Policy assignment on money supply: the case of Indonesia in the 1980s

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July 1995

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Indonesia has taken a series of the most drastic deregulatory steps on the financial sector among Asian developing countries since the 1980s. The financial deregulation has contributed to the accommodation of the loanable funds necessary for its intensive investment. Indonesia, on the other hand, has managed to curb inflation at the annual rate below double digits by controlling money supply. When we focus on the stance of monetary policy in the long-run view, investment requires the expansion of money supply, and price stability requires its contraction. Thus, the monetary policy in Indonesia has been on a double-edged sword. This article describes how Indonesia has struggled with "double-track" targets on monetary policy, and evaluates its policy performance from the viewpoint of its workability and consistency.

I Introduction

Monetary policy has double-track targets: (1) to control money supply for the purpose of curbing inflation, and (2) to accommodate deposit money for investment to secure economic growth. Section II presents the theoretical backgrounds concerned with the relationships between money and inflation and between money and economic growth in order to clarify the double-track targets on monetary policy. Section III describes the attainability of the double-track targets based on the empirical studies of Asian developing countries; the double-track targets are simultaneously attainable by the policy assignment on money supply: assigning monetary base to control for curbing inflation, and assigning M2 to accommodate for investment. Section IV reviews and evaluates the specific policy instruments to attain the double-track targets by keeping track of the Indonesian monetary policy.

The strategic implication of our findings is the significance of the policy assignment on money supply to attain the double-track targets, and of the improvement of the policy instruments in their implementation.

II Theoretical Backgrounds

A. Money and Inflation[1]

In this section we concentrate on the theoretical backgrounds concerning the effect of money growth on inflation. It is only under rational expectations and with full wage and price flexibility that money expansion instantly leads to inflation with no impact on output. Money growth

is, however, translated fully into inflation in the long run though it expands output in the short run, in standard macroeconomic framework.[2]

Empirical evidence verifies the long-run link between money growth and inflation in the sense that inflation could not continue without continued money growth. That link is, however, not always solid for the following reasons: (1) Increases in real income expand money demand, and thereby reduce inflation rate; (2) Changes in interest rates, fiscal policy change, supply shock[3] and so forth, disturbs the money-inflation link; (3) The consecutive shift of money demand, typically associated with financial renovation, makes the money-inflation link insignificant. The first two reasons explain short-run instability of the money-inflation relationship, while the third factor explains the even, long-run one.

There is a frequent argument that money growth is the result of government fiscal deficit. If government monetizes its deficit, it runs the risk of increasing the inflation rate, as it is called "inflation tax". Hyperinflation, typically seen in the aftermath of wars, usually originates from a large budget deficit that causes the monetary authorities to print money to finance the deficit.

Curbing inflation is of vital importance, especially in developing countries, since price stability is a fundamental condition for economic development as it enhances savings and investment by removing uncertainty. The implication for monetary policy is, then, the significance of controlling money to curb inflation in the long run.[4]

B. Money and Economic Growth[5]

The relationship between money and economic growth can be attributed to the relationship between money and productive capital asset, since capital is an essential factor of production, especially in a labour-surplus economy. Therefore, we now focus our discussion on the relationship between money and productive capital asset.

James Tobin's (1965) model of money and economic growth comes first as the concerned literature in the postwar period. This model presumes that households allocate their savings

between money and productive capital assets. It follows that holding money in their portfolios has the effect of reducing savings available for investment, thereby having a negative impact on economic growth. This substitution hypothesis between money and productive capital asset brings in the policy implication that the return on money should be curbed by policy instruments to enhance economic growth.[6]

Ronald McKinnon (1973) and Edward Shaw (1973) challenge the case for financial repression. They advocate financial liberalization as one of the important factors to enhance economic growth.[7] McKinnon (1973) presents an alternative model[8] in which money is complement to, rather than substitutes for, productive capital assets in the sense that investment expenditures are lumpier than consumption ones; potential investors must accumulate money before their investment.[9]

McKinnon's complementarity hypothesis is based on the assumption that all economic units are confined to self-finance; they do not borrow from, or lend to, each other. Investment with its lumpiness, however, necessitates the accumulation of deposit money, regardless of financing method: self-finance or borrowings. Shaw (1973) develops a monetary model in which money is backed by investment loans to the private sector, recognizing that "credit money" has mostly displaced "commodity money" in our modern economy.

The complementarity hypothesis has been put to empirical tests on a number of developing countries and has been one of the intellectual bases for financial sector analysis and policy advice over the past 15 years, especially in the context of the recent financial liberalization in East Asian countries.[10] We now follow the complementarity hypothesis. The implication for monetary policy here is the significance of accommodating deposit money for investment to secure economic growth.

C. Double-track Targets and Policy Assignment

The discussions in subsections A and B above suggest that monetary policy has double-track

targets: (1) to control money supply for the purpose of curbing inflation; (2) to accommodate deposit money for investment to secure economic growth. There comes the question on whether both independent targets are simultaneously attainable. As Mundell (1962) tells us, multiple targets can be coped with by at least the same number of policy instruments.

From the observations on the behaviour of monetary aggregates of Asian developing countries in the following section, we find that both targets are simultaneously attainable by assigning the corresponding variables of money supply: assigning monetary base to control for curbing inflation, and assigning M2 to accommodate for investment.

The next question concerns the kinds of specific policy instruments that are available to handle each variable on money supply. The Indonesian case described in Section IV tells us: (1) that the control of the monetary base requires a fiscal discipline counting on no "inflation tax" and a matured system of open market operation, and (2) the accommodation of M2 necessitates financial deregulation, specifically eliminating interest rate ceilings, reducing minimum reserve requirements and so forth, accompanied by improving banking management and supervision.

III Behaviour of Monetary Aggregates and the Macroeconomy in Asian Developing Countries

A. Money and Inflation

We now start the observation on the behaviour of monetary aggregates in Asian developing countries with the long-run link between money growth and inflation (Table 1). The countries and region selected are those with the population sizes of over ten million and with the availability of continuous annual data in 1980s.

Figures 1a and 1b describes the association between annualized inflation rates in the 1980s and annualized growth rates of M2 and monetary base which are respectively adjusted for annualized

growth rates of real GDP.[11] The following are the main observations of these figures:
1. The monetary base-inflation link is strikingly solid, not only because the higher the growth of the monetary base of a country, the higher inflation rate the country records, but because inflation rates are nearly equal to the growth rates of the monetary base except for the Philippines and Nepal, as shown in the dots converging closely on the 45° line.
2. The M2-inflation relationship does not have any remarkable characteristic except that in most countries, especially in all East Asian countries, the growth rates of M2 exceed inflation rates.

From these observations, in the long-run view monetary base rather than M2 is reasonably assigned to control for curbing inflation, and that the income velocity of M2 has declined in most countries. This will be commented on in a later section.

Determinants of Monetary Base Growth

We now describe what factors had a major impact on monetary base in the balance sheet of the monetary authorities. Figure 2 describes the contributions of the foreign factor, in terms of net foreign capital inflow, and the contributions of the fiscal factor in terms of money financing of fiscal deficits, to the growth rate of monetary base during the 1980s for nine Asian developing countries.[12] It is observed that:
1. In central Asian countries of Nepal, Sri Lanka, India and Pakistan, which encounter higher growth of the monetary base, the fiscal factor dominates the growth of the monetary base.
2. In the East Asian countries of Korea, Indonesia, Thailand and Malaysia except for the Philippines, the foreign factor occupied a great part of the growth of the monetary base. The fiscal factor, which shows a negative impact, offsets the foreign factor to some extent.

The implications from these observations are:
1. Money financing of fiscal deficits tends to cause the higher growth of the monetary base, thereby incurring inflation. No reliance on "inflation tax" in fiscal balance is, therefore, one of the prerequisites to curb inflation.
2. Under the relatively liberalized foreign

TABLE 1
Behaviour of Monetary Aggregates and the Macroeconomy in Asian Developing Countries: Annualized Growth Rate for 1980–90
(Percentages)

| | Figures 1a, 1b | | | Figures 4a, 4b | | | | Figure 2 | |
	Inflation	*Monetary Base[1]*	*M2[1]*	*Investment (real)*	*M2*	*Money Multiplier*	*Monetary Base*	*Contribution Rate Foreign*	*Fiscal*
East Asia									
Indonesia	9.1	8.5	20.9	7.4	27.1	11.4	14.0	11.4	−9.5
Korea	6.4	5.7	8.4	12.0	18.5	2.6	15.6	13.6	−8.3
Malaysia	1.9	4.6	4.6	6.4	10.8	0.0	10.8	15.5	−1.7
Philippines[2]	15.4	20.4	15.6	−2.8	16.7	−4.0	21.5	−20.4	−16.5
Taiwan	3.0	4.3[3]	12.5	6.3	21.2	7.8	n.a.	n.a.	n.a.
Thailand	4.0	4.4	11.2	9.5	19.8	6.5	12.5	29.7	−10.8
South Asia									
India	8.3	10.1	10.6	6.6	17.0	0.4	16.5	0.6	19.5
Nepal	9.1	13.5	14.3	4.8	19.7	0.7	18.8	10.4	14.5
Pakistan	7.2	7.9	6.5	5.6	13.2	−1.3	14.7	−1.7	10.7
Sri Lanka	14.8	14.9	13.4	−0.6	15.7	−1.2	17.1	1.1	24.0

NOTES
1. Adjusted for real GDP growth.
2. 1983–90.
3. Currency instead of monetary base that is not available.

SOURCES: Taiwan and real investment: *Key Indicators of Developing Asian and Pacific Countries 1992. Volume XXIV* (Manila: Economics and Development Resource Center, Asian Development Bank, 1992). Others: *International Financial Statistics Yearbook 1992* (Washington, D.C.: International Monetary Fund, 1992).
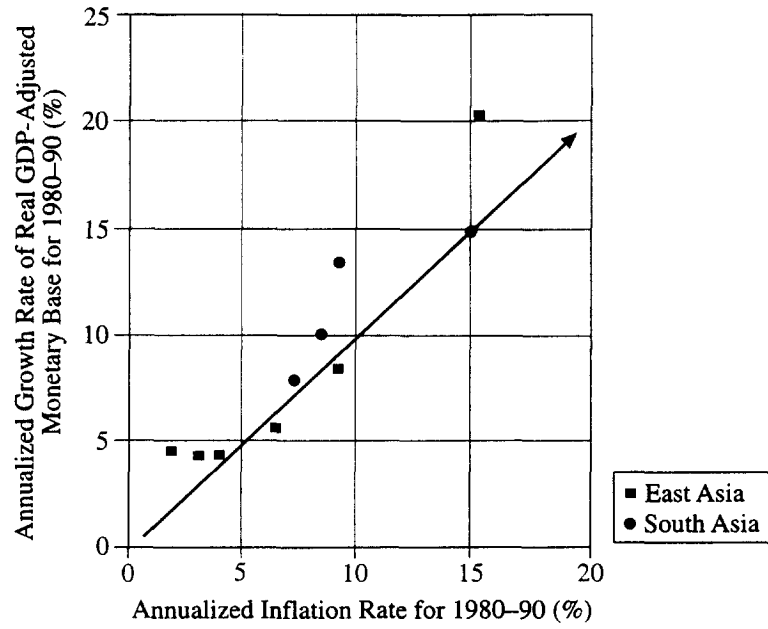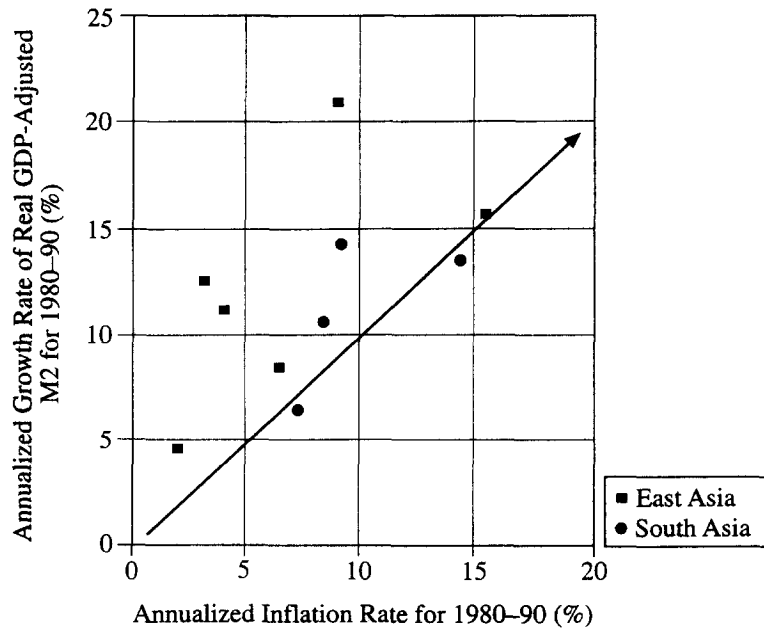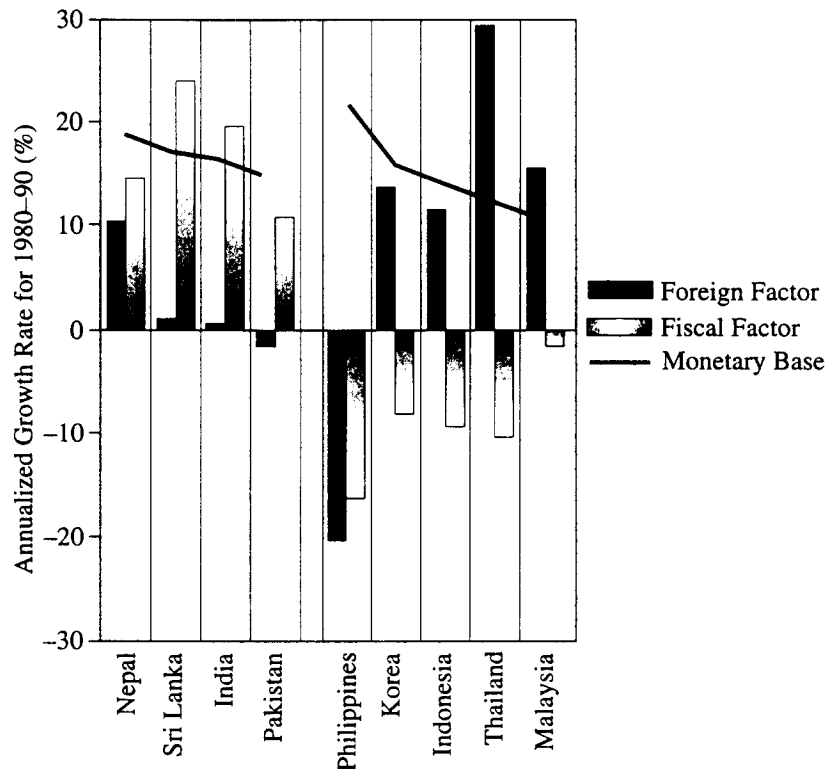
FIGURE 1a
Monetary Base-Inflation Relationship

Annualized Growth Rate of Real GDP-Adjusted Monetary Base for 1980–90 (%) [y-axis]

Annualized Inflation Rate for 1980–90 (%) [x-axis]

Legend:
■ East Asia
● South Asia

FIGURE 1b
M2-Inflation Relationship

Annualized Growth Rate of Real GDP-Adjusted M2 for 1980–90 (%) [y-axis]

Annualized Inflation Rate for 1980–90 (%) [x-axis]

Legend:
■ East Asia
● South Asia

SOURCES: See Table 1.

FIGURE 2
Foreign and Fiscal Factors of the Monetary Base

SOURCES: See Table 1.

exchange systems in East Asian countries, massive foreign capital flows was one of the major factors causing fluctuations in the monetary base in the balance sheet of monetary authorities. Monetary authority is, therefore, required to equip such policy instruments as open market operations to sterilize and offset the impact of foreign capital flow on the monetary base.

Behaviour of Income Velocity

We now revert to the money-inflation relationship in terms of income velocity. Figures 3a and 3b show the behaviour of income velocity of M2 and the monetary base in long-term intervals, for East Asian countries[13] and the United States. It is observed that:

1. East Asian countries show a declining trend of income velocity of M2, while their velocity of the monetary base reveals relative constancy at around ten despite short-run volatility.

2. The United States shows constancy in the income velocity of M2, while the velocity of the monetary base has an increasing trend until the early 1980s, and a declining trend thereafter.

The implications from these observations are:

1. The constancy of the income velocity of the monetary base in East Asian countries is nothing more than another expression of their solid link between inflation and real income-adjusted monetary base.[14]

2. The declining trend of income velocity of M2 in East Asian countries corresponds to the case

FIGURE 3a
Income Velocity of M2

Legend:
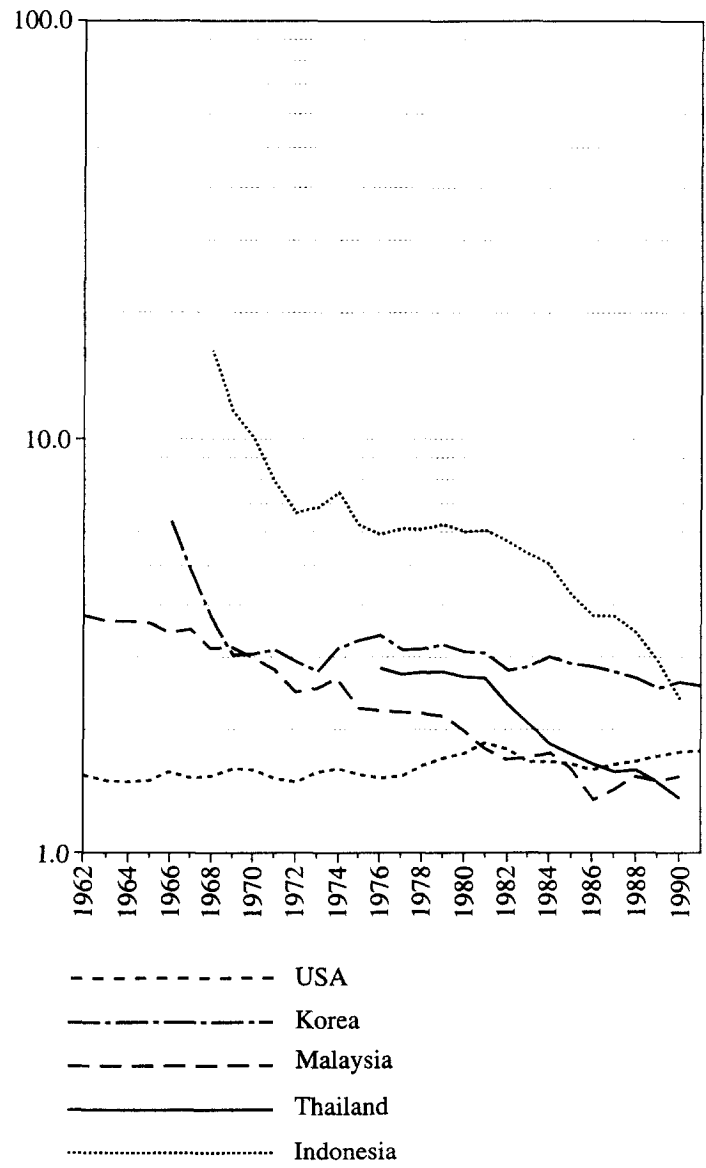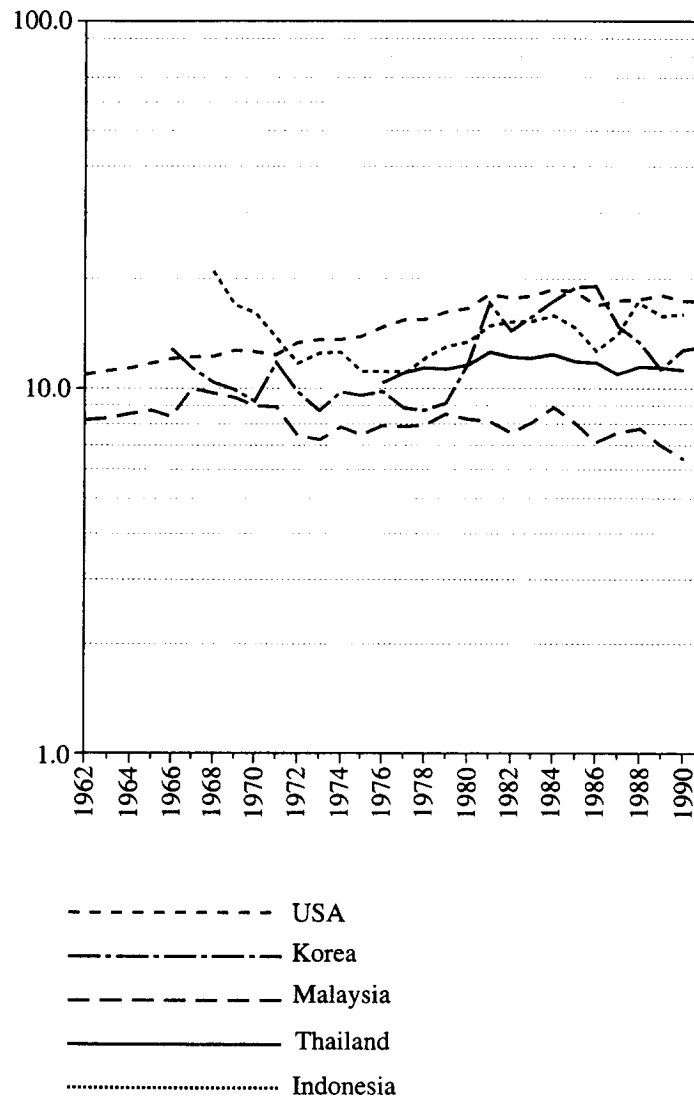- USA
- Korea
- Malaysia
- Thailand
- Indonesia

FIGURE 3*b*
Income Velocity of the Monetary Base

SOURCE: *International Financial Statistics Yearbook 1993* (Washington,
D.C.: International Monetary Fund, 1993).

that was previously stated in Section II as the reason (3) to explain the instability of the money-inflation relationship. This declining trend is consistent with the observation in subsection A that M2 growth adjusted for real gross domestic product (GDP) growth exceeds inflation rate in concerned countries.

The declining trend of income velocity of M2 implies the possibility of the consecutive rightwards shift of M2 demand.[15] If we follow McKinnon's hypothesis, we can interpret that the consecutive rightwards shift of M2 demand is caused by intensive investment. In other words, the reason why the rapid M2 has not led to the same speed of inflation lies in its growing demand for investment. The relationship between M2 and investment will be examined in the following section.

3. The behaviour of income velocity in the United States forms a striking contrast with those in East Asian countries. In the United States, M2 rather than the monetary base has usually been adopted as a target for monetary control due to the constancy of income velocity of M2. The demand for monetary base, on the other hand, has been unstable partly because of its demand shift named "missing money" in the financial innovation of the mid and late 1970s.

B. Money and Investment

We next examine the relationship between money and investment in Asian developing countries. The "money" we are concerned with is "deposit money" as described in subsection B of Section II. Therefore we basically pay attention to M2 as a monetary aggregate; M2 is a monetary aggregate broadly defined to include time deposits.

Figure 4a depicts the relationship between annualized M2 growth rate in the 1980s and annualized growth rates of investment in real terms. Unfortunately, we could not find any clear correlation between them in this figure.

In addition, we are also concerned about M2 growth minus monetary base growth: the percentage change in money multiplier, because M2 contains the monetary base which falls into a

category different from deposit money, and also shows a different trend from M2. Figure 4b, then, indicates the relationship between the annualized percentage change in money multiplier and annualized growth rates of investment in real terms. We observe loose, but positive, correlation between them. It is rather natural that their correlation is loose since the determinants of the money multiplier and real investment are not confined to be each other's variable, especially in a cross-sectional relationship.

The higher hike of the money multiplier in Indonesia, Taiwan, Thailand and Korea is consistent with the fact that they have more or less experienced financial deregulation in the 1980s. These countries also record the relatively high growth of real investment. It implies that M2, specifically deposit money, which has been accommodated through financial deregulation, has been a good match for the growing deposit money demand for intensive investment. We will clarify the specific instruments of deregulation for accommodating M2 by focusing on the Indonesian case in the following Section.

IV Policy Assignment on Money Supply in Indonesia

A. Policy Instruments to Control Monetary Base[16]

We verified the long-run link between the monetary base and inflation including the Indonesian case in Section III. We now concentrate on the issues of how Indonesia has controlled the monetary base and how it can be evaluated.

Figure 5 depicts the simplified balance sheet of the monetary authorities since 1983. We observe the following characteristics on the major factors that affected the monetary base:

1. The fiscal factor: the central government net assets have made negative and constant contributions to the monetary base. This is because Indonesia has adopted the "balanced budget principle" since 1968; the fiscal deficit should be financed not by the government bonds but by foreign borrowings. Indonesia has, therefore, depended on no inflation tax for its fiscal deficit.
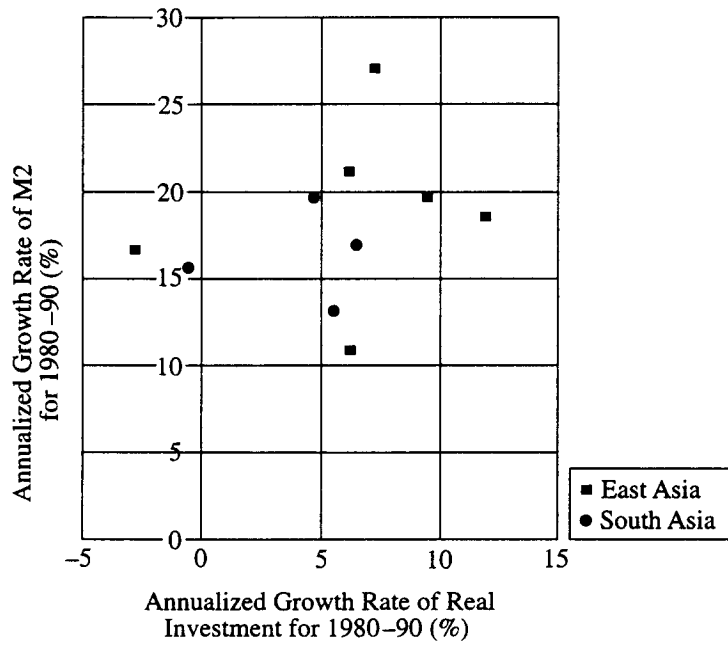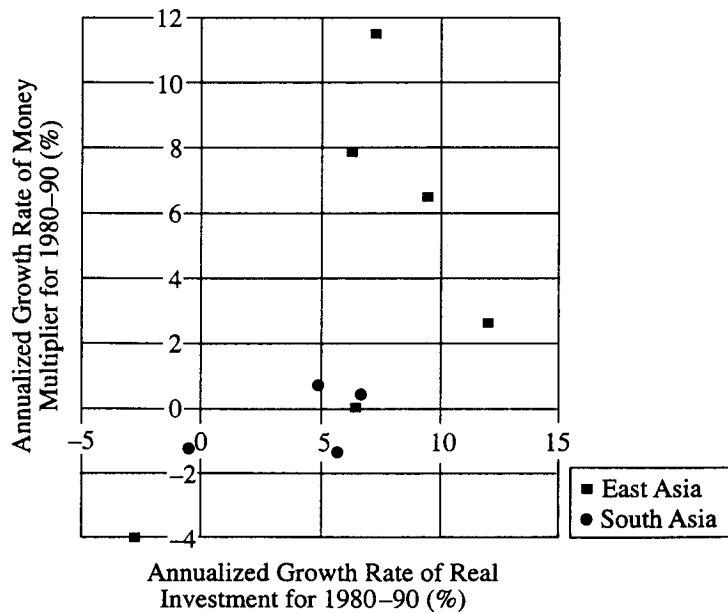
FIGURE 4a
M2-Investment Relationship

Annualized Growth Rate of M2 for 1980–90 (%)

Annualized Growth Rate of Real
Investment for 1980–90 (%)

FIGURE 4b
Money Multiplier-Investment Relationship

Annualized Growth Rate of Money Multiplier for 1980–90 (%)

Annualized Growth Rate of Real
Investment for 1980–90 (%)

SOURCES: See Table 1.

FIGURE 5
Balance Sheet of Bank Indonesia


```
            Foreign Factor
      — - — Fiscal Factor
      -------- SBI
      ............ SBPU
            Monetary Base
      — - — Others
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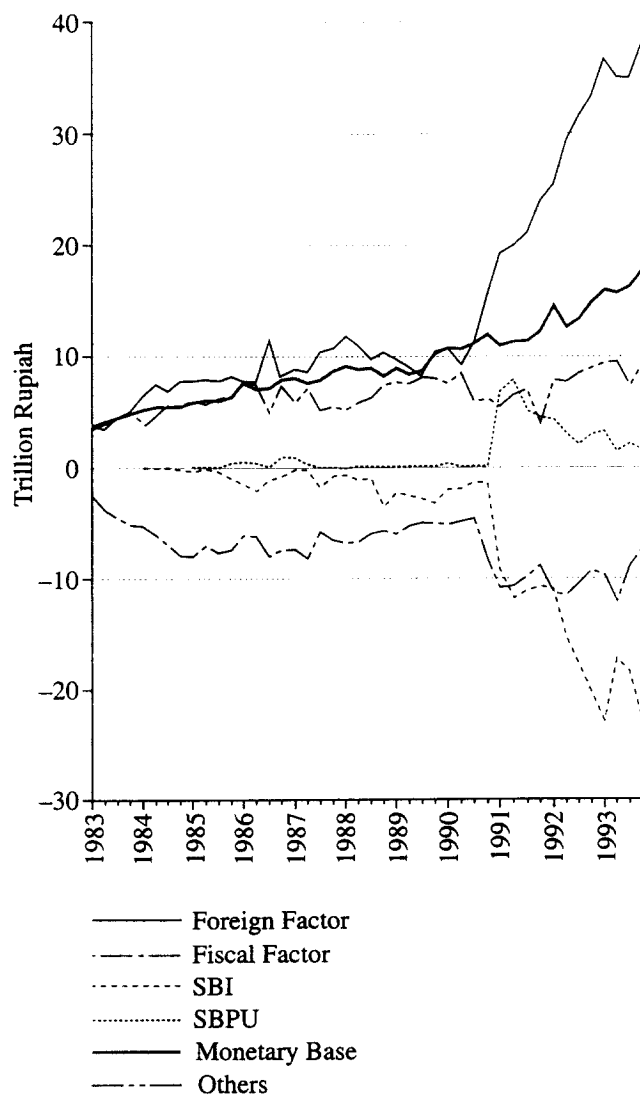
SOURCES: *Indonesian Financial Statistics*, Bank Indonesia,
January 1994, and previous issues.

2. The foreign factor: the foreign net assets have brought volatility in the trend of the monetary base. This is because Indonesia has adopted an open exchange rate system since 1971; there is no surrender requirements for export proceeds and tax or subsidy on the purchase or sale of foreign exchange. The only obstacle of foreign capital flows have been the ceilings on external borrowings of financial institutions.

Under the balanced budget principle and open exchange rate system, the monetary authorities have concentrated on struggling with the volatile impact of the foreign capital flow to control the monetary base. While promoting financial

deregulation in the 1980s, Indonesia facilitated instruments for open market operations: Sertifikat Bank Indonesia (SBI) is the central bank's debt paper, which was introduced in February 1984. Surat Berharga Pasar Uang (SBPU) are promissory notes issued by the banks and non-bank financial institutions as well as those issued by the bank's customers and endorsed by the related bank, which were introduced in February 1985.

The question is, then, whether SBI and SBPU have functioned as vehicles for open market operations. The typical examples are those cases where the central bank substantially increased the issuance of SBIs in the third quarter of 1987 and the first quarter of 1991, aiming at the absorption of excess liquidity caused mainly by foreign capital inflow. As those cases were called Sumarlin Shock,[17] SBIs were issued in such a way that the central bank just forced state banks to transform their deposits from state owned corporations into SBIs, under the prevailing speculation on the currency's devaluation. The state banks still hold the placed SBIs since they have not been allowed to trade them in the markets.

The introduction of the SBI and the SBPU could be significant steps to improving the controllability of the monetary base. However, the existing operation has not yet attained to "matured" open market operation due to the limited liquidity of SBI and SBPU, and the lack of secondary markets for such instruments.

B. Policy Instruments to Accommodate M2

We now examine the issues of how Indonesia has accommodated a sufficient amount of M2 for intensive investment and how it can be evaluated.

First, we review a series of deregulation steps in the financial sector since the early 1980s. Financial deregulation started in 1983 to eliminate interest rate ceilings and reduce the discretion in credit allocation of several sectors. This was followed by consecutive deregulation packages: PACT in 1988 stipulated lowering barriers on entry and branching, and reducing the minimum reserve requirement from 15 per cent to 2 per cent. Packages in 1990 and 1991 stipulated

various measures to improve banking management and supervision, including the prudential regulation on Capital Adequacy Ratio called CAR.[18]

These measures have contributed to the accommodation of M2, not through the growth of monetary base but through a rise of the money multiplier;[19] the reduction in the reserve requirement and the elimination of barriers on entry and branching of banks have directly raised the money multiplier, while the removal of interest rate ceilings has done it through a rise of the market interest rate. The accommodation of M2 through a rise of the money multiplier is of great significance, first because the monetary base should be controlled for curbing inflation as we stated before, and second because it is "deposit money" that investment will necessitate.

Through the above mentioned process, financial deregulation has significantly expanded M2 by more than 20 per cent annually since the early 1980s and the M2 expansion, which satisfied the growing demand for investment funds, led to the investment boom and the high economic growth around 1990 (Figure 6). Therefore, we can say that Indonesia has successfully accommodated a sufficient amount of M2 for intensive investment through financial deregulation measures. The next question is whether the expanded M2 had been efficiently allocated to investment projects.

Since the 1990s, Indonesia has suffered from accumulating bad loans in its banking system. According to announcements by the Indonesian Ministry of Finance,[20] the average for non-performing credit in the overall banking industry increased to 15.8 per cent of their outstanding loans as of October 1993, up from 13.4 per cent as of 1992, 8.2 per cent as of 1991 and 6 per cent as of 1990. Most of the non-performing loans occurred at state banks, which occupy about 50 per cent of the overall lending portfolio. Several measures were taken to improve banking management and supervision in the 1990 and 1991 Packages. The accumulating bad loans, however, reflect that these efforts so far have not been enough for efficient allocation of investment funds, and that there still remain some preferential

FIGURE 6
Trends of M2 and Investment in Indonesia

M2
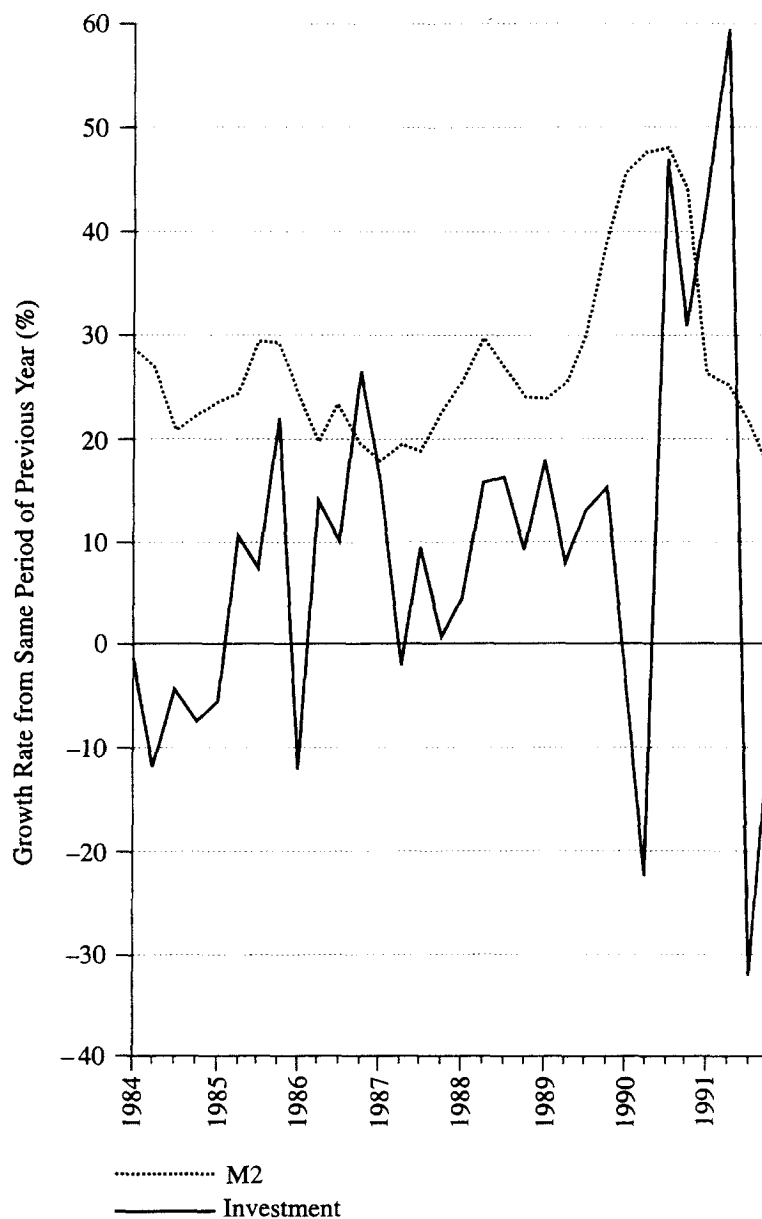
Investment

NOTE: Investment is at constant 1983 market prices.
SOURCES: For M2, *Indonesian Financial Statistics*, Bank Indonesia, January 1994 and previous issues. For Investment, *Pendapatan Nasional Indonesia, Triwulanan, 1989–1991*, Biro Pusat Statistik, and various issues.

credit on an informal basis to some state-owned enterprises which are not necessarily efficient.[21] These shortcomings in the credit side are under-laid by not only the fledgling banking system but the delay in deregulation in the real sector.[22]

V Concluding Remarks

Monetary policy has double-track targets: (1) to control money supply for the purpose of curbing inflation, and (2) to accommodate deposit money for investment to secure economic growth. The empirical studies on Asian developing countries tell us that both targets are simultaneously attainable by assigning the corresponding variables on money supply: assigning monetary base to control for curbing inflation, and assigning M2 to accommodate for investment.

Indonesian monetary policy has been designed to cope with its double-track targets. As for control of the monetary base, Indonesia has managed a kind of open market operation system since the 1980s. Its operation has, however, relied on shock therapy although this has succeeded in keeping

annual inflation rate at the level below double dig-its. In this sense, the existing system has still been a way off "matured" one to control the monetary base.

Indonesia has accommodated a sufficient amount of M2 to meet the growing demand for investment funds through a series of deregulation measures on the financial sector since the 1980s. It is true that it led to the investment boom and the high economic growth around 1990, but at the same time, it has caused the accumulating bad loans. It reflects the fact that the expanded funds have not been efficiently allocated to investment projects due to the premature banking management and supervision.

Indonesian monetary policy has been facing the above mentioned difficulties in their implementation process, although it was designed to achieve double-track targets. Since monetary policy plays a significant role in economic stability and growth, there is urgent necessity for further improvements of the instruments of monetary policy.

NOTES

1. The descriptions in this section mostly refer to Dornbusch and Fischer (1990), Chapter 17.
2. The money-inflation relationship can typically be shown by the following rewritten "quantity equation":

$$\pi = m - y + v$$

where m is money growth, v is the percentage change in income velocity, π is inflation rate, and y is real income growth.
The monetarist proposition that inflation is a monetary phenomenon implies that income velocity changes are not significant if money growth is adjusted for real income growth on this equation.
3. In those developing countries that are usually in labour-surplus economies, labour cost would not be a main factor to push prices.
4. When it comes to monetary policy, there have been controversies on whether the monetary authorities should control money stock or interest rate. Monetarists, in favour of targeting money stock, argue that a policy of targeting the interest rate over long periods can lead to inflation by steadily raising money growth. This section follows their argument and focuses on the control of money stock in the long run view.
5. The descriptions in this section mostly refer to Fry (1988).
6. The backgrounds of financial repression come not only from Tobin's model but also from the practical motive in developing countries aiming to shift domestic savings to the public sector.
7. The central argument of McKinnon (1973) and Shaw (1973) is that the distortions of such financial prices as interest rates and foreign exchange rates, reduce the incentives to save and invest, efficiency of investment, and thereby economic growth. However, we now focus our discussion on the complementarity between money and productive capital asset in their argument.
8. McKinnon formalizes the money-investment complementarity in money demand function of the form:

$$M/P = f(Y, I/Y, i-\pi^e), \frac{\partial (M / P)}{\partial (I / P)} > 0$$

where M is money stock of M2 that is broadly defined to include time deposits as well as demand deposits and currency, P is the price level, Y is real gross national product, namely GNP, I/Y is the ratio of investment to GNP, and $i-\pi^e$ is real deposit rate of interest (i is nominal deposit rate and π^e is expected inflation). This function tells that money demand will be greater the larger the proportion of investment in total expenditures.

9. Molho (1986) takes house purchase as an example of a lumpy investment, to argue that deposits accumulated in period 1 may be complementary to productive capital in period 2: an intertemporal complementarity, though they may be substitutes in the same period.
10. The empirical studies are summarized in Fry (1988), Chapter 6, McKinnon (1991), Chapter 2.
11. In this section, the growth rates of monetary base and M2 are respectively adjusted for real GDP growth rate.
12. Taiwan's data are not available here.
13. The figures exclude the Philippines, which shows a different trend, and Taiwan whose data are not available.
14. We can rewrite the "quantity equation" into the following form:

$$v = \pi - (m - y)$$

15. We can rewrite the "quantity equation" further into the form:

$$v = y - 1 (i, Y)$$

where $1 (i, Y)$ is the percentage change in money demand with ordinary form. According to the inventory theoretical approach developed by Baumol (1952) and Tobin (1956), the income elasticity of money demand is less than unity. In that case, income velocity will rise. Hence, the only factor to reduce income velocity in this money demand function is lowering interest rates. It is, however, unrealistic to expect that the interest rate keeps the lowering trend in the long term intervals. For all reasons, we had to attribute the declining trend of income velocity of M2 to a consecutive rightwards shift of M2 demand. As we mentioned in Note 8, McKinnon introduces I/Y as a variable to shift M2 demand in the equation.

16. The descriptions in this section mostly refer to Komatsu (1992).
17. Sumarlin is the name of finance minister at that time.
18. Private capital market has shown progress, for the Jakarta Stock Exchange was officially privatized in July 1992.
19. The mechanism of M2 accommodation can be shown by presenting a money supply function:

$$M = mm * H$$

where M is money stock, mm is the money multiplier, and H is the stock of the monetary base, so-called high-powered money. The money multiplier is defined by reserve-deposit ratio re and currency-deposit ratio cu:

$$mm = \frac{1 + cu}{re + cu}$$

Reserve-deposit ratio re is a function of interest rate i, the discount rate i_D, reserve requirement ratio r_R, and the variability of deposit flows σ:

$$re = re (i, i_D, r_R, \sigma)$$

$$\frac{\partial (re)}{\partial (i)} < 0, \frac{\partial (re)}{\partial (i_D)} > 0, \frac{\partial (re)}{\partial (r_R)} > 0, \frac{\partial (re)}{\partial (\sigma)} > 0$$

Thus the money multiplier can be described in the following form:

$$mm = mm (i, i_D, r_R, cu, \sigma)$$

$$\frac{\partial (mm)}{\partial (i)} > 0, \frac{\partial (mm)}{\partial (i_D)} < 0, \frac{\partial (mm)}{\partial (r_R)} < 0, \frac{\partial (mm)}{\partial (cu)} < 0, \frac{\partial (mm)}{\partial (\sigma)} < 0$$

Financial deregulation contributes to a rise of the money multiplier mm in the following ways:
a. The removal of interest rate ceilings raises the money multiplier mm through a rise of market interest rate i and a fall of currency-deposit ratio cu.

b. The reduction in the reserve requirement raises the money multiplier through a fall of reserve-deposit ratio *re*.

c. The elimination of barriers on entry and branching of banks possibly raises the money multiplier through a fall of currency-deposit ratio *cu* or the variability of deposit flows σ.

To verify the mechanism of M2 accommodation in Indonesian financial deregulation, we now estimate a money supply function using the time-series data on Indonesia:

$$\log M2 = -2.280 + 0.005 * (i - i_D) - 0.029 * r_R + 1.455 * \log H$$
$$\quad\quad (-3.0)\quad (1.0)\quad\quad\quad\quad (-4.6)\quad\quad (16.9)$$
$$RR=0.997\quad\quad\quad D.W.=2.1\quad\quad\quad (1975-1991)$$

where i is six-month time deposit rate, i_D is interbank rate, and r_R is minimum reserve requirement ratio. From this estimation, we find that the minimum reserve requirement ratio is the more significant instrument to raise the money multiplier than the interest rates.

20. *Jakarta Post*, 8 March 1994.
21. See Nasution (1993).
22. See Taguchi (1993).

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