	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 p
1. Growth	4.1	9.9	4.4	4.9	9.4	9.9	10.4	5.3	4.8	6.3	4.1	7.3	7.1	3.5	4.9	9.5	13.2	12.0	10.0	8.2	7.4	7.5
- Agriculture	-1.7	9.5	2.9	4.4	6.0	2.3	12.5	-1.8	1.7	5.4	3.1	4.4	5.6	6.2	0.3	(0.2)	10.2	6.6	(3.9)	4.4	3.7	1.7
- Non-Agriculture	6.2	10.0	4.8	5.0	10.5	12.3	9.9	7.4	5.6	6.6	4.3	8.0	7.5	2.9	6.1	11.8	13.0	13.1	12.7	8.8	8.0	8.4
2. Inflation	4.9	15.5	24.3	5.3	4.2	7.6	7.9	9.9	19.7	12.7	5.2	3.8	0.9	2.4	1.9	2.5	3.8	5.4	6.0	5.7	4.1	3.3
3. % World Oil Price (US\$/Barrel)	8.3	103.2	131.2	-11.0	9.5	10.6	1.2	113.8	16.8	2.7	-6.2	(7.9)	(4.1)	2.0	(30.4)	27.0	(22.4)	20.8	29.0	(18.5)	3.7	(11.0)
4. % Domestic Retail Price of Petroleum Products	0.0	22.3	60.0	6.7	0.0	9.6	10.1	41.7	55.4	18.2	1.4	-3.9	(4.3)	0.0	(9.8)	(4.4)	0.2	(3.0)	8.7	13.7	(3.4)	(1.1)
5. % Minimum Wage 1/	-	n.a.	55.6	33.9	0.6	3.4	17.3	28.4	28.3	19.5	11.5	3.6	3.2	5.7	0.0	3.6	1.2	6.4	11.8	11.9	11.4	10.1
6. % Non-Oil Import price	-0.3	9.3	45.9	4.5	4.6	7.6	10.2	9.7	9.5	16.5	3.7	(3.9)	3.4	8.1	4.2	7.7	14.4	6.2	2.9	4.8	1.7	1.8
7. % M2	23.8	22.4	21.2	16.2	20.9	20.0	19.3	14.7	22.5	16.3	24.2	23.8	19.4	10.3	13.4	20.2	18.2	26.3	26.7	19.8	15.6	18.8
8. % Private Credit	13.9	43.5	34.9	23.1	18.0	28.1	29.7	22.9	11.4	15.2	18.0	34.1	18.4	10.7	4.8	23.2	27.0	29.8	33.3	21.0	20.6	19.2
9. Maximum Lending Rates 2/	14.0	14.0	15.0	15.0	15.0	15.0	15.0	15.0	18.0	19.0	19.0	17.5	19.0	19.0	15.0	15.0	15.0	15.0	19.0	16.0	14.5	14.5
10. Maximum Deposit Rates 3/	7.0	7.0	8.0	8.0	8.0	8.0	8.0	9.0	12.0	13.0	13.0	13.0	13.0	13.0	9.5	9.5	9.5	9.5	13.0	10.5	8.5	7.0
																						15.5

1/ Minimum wage rate was introduced in 1973.

2/ Lifted from June 1992.

3/ Lifted from March 1990.

p/ Preliminary

Table E

COMMODITY CONTROL BY ITEMS AND MEASURES

	Present Control						Notes
	Price Control			Quantity Control			
	Display	Report After Adjustments	Report Before Adjustments	Price Ceilings	Report Quantity	Transportation Control	
Agricultural Products and Food							
01 Pork	/						
02 Sugar	/			/			
03 Milk (Powder Fresh, Condensed and Evaporated	/	/		/			
04 Cooked Food	/*						
05 Cooking oil (both edible and inedible	/*		/*		/**	**	* For restaurants and food shops ** For Bottled vegetable oil ** For palm oil
06 Live Pig							
Household Goods							
07 Drugs	/	/					
08 Detergent except for Concentrated types	/		/				
Construction Materials							
09 Iron rods	/		/		/		
Energy							
10 Fuel	/	/		/*			* For LPG for Cooking Purposes
11 LPG	/						

Table E (Cont'd)
COMMODITY CONTROL BY ITEMS AND MEASURES

	Present Control							Notes
	Price Control				Quantity Control			
	Display	Report	Report After Adjustments	Report Before Adjustments	Price Ceilings	Report Quantity	Transportation Control	
Automobile, Parts and Equipment	/			/*		/**		* For all kind of motorcycle and pickups, and private cars no more than 1,600 cc. ** Only cars and trucks
12 Motorcycles, cars, trucks								
Parts and Equipments								
General Items								
13 Concentrated Pet Food	/		/					
14 Fertilizer	/							
15 Pesticide or Insecticide	/			/				
16 Student Uniform	/		/	/				
17 Helmet	/							
18 Tape cassettes, Compact Discs and Video Tapes	/						/	
19 Formic Acid							/	
20 Calcium Carbide							/	
21 Cassette, Compact Disc, and Video Recorders								
Total 21 items	17	1	4	6	3	3	1	

* For all kind of motorcycle and pickups, and private cars no more than 1,600 cc.
** Only cars and trucks