The Currency Ratio: Case Study of Korea

In Kie Kim*

The money multiplier $k_2$ (or $k_1$) is defined as the ratio of money (M) to the central bank's monetary liabilities to the private sector (H), and is written as

$$\frac{1}{c_2 + r_3 (1 - c_2)} = k_2 \frac{H}{c_1 + r_2 (1 + r) (1 - c_1)} = k_1^1$$

In these equations, $c_1$ and $c_2$ denote the ratio of currency in circulation to $M_1$ and $M_2$ respectively. Obviously, the value of $c_2$ is always less than that of $c_1$ as $M_2$ exceeds $M_1$.

Any change in the currency ratio without a compensating change in either high-powered money or the reserve ratio results in variations of the money multiplier, and hence the supply of money. If banks maintain a fractional reserve ratio and convert deposits into currency upon request, as in the Korean monetary system, the currency ratio affects the distribution of high-powered money between banks and the public and thereby helps to determine the quantity of deposits created. A withdrawal of deposits in currency reduces bank reserves and, unless reserves were previously in excess of the desired level or are otherwise replenished, forces a multiple contraction of earning assets and deposits. While changes in the ratio of currency to the money supply, unlike other changes such as the reserve ratio and high-powered money, is not subject to the direct control of the monetary authorities, it can be offset by appropriate open-market operations of the central bank. However, since open-market operations do not exist in Korea, the currency-money ratio bears far important implications in an understanding of the determinants of the money supply.

In the light of many typical characteristics of less developed

*Assistant Professor of Economics, Chung-Ang University. The author offers thanks to Paul Meyer and Robert Bennett for their valuable comments. However, the author alone is responsible for all errors and omissions.

1 For derivation, see Nam, Lee, and Kim (1986, pp. 76-82); see also Cagan (1967, p. 12).

2 Cagan (1964, p. 303).
countries (i.e., public unfamiliarity with banking habits), it is generally believed that the currency-money ratio in less developed countries is much higher than in advanced countries, and also is expected to decline as economy grows. What is important to notice in the case of Korea is that over the period of 16 years (1954-1969) the movement of this currency ratio has been significantly different depending upon how we define the money supply. Furthermore, in the case of M₁ the currency-money ratio has not decreased substantially. This may be due to the fact that, over a short period of time, some exceptional and abnormal development might lead the proportion in the opposite direction. Even over a considerable period of time the currency money ratio could increase if abnormal factors continue to operate. Accordingly, in section I, the secular movement of the currency-money ratio will be reviewed. The following sections assess the importance of various factors that could have produced substantial variation in the currency ratio. Particular emphasis will be given to the variables which seem to be most responsible for the variation of the currency ratio in Korea. In section III, the empirical results will be given.

I. The Magnitude and Direction of the Currency-Money Ratio

Figure 1 contains information in the currency ratio (both M₁ and M₂) from 1954 to 1969 semi-annually. One important factor to be noticed is the significant difference in the fluctuations of the M₁ currency ratio and the M₂ currency ratio. The M₁ currency ratio has varied from 66.79 percent for the second period of 1954 to 40 percent for the first period of 1963. Generally, the M₁ currency ratio had a downward trend from 1954 to the end of 1963 except for a few periods. Since 1963, the M₁ currency ratio appears not to have changed significantly, but showed a slightly upward trend. However, for the M₂ currency ratio, the figure shows wide fluctuations since 1954. The M₂ currency ratio has varied from 64.79 percent for the first period of 1954 to 14.30 percent for the first period of 1969. Furthermore, the M₂ currency ratio has constantly decreased except for the early 1960's. This declining trend seems to be particularly obvious since 1965, at which time the interest rate reform was introduced.

The currency ratio movement cannot be explained by any simple correspondence with the trends of one or two economic factors. A common explanation of the decline in the currency ratio is that an increasing proportion of the population became familiar with the banking habit and the advantages of holding deposits. The apparent differences in fluctuations between the M₁ and M₂ currency ratio must be explained in terms of other factors unrelated in any simple way to the trend in the growth of banking systems and bank-
Figure 1

The Currency Ratio

$M_1$ currency ratio

$M_2$ currency ratio

ing habits. A number of factors deserve considerable attention.

II. Factors Affecting the Currency Ratio

The desired level of the currency ratio depends on individuals' preference for currency or deposits in the light of the costs and advantages of holding these or other assets. In the Korean Monetary System, there are no restrictions on exchange from deposits to currency or vice versa. An individual can easily and quickly make the actual ratio equal to the desired ratio by exchanging between deposits and currency. Therefore, we assume that the actual and desired currency ratio are equal at all times.

Currency is not held just to facilitate current transactions, but is also held as a store of wealth. In particular, for lack of a well-developed financial mechanism and lack of attractive financial assets, a large amount of currency is held as a store of wealth in less developed countries, though the nature of such holdings may have changed over the years due to the expanded growth of time and savings deposits. The development of such alternative financial assets might have reduced currency holdings considerably.

As Cagan pointed out:

The main substitute for currency as means of payments is a checking account; and as a store of wealth, probably a savings deposit. Assuming that individuals account for most currency demand, we may express the demand in terms of the public's preference for currency as a medium of exchange and as a store of wealth. To explain changes in the amount demanded, two sets of variables are involved, one for the transaction demand and one for the store of wealth demand.\(^3\)

In the case of Korea, the important determinants for the first demand might be the volume of retail transactions, the volume of consumer expenditures, the cost of checking account, and the society's custom of using checking accounts, and the public's access to banking facilities, etc. The demand for currency for the purpose of the store of wealth demand might depend upon total private wealth, the returns on alternative assets, the rate of inflation, etc. In addition, we must consider some other variables which are only typical in less developed countries, one of which is the monetization variable.

Since we are concerned with currency holdings relative to total money supply, the preceding variables are relevant only to the extent that they affect the demand for currency and deposits differently. For example, the interest paid on deposits have differential

\(^3\) Cagan (1967, p. 119).
effects on currency and deposits by inducing substitutions between them. Also, the growth of per capita real income affects currency and deposits differently. In the following discussion, we will assess some important factors affecting the currency-money ratio.

1. **Interest Rates on Deposits**

The economic theory of demand suggests that the desired currency ratio depends on the expected cost of holding currency in lieu of deposits. The foregone cost of holding currency is measured by the current rate of return on deposits, since currency typically yields no nominal return. A rise in the cost of holding currency leads people to substitute deposits for currency and conversely. Generally the interest rates paid on deposits net of service charges and other indirect costs represent the foregone income of holding currency. There have been different interest rates paid on different kinds of deposits in Korea. The interest rates paid on demand deposits, time and savings deposits were substantially different and behaved differently and require separate analysis.

**Demand Deposits.** In Korea, demand deposits are composed of four different kinds of deposits, namely checking deposits, passbook deposits, saving deposits, and extra deposits. Checking deposits have never earned interest rates and entail both direct and indirect costs. Both small service charges and a minimum balance were common for checking deposits. In general, only businesses and wealthy individuals use checking deposits.

The remaining three deposits have earned interest rates. Table I shows the interest rate paid on these deposits. The passbook deposits do not involve check transactions, but were designed for those of the general public and small business units who could not afford to open checking accounts with commercial banks. The Saving deposits are said to have been motivated by the recommendation of Mr. Powell, then advisor of the Bank of Korea, with the hope of attracting small savings of the general public and small business units who could not afford to open checking accounts. These deposits were different from passbook deposits only in that a slightly higher rate of interest is paid and the maximum deposit is 500 thousand won. These deposits were originally classified in the category of time deposits and were reclassified as demand deposits in 1967. Finally, extra deposits are those deposits of funds against which banks have issued certified checks.

---


5 Not to be confused with savings and time deposits, the term used in many parts of our study.
Table 1
Nominal Interest Rates on Deposits
(percent per annum)

<table>
<thead>
<tr>
<th>Effective From</th>
<th>Time Deposits (18 month &amp; over)</th>
<th>Installment Deposit</th>
<th>Notice Deposit</th>
<th>Pass Book Deposit</th>
<th>Extra Deposit</th>
<th>Saving Deposit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951</td>
<td>10.10</td>
<td>4.80</td>
<td></td>
<td></td>
<td>1.80</td>
<td>1.83</td>
</tr>
<tr>
<td>1954</td>
<td>5.16</td>
<td>12.00</td>
<td></td>
<td>2.19</td>
<td>1.80</td>
<td>1.83</td>
</tr>
<tr>
<td>1955</td>
<td>8.3</td>
<td>12.00</td>
<td></td>
<td>3.65</td>
<td>1.80</td>
<td>1.83</td>
</tr>
<tr>
<td>1959</td>
<td>2.16</td>
<td>12.00</td>
<td></td>
<td>3.65</td>
<td>1.80</td>
<td>1.83</td>
</tr>
<tr>
<td></td>
<td>7.15</td>
<td>10.00</td>
<td></td>
<td>3.65</td>
<td>1.80</td>
<td>1.83</td>
</tr>
<tr>
<td>1960</td>
<td>1.1</td>
<td>10.00</td>
<td>4.00</td>
<td>3.65</td>
<td>1.80</td>
<td>1.10</td>
</tr>
<tr>
<td>1961</td>
<td>7.10</td>
<td>15.00</td>
<td>4.00</td>
<td>3.65</td>
<td>1.80</td>
<td>1.10</td>
</tr>
<tr>
<td>1962</td>
<td>2.1</td>
<td>15.00</td>
<td>10.00</td>
<td>3.65</td>
<td>1.80</td>
<td>1.10</td>
</tr>
<tr>
<td>1964</td>
<td>3.16</td>
<td>15.00</td>
<td>10.00</td>
<td>3.65</td>
<td>1.80</td>
<td>1.10</td>
</tr>
<tr>
<td>1965</td>
<td>9.30</td>
<td>30.00</td>
<td>30.00</td>
<td>5.00</td>
<td>1.80</td>
<td>1.00</td>
</tr>
<tr>
<td>1968</td>
<td>4.1</td>
<td>27.60</td>
<td>28.00</td>
<td>5.00</td>
<td>1.80</td>
<td>1.00</td>
</tr>
<tr>
<td>1969</td>
<td>10.1</td>
<td>25.20</td>
<td>25.20</td>
<td>5.00</td>
<td>1.80</td>
<td>1.00</td>
</tr>
<tr>
<td>1969</td>
<td>6.1</td>
<td>22.80</td>
<td>23.00</td>
<td>5.00</td>
<td>1.80</td>
<td>1.00</td>
</tr>
</tbody>
</table>

More than two-thirds of demand deposits were composed of checking deposits during the period under study, on which the average return has been negative due to the service charges and minimum balance requirements. Further, the interest paid on the remaining three deposits has been so small and stable, as Table 1 indicates, that the average return on total demand deposits has been largely constant at zero or a negligible rate. Accordingly, the interest rate payments on demand deposits could not have had any significant effect on shifts to demand deposits from currency or other financial assets.

**Time and Savings Deposit.** Time and savings deposits as they are called in present Bank of Korea statistics are made up of mainly (1) time deposits proper, (2) installment savings deposits, (3) notice deposits. The first two deposits are self-explanatory. Banks may require a prior notice of at least 30 days to withdraw notice deposits. These deposits have always paid interest rates, though the rates have varied substantially. Before the interest rate reform of 1965, the nominal interest rate paid on long term time deposits\(^6\) ranged from 4.6 percent for the first period of 1954 to 15 percent for the second period of 1965. In 1965, a drastic upward adjustment of interest rates on time and savings deposits was made. In September 1965, the Monetary Board raised the interest rate paid on long term time and savings deposits from 15 percent to 30 percent. Also the Board raised the basic loan rate of commercial banks to 26 percent per year from its previous level of 16 percent.\(^7\) During the same period, the annual rate of inflation measured by the GNP deflator averaged 24 percent. Accordingly, the real interest rate (measured as the nominal interest rate minus the rate of price increase) on long-term time and savings deposits ranged from -33.12 percent for the first period of 1955 to 18.35 percent for the same period of 1966.

On the other hand, interest rates on the private curb market were abnormally high during this period, even considerably higher than prevailing rates in other less developed countries. The nominal curb market rates reached as high as 15 percent per month during the active phase of the Korean War, and they have ranged between roughly 4 to 6 percent per month on the average during the last several years.

Insofar as time and savings deposits substitute for currency as a store of wealth, it is expected that the fluctuations in interest rates paid on time and savings deposits produce opposite movements in the currency ratio. This effect, therefore, helps explain the ac-

---

6 18 month or over time and savings deposits.
7 For detailed analysis of the interest rate reform see Brown (1973).
celerated decline in the $M_2$ currency ratio. The effect of interest rates on the $M_2$ currency ratio appears to be particularly significant since 1965. It is expected that a rise in interest payments on time and savings deposits induces shifts from currency or demand deposits to time and savings deposits, thus producing a decline in the $M_2$ currency ratio.\footnote{A shift may occur from real assets to time and savings deposits, and from loans in private curb market to time and savings deposits, which appears to be a shift from demand deposits or currency to time and savings deposits. These shifts are not distinguishable, and we did not consider such shifts in this paper. Allowing such shifts will not alter our finding of the impact of time and savings deposit rates on the currency ratio.} Sometimes this effect of deposit rates on the currency-money ratio is less certain because of parallel movements in general interest rates. For example, Cagan indicates that a rise in deposit rates induces shifts from currency to deposits, but when interest rates at large also rise, the public may at the same time shift from demand deposits and perhaps time deposits to other assets, depending upon yield differentials.\footnote{Cagan (1967, p. 125).} But there is no such evidence in the case of Korea, though there was a continuing rise in real asset value after the 1965 interest rate reform. The drastic upward adjustment of interest rates on time and savings deposits in September 1965 resulted in a dramatic increase of time and savings deposits by 50 percent in the final three months of 1965 and 185 percent in the fifteen months after the interest rate increase. This rate of growth has continued almost unabated during 1967, 1968, and 1969. Thus, this evidence suggests that the upward adjustment had a profound effect on the public's preference to hold time and savings deposits, and on the reduction of the $M_2$ currency ratio. Table 3 shows a drastic decline in the $M_2$ currency ratio after 1965. In Korea, for demand deposits which offered a zero or a negligible return, which remained largely constant, a rise in interest rates on time and savings deposits must have induced shifts from currency or demand deposits to time and savings deposits, and resulted in a decline in the $M_2$ currency ratio.

The effect of deposit rates on the $M_1$ currency ratio is less certain because of the simultaneous shifts of both currency and demand deposits to time and saving deposits. Since, in most cases, both currency and demand deposits shift into time and savings deposits, the sign of $\frac{d(C)}{C+D}/dr$ (C: currency in circulation, D: demand deposits, r: interest rates on time and savings deposits) depends on the elasticity of currency and demand deposits with respect to interest rates paid on time and savings deposits. However, in Korea, it is believed that the demand for currency has a stronger response to changes in interest rates paid on time and savings depo-
sits than demand deposits. Therefore, a declining $M_1$ currency ratio is expected in response to rising interest rates, but the effect will be much less than that of the $M_2$ currency ratio.

2. **Monetization Effect**

The process of monetization apparently influences the demand for currency, for its influence upon the non-monetized or partially monetized sector is a complex mixture of monetary and socio-economic effects. Generally, the degree of monetization is defined as the fraction of total income received in the form of money in the whole economy. Monetization has accelerated in Korea since the structural changes brought by the Korea War and the massive impact of large-scale programs for economic development. Whenever monetization advances, by definition, a greater demand for money follows. Even if the national income were to remain constant, the transaction demand for money would increase as the monetization of the economy advanced. But monetization does have differential effects on currency and deposits. Those areas where money is introduced cannot be immediately served by banking facilities, whose response to increased monetization is necessary lagged, causing an increase in the currency-money ratio.

There are two major channels through which monetization has proceeded. The first channel is the normal development when there exists no mechanism to issue new currency. Currency will then be drained away from the already monetized sector. This will cause an increase in the currency ratio in the absence of new currency coming forth, because deposits in the already monetized sector will decline.

One typical example of the first channel of monetization is the case in which the money lenders borrow money in the monetized sector and lend in the previously non-monetized or partially monetized sector. The non-monetized sectors are predominantly rural agricultural sectors which have rudimentary financial institutions. The demand for funds by rural agriculturalist is likely to be more urgent than the demand of borrowers in the monetized sector. The urgent demand stems from the special social and economic factors prevalent in the rural areas. The low level of income leaves little surplus for saving and for the accumulation of capital for self-financing of agricultural and handicraft production. The uncertainty of the weather, which affects crop yields and income, causes an additional need for outside funds in bad years. A significant portion of the demand for loanable funds in rural areas is for financing consumption at levels higher than are warranted by the low income of the people. In these sectors, the borrowers are small agriculturalists, cottage industry workers, and some retail shopkeepers. The suppliers
of credit are dominated by indigenous bankers, professional money lenders, landlords, shopkeepers, etc. Loans are granted on a more personal basis than in the organized money markets, and proper records of loans granted or repaid are usually not kept. Under this situation, interest rates charged by loan sharks are extremely high.\textsuperscript{10} These high interest rates encourage money lenders to borrow money in the monetized sector and lend in the non-monetized or partially monetized sector. When monetization proceeds in this way, money is withdrawn from the already monetized sector, deposits decline relative to currency, and this causes an increase in the currency-money ratio unless it is simultaneously accompanied by banking developments of the same order in the areas where money is introduced.

Another way of introducing currency into the non-monetized or partially monetized sector is through a large-scale monetary investment in the agricultural sector which is usually accomplished by economic development programs. These large scale monetary investments affect both currency and deposits simultaneously, affecting currency more than deposits. In the case of Korea, a significant portion of development projects are being undertaken by the government because the private sector, the government thought, could neither work according to a system of national priorities nor undertake investment of the magnitude necessary for initiating development in the country.

In terms of priorities, the main emphasis in Korea was on social overhead capital and allied industries, and agricultural projects. During the period of the so-called five-year economic development plans which was initiated in the early 60's, the Korean government attempted to influence the cost and availability of credit in the non-monetized sector by indirect lending through the Federation of Korean Agricultural Cooperative. When monetization proceeds in this way, the problem is that those areas where money is being introduced cannot be served immediately by banking facilities, thus causing an increase in the currency-money ratio.

Two different sources of monetization have been described. In both cases, the process of development and extension of banking facilities has been very slow in areas where money is introduced. For almost two decades, the banking system in Korea and the use of bank deposits have been confined to big cities and important

\textsuperscript{10} For more detailed analysis of rural money lenders, see, Wai (1956); see also Wai (1957).
The credit departments of the National Agricultural Cooperative Federation branches in many villages accept deposits, but their deposits are only small part of the total deposits. It means in essence that in rural Korea transactions are mostly conducted by currency or barter. In this situation, the use of bank deposits in rural areas is probably slow when money is introduced, thus causing an increase in the currency ratio.

In conclusion, whatever may be the source of currency for the monetization process, the one definite effect of this process will be to raise the proportion of currency to deposits unless it is simultaneously accompanied by banking developments of the same order — which is certainly not likely to be the case.

3. Income Effect (Growth of Per-Capital Real Income)

Cagan argues that “rising real income changes our mode of life and somewhere along the way may convert practices of holding wealth and making payments from currency to deposits. Interrelated as these developments are, it may still be possible (and if possible, certainly revealing) to separate the effects on currency demand of some of them, such as urbanization, from the others, which may then be combined into an all-inclusive ‘income effect’.” Cagan pointed out, it is convenient for us to treat the income variable as a proxy for a host of income related variables — such as urbanization, the volume of travel per capita, etc. — which on balance may work to increase the demand for deposits relatively to currency. Let us discuss some aspects of income or income related variables which on balance may work to reduce the currency-money ratio.

First of all, deposits offer a convenient method of exchanging money without risk of loss in transactions. Also, deposits provide a permanent receipt of debt paid. Furthermore, holding balances in

11 There are five major commercial banks in Korea. In addition to five commercial banking institutions, there are several specialized credit institutions; The Korean Reconstruction Bank specializing in long-term development credit, the Credit Departments of the National Agricultural Cooperatives Federation and member Co-operatives specializing in agricultural credit, the Medium Industry Bank specializing in small industrial credit, and the Citizen National Bank specializing in consumer credit for the general public. These institutions are all established under special law. Most of these banking facilities are located in cities and important towns. The number of commercial banks and their branches has increased from 153 in 1957 to 215 in 1959. The more recently established branches are mostly concentrated in big cities and towns with population more than 50,000. Although the NACF maintains branches in some villages, most branches are concentrated in towns with populations exceeding 5,000. Source: National Agricultural Cooperative Federation, Agricultural Year Book, 1970.


banks avoids the hazards of keeping currency on hand. Except in the case of currency held in safe deposit boxes or vaults, currency holdings entail substantially higher risks than demand deposits. Special governmental protection to banks and bank responsibility for losses due to check forgery make deposits safe against default and personal hazards whereas currency is significantly subject to accidental loss and theft. These advantages of holding deposits may indicate that the services of one unit of deposits may rise relative to those of one unit of currency. If so, the currency ratio would tend to decline as real per capita income rose, other things, such as the comparative return on two kinds of assets, remaining constant.

Second, shifts in the distribution of income may also affect the currency-money ratio. We expect that the relative increase in income in upper income groups may have worked to decrease the currency-money ratio. The cost of holding currency undoubtedly will be higher for upper-income families because of greater knowledge of the mechanics of having interest-bearing assets, and greater proficiency in analyzing investment opportunities. Also, the relative increase in income of urban group may also reduce the currency ratio. The effect of such shifts are difficult to distinguish from those of the gradual rise in real income. No attempt was made to distinguish such shifts in the distribution of income. We simply assume that the observed effect of changes in per capita real income incorporates any effect produced by long-run changes in the distribution of income.

Third, as per capita real income rises, it is expected that the volume of travel per capita would also rise. If we assume the income elasticity of travel is greater than one, the rising volume of travel per capita would tend to increase the use of currency relative to deposits. Since payments by check require that parties to a transaction be known to each other, currency is likely to supplant checks when a person buys where he is not known or when he does not have the opportunity to establish a line of credit. These difficulties bother travelers in all transactions, thus encourage travelers to use currency and produce an increase in the currency ratio. The need for currency in relation to travel rises with the duration of the trip and the number of miles covered. In the past, this effect was not significant in Korea because of the low level of per capita income.\textsuperscript{14} The only purpose of introducing this variable in the discussion is to indicate the fact that there are some forces working against the use of deposits when per capita real income rises.

Finally, we will consider one of the most important income

\textsuperscript{14} However, there are some indications that the volume of travel has risen substantially recently. For example, the frequency of hotel room occupancy has increased significantly for the last three or four years. We expect that this variable will play an important role in the future.
related variables — urbanization, and its effect on the currency ratio. The urbanization movement increased sharply after the Korean War. Generally, the amenities and well-established public service of the urban area are one of the contributing reasons for massive migration of people from rural areas. However, the strongest inducement has been the widening income differences between urban wags and rural income. In particular, governmental policies have been the direct instruments for raising urban wages. The public sector is frequently the largest employer, and also the only sector that is highly organized. Wages in the public sector have risen rapidly and have commonly acted as the base for a wider pattern of wage increase. Further, minimum wage regulations have been influential in raising urban wages and in having a greater impact on the total wage structure in a less developed economy.

Then, what are the effects of this rapid urbanization on the currency ratio? It is expected that larger bank deposits are held by individuals in cities than in rural areas: The implication drawn from this line of argument is that urban life provides familiarity with the advantages of checking accounts and encourages the banking habit. For example, the payment of wages and salaries by checks is more common in urban areas than in rural employments. In addition, wide availability of banking facilities and advertising of their availability through mass media are conducive to the development of the banking habit among the people in urban areas. As indicated previously, in Korea, the banking facilities are mainly confined to big cities and important towns. This phenomenon is illustrated by the fact that 10 largest cities share more than three-fourths of total deposits of commercial banks in Korea. It means transactions in rural Korea are mainly conducted by currency, or indigenous instruments of money lenders. This effect of urbanization will increase the use of deposits compared to currency, thus, the effect will be a decrease in the currency ratio.

However, there are some important qualifications on this line of argument. One important question is whether migrants from rural areas to cities become familiar with banking practices and expand their use of banking facilities at the expense of currency. In Korea,

---

15 The Economic Planning Board census figures on the percentage of Korean population in urban centers are as follows:

<table>
<thead>
<tr>
<th>Population</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000 and over</td>
<td>20,000 and over</td>
</tr>
<tr>
<td>1955</td>
<td>47.7 percent</td>
</tr>
<tr>
<td>1960</td>
<td>80.3 percent</td>
</tr>
<tr>
<td>1966</td>
<td>87.3 percent</td>
</tr>
</tbody>
</table>


it is well known that the majority of migrants are from very low income groups. For these people, whether they live in cities or rural areas, they are not able to have bank accounts because of their low income. Further, when they live in rural areas, their payment of retail purchase was on many occasions conducted on credit basis or barter basis since their surroundings are very closely knitted personal organizaiton. It is common practice in rural areas to conduct a significant number of transactions between harvest periods on credit. The growth of cities, however, placed urban trade on an impersonal basis, thus discouraging the use of credit and increasing the use of currency. These factors render the effects of urbanization on the currency-money ratio much less than would be expected otherwise.

As we have seen, there are some factors working against the use of deposits as per capital income rises. However, this effect is not likely to outweigh the forces working in favor of the use of deposits. Combining all the effects, a rising real per capita income and its interrelated development such as urbanization change our mode of life and encourage people to convert the practice of holding wealth and making payments from currency to deposits. Therefore, the higher income elasticity of deposits is likely to be one of the most important factors in the long-run decline in the currency-money ratio.

4. Tax Evasion and Other Illegal Activities

Finally, we will consider some of the illegal activities which could affect the currency-ratio. Some examples are tax evasion, black market operations, smuggling operations, etc. All of these illegal activities increase the demand for currency in order to conceal transactions. Since these activities are obviously not visible, it is impossible to analyze the extent of their influence on the currency-money ratio in any organized fashion. But in Korea, it is also obvious that the nature and extent of these activities have changed and have contributed somewhat to the variation of the currency-money ratio.

Tax Evasion. Some people evade taxes by making as many transactions as possible with currency and not reporting them to the tax authorities. Also, it is expected that almost all of the unreported income is transacted with currency in order to conceal such transactions. For example, in the case of retail stores and many services where receipts are mostly in the form of currency, a proprietor or worker who wished to evade income taxes would make his expenditures with currency and not deposit his receipts in a bank as is usually done. Thus, unreported income produces an abnormal demand for currency to hoard. Such hoarding on a wide scale would increase the currency-money ratio.

The use of currency to conceal taxable transactions is probably
higher in less-developed countries because of their institutional and legal environments. One strong incentive for tax evasion is the tax rate. For example, Cagan states that:

Evasion will occur on a large scale only if the tax rate is high enough to create sufficient incentive. The most extensive tax on transactions with a high rate is the income tax and even here the rates have become exceptionally high since the late 1930's. The nature of many income payments makes their transaction with currency highly impractical, so that the possibility of evasion by use of currency is effectively limited to the income of unincorporated businesses and independent professional practices. As for other taxes, most sale and excise taxes have fairly low rates and are difficult to evade.¹⁷

How, in Korea, the extent of tax evasion is likely to go far beyond the points mentioned by Cagan. Even in Korea, the tax rate is one of the important elements. But besides the tax rate, her institutional and legal environment give a strong incentive for people to evade taxes.

First, prevalence of accounting records and reliability were never maintained in an honest and reliable fashion. It is an observed fact that many businessmen keep no books at all, or others maintain two or more sets of their business records in many cases. Accordingly, portions of income escape taxation, being paid in currency to conceal a taxable transaction. These phenomena are particularly widespread for unincorporated businesses and independent professional practices. For example, Musgrave points out in his report that "in 1963, it appears that well over one-half of business and property income escapes income taxation."¹⁸

Second, an honest and efficient administration dealing with tax assessment and collection is not firmly established. For example, since 1964, there has been a spectacular increase of 245 percent in internal tax receipts,¹⁹ for the most part owing to improved tax administration. The improved tax administration has been achieved mainly through the establishment of a new office of national taxation, an increase in the number of tax offices and officials, and the introduction of more efficient techniques of assessment and collection. An important factor in this success was the strong personal support given to the tax drive by the President of the country. Of course, some tax changes consisted of upward adjustment in indirect taxes, including commodity taxes and profits of government monopolies (i.e. tobacco). But the main thrust was still in improved tax administration. This might suggest the extent of tax evasion in the

¹⁷ Cagan (1964, p. 312).
¹⁸ For detailed analysis see Musgrave (1965, p. 26).
1950's and early 1960's. Further the fact that indirect tax revenue expanded less rapidly than direct taxes may indicate the evasion was previously greater in the area of direct taxes. Thus, improved tax administration and more strict enforcement of tax laws must have reduced significantly the amount of income which evaded taxes previously, and expect to influence the currency-money ratio significantly the future.

Finally, voluntary compliance on the part of tax payers is lacking. On many occasions, tax evasions are attempted and accomplished with little or no moral disapproval. There has been a tendency for many businessmen to believe that honest compliance with the tax law makes it impossible for them to do the business. Without voluntary compliance, even the best administrative organization cannot satisfactorily collect income taxes from the self-employed. The roots of tradition of voluntary compliance with tax laws are not easy to trace, but it is clear that such a spirit cannot grow up over night. The firm establishment of voluntary compliance and the acceptance of the fiscal responsibilities of citizenship require a long period of popular education and efficient and equitable tax administration. Tax evasion is not only limited to the income tax case, but it also prevails with sales or excise taxes. A significant portion of luxury commodities, which either are not permitted to be imported legally, or involve an extremely high tax rate evade sales or excise taxes since transactions of these commodities are usually conducted on the black market. The increase in the leakage of the U.S. Army PX goods into the market is one of the typical examples of evasion of sales taxes.

Under this environment, it seems natural that people attempt to evade taxes. Even if we do not know the precise extent of tax evasion in Korea, it is clear that there have been substantial changes in the extent of tax evasion during the period. These changes help to explain the variations of the currency-money ratio.

**Black Market and Other Illegal Activities.** Besides tax evasion, black market activities and smuggling are other illegal activities that affect the currency ratio. Both black market and other illegal business activities will increase the use of currency in order to conceal transactions. Insofar as the black market operation and other illegal activities involve the evasion of income tax, the substantial part of their effect on the currency ratio was taken into account in the previous discussion of tax evasion. But not all black market operation and other illegal activities involve tax evasion.

The black market in Korea was particularly prevalent in foreign exchange transactions prior to 1964. There had been a persistent disparity between the officially fixed foreign exchange rate and the true exchange rate. The official exchange rate was always fixed at an unduly low level. Thus the overvalued foreign exchange rate and
resulting tight quantitative control for foreign exchange enhanced the operation of the foreign exchange black market enormously. Such large scale black market operations probably increased the use of currency significantly, and particularly large denominations of bills in order to conceal such transactions. This factor might be one of the important contributing factors for the large currency-money ratio in the 1950's and early 1960's. However, in May 1964, as part of the Korean government's over-all financial stabilization program the foreign exchange rate was significantly depreciated in order to represent the true value. Simultaneously, all existing multiple devices were eliminated and quantitative import restrictions were relaxed, particularly for industrial raw materials. This series of policy actions was conducive to reducing such black market operations significantly, suggesting a declining influence on the currency-money ratio.

Finally, smuggling and bribing activities inevitably involve the use of currency rather than deposits in order to conceal transactions. Smuggling activities were prevalent for those commodities which involve a high sales tax rate or are not allowed to be imported by law. But both of these activities involve evasion of income tax or excise tax. Therefore, their effects on the currency ratio are difficult to separate from the effect of tax evasion on the currency ratio. Yet tax evasion does not always reflect these activities. Insofar as tax evasion does not always reflect these activities, they have important effects on the currency-ratio as independent factors.

III. Empirical Results

Regression analysis is one way to test the foregoing hypothesis. Regressions were run for the period 1954-1969, using interest rates, per capita real income, monetization, a tax evasion variable, and dummy variables.

1. Description of the Data

Interest Paid on Deposits. Judging from the movement of time and savings deposits since the 1965 interest rate reform, we might expect one of the most important determinants of the M₂ currency ratio to be the cost of holding currency in lieu of deposits, of the net rate of interest paid on deposits. The data needed to construct a time series of this variable are available. As mentioned previously, some category of demand deposits entailed both service charge and minimum balance, but other categories of demand deposits paid interest rates though the amount was negligible. Since the majority of demand deposits are made up of checking deposits, and interest paid on other kinds of demand deposits was so small, and unchanged, it would be safe to assume that the net return on total demand deposits was constant at zero or a negligible rate, and produced no
effect on variations in the currency-money ratio.

In the case of time and savings deposits, interest payments were much higher and changed frequently. Various categories of time and savings deposits were paid different interest rates. Therefore, the correct interest rate measure must be the weighted average of interest rates paid on various category of time and savings deposits. However, since the majority of time and savings deposits consists of long term time and savings deposits, it would be safe to use the nominal interest rate paid on long term time deposits as the measure of net rate of return on time and savings deposits. We used the nominal interest rate on long term time and savings deposits (18 month or over) in our regressions (both the $M_1$ and $M_3$ currency ratio). The interest rate data are shown in Table 2.

*Per Capita Real Income.* As indicated in the earlier section, the income variable was used not only to represent rising income itself, but also to serve as a proxy for income related variables such as urbanization and the volume of travel per capita. Particularly urbanization appears to be highly correlated with the per capita income variable and the effects of the two cannot be distinguished in a time-series correlation. So are other income related variables.

In Korea, either semi-annual or quarterly GNP series is not available. Therefore, we cannot construct a direct semi-annual per capita income series in our study. Since other variables such as interest rates, and a monetization variable are available on semi-annual basis, we generated semi-annual per capita income series based on a strict linear interpolation method. The only purpose of generating semi-annual per capita income data is to keep up the consistency with other variables in our regressions.

*Monetization Variable.* Generally, the degree of monetization is defined as the fraction of total income received in the form of money in the whole country. Even if governmental statistics generally impute much of the income earned outside of market transactions, and these imputations are high in Korea, they do not distinguish the proportion of income earned between market transactions and outside market transactions. Therefore, we cannot construct the time series for the degree of monetization. Widely used proxies for the degree of monetization are the urbanization ratio, and the size of non-agricultural output, the ratio of deficits to total government expenditures. These variables proved unsuccessful.

---

20 For example, small savers seem to have concentrated more on six month than on longer maturity deposits. Six month deposits accounted for 60 percent of the total number of accounts at the end of 1968, but only 10 percent of the value of such deposits; the average 18 month long term deposit was ten times larger than the average six month deposit. See Brown (1973).
The other available statistics regarding this variable are the ratio of cash income to total income received by farmers. These figures are average per farm household. These statistics are compiled from the information reported by the sample farm household, 300 households unit at the end of 1955, 600-1200 households from 60 different villages thereafter which represent the various sections of the agricultural area in the country.21

The Variable for Tax Evasion and Other Illegal Activities

Tax evasion, black market operation, smuggling and other illegal activities induce the use of currency rather than deposits in order to conceal such transactions. Since all of these illegal activities are hidden factors in their nature, there is no way to know the magnitude of such illegal activities, or the currency used for such purposes.

The first measure used in our study to explain tax evasion is the annual percentage of personal income collected for income taxes. In other words, the measure used may be considered the average rate paid to total personal income. This measure is not ideal, even may be poor, since it excludes evaded taxes, and also ignores other incentives to use currency for concealing illegal transactions that might have varied appreciably in volume, such as black market operations, and smuggling operations. No attempt has been made to take account of such facts. However, this measure assumes that the amount of tax evasion depends directly on the rewards. At higher rate, more tax evasion is expected, this raises the currency ratio. Even in this case this measure may be poor since the annual percentage of personal income collected for income tax could change because tax rates change or evasion percentage changes. A better measure would be the marginal tax rate levied on the average level of income for which taxes are not withheld, permitting currency to be used to aid evasion. But we are unable to obtain the data.

In addition to the annual percentage of personal income collected for income taxes, we provided the dummy variable $S_3$ to indicate particular policy action which could influence the amount of tax evasion and other illegal activities, and hence the currency ratio. We indicated previously that after 1964, there has been a spectacular increase in internal tax receipts for the most part owing to improved tax administration. The dummy variable $S_3$ takes the value of zero for 1954 – 1963 II, and I for 1964 I – 1969 II.

Other Dummy Variables22 It is generally expected that the use of currency relative to deposits would tend to increase during periods of political unrest mainly due to the psychological impact. The years

21 Source: Bank of Korea, Statistical Year Book, 1954-1969

22 Since the dummy variables $S_1$ and $S_3$ are rather highly correlated and almost identical, we cannot include both of the dummy variables in the regression equation at the same time.
1960–1961 were characterized by a period of political unrest occasioned by the student revolution of April 1960 and the military revolution of May 1961. The dummy variable $S_1$ is intended to capture this impact.

Finally, in view of the large increase in interest rates in the second period of 1965, we provided shift variables. The dummy variables $S_1$ and $S_2$ are shift variables for the constant term and the interest rate. These dummy variables are defined as follows

$$S_1 = 0 \quad 1954 \quad I - 1965 \quad I$$
$$1 \quad 1965 \quad II - 1969 \quad II$$

$$S_2 = 0 \quad 1954 \quad I - 1965 \quad I$$
$$\quad \text{interest rate} \quad 1965 \quad II - 1969 \quad II$$

$$S_4 = 0 \quad 1954 \quad I - 1959 \quad II \text{ and } 1962 \quad I - 1969 \quad II$$
$$1 \quad 1960 \quad I - 1961 \quad II$$

2. Empirical Results

The variables just discussed were used in multiple regressions to explain the variations in the currency ratio (both $M_1$ and $M_2$). We used semi-annual data including 32 observations over the period 1954-1969. The usual regression criteria are used to evaluate the results of the estimations. These are: goodness of fit ($R^2$ and adjusted $R^2$); the t-test for significance of regression coefficients; the Durbin-Watson statistic (D.W.), measuring the degree to which serial correlation exists in the residuals, and the extent to which the signs of regression coefficients agree with expectation.

In fitting the model, the variant which seemed most representative based on a priori reasoning was fitted first (namely, per capita real income and the interest rate) and the results were compared with those obtained using other specification of equations (adding other variables).

Tables 2 and 3 show some of the statistical results. The results may be summarized briefly. Let us start with the $M_2$ currency ratio. In each equation, all variables except the dummy variable $S_4$ show the appropriate signs. Interest payments are negatively related to the $M_2$ currency ratio, indicating a shift to deposits when interest payments rise; per capita real income is also negatively related indicating that deposits are a superior asset to currency and are held in a greater proportion as per capita real income rises. The monetization variable is positively real income rises. The monetization variable is positively related to the currency ratio, suggesting that as monetization proceeds, currency use relative to deposits would increase; the income tax variable is positively related to the currency ratio, indicating that a higher tax rate brings a greater use of currency. Finally, the dummy variable $S_3$ is also negatively related to
the currency ratio, suggesting that improved tax administration would tend to reduce the currency ratio.

The multiple linear regression function, with the M₂ currency ratio and three independent variables (per capita real income, the interest rate, and the dummy variable for the interest rate S₂), accounts for 90 percent of the variation in the M₂ currency ratio. The regression coefficients of all three variables are significant above the 0.01 level. The multiple linear regression function, with the M₂ currency ratio and five independent variables (per capita real income, the interest rate, the monetization variable, the income tax variable, and S₂), explains 91 percent of the variation in the M₂ currency ratio. The regression coefficients of the monetization and income tax variable are not significant. In general, including either of the two variables or both (the monetization and the income tax variable) does not improve the equation much. Including the dummy variable S₂ in the equation, the statistical result shows and R² value of 0.918. In most equations, the regression coefficient of the dummy variable for the interest rate (S₂) is significant at the 0.05 level. The coefficients of other dummy variables are not significant.²³

We also investigated the presence of a lagged interest rate term. In a semi-annual model of the monetary sector such as this, one might expect to find lags in the response of general public to changes in interest rates simply because they are apt to neglect to manage their cash position as close as possible. However, the regression coefficient of the one period lagged term on the interest rate turned out insignificant. Finally, the reciprocal values of the independent variables in linear equations were tried in order to determine the better fit.²⁴ The results of the equation with the reciprocal values of the independent variables are not significantly different from those using untransformed variables, but show a lower t value for the interest rate coefficient and better R².

The Durbin-Watson statistics show some degree of serial correlation in the residuals. However, the D. W. statistics of less than one were found mostly in equations which include either the interest rate or the income variable alone, but not in equations which include both of these variables.

In all logarithm equations, the signs are appropriate and the regression coefficient of per capita real income variable is highly

²³ When other dummy variables are included in the equation, these variables perform very poorly. Their coefficients are insignificant, and the addition of these terms increases the degree of explanation by less than one percent. Moreover, some other coefficients are strongly affected.

²⁴ The reciprocal transformation is useful if one wishes to build in the assumption of an asymptotic level, and an estimate of the constant term as an estimate of the asymptotic level. Johnston (1980, p. 49).
significant. The coefficient of the interest rate is significant at the 0.05 level in many equations. On the whole, the results of the logarithm equations are similar to those found in the linear equations.

The results are not as good for the M₁ currency ratio as they are for the M₂ currency ratio. Even in the M₁ currency ratio, however, all variables except for the dummy variable S₃ show the appropriate signs in each equation. The regression coefficients of the interest rate and per capita real income are significant above the 0.05 level. The coefficient of the monetization variable is significant at the 0.1 level in some linear equations. The tax variable does not show up significant regression coefficient.

In each equation for the M₁ currency ratio, the fit is poor compared to the case of the M₂ currency ratio. When we regressed the M₁ currency ratio on per-capita real income, the interest rate, monetization, the tax variable and S₂, the R² is 0.617. The addition of the variable S₁ in the equation increased R² to 0.652. The three independent variable regression of the M₁ currency ratio on per capita real income, the interest rate, and S₂ accounts for only 56 percent of the variation in the M₁ currency ratio.

It appears that some of the variables considered in previous discussions which were discarded because of insufficient information might explain the M₁ currency ratio. For example, we did not include the variables which explain all kinds of illegal activities mentioned previously. Also we did not consider the volume of retail transactions due to lack of data. If we suppose that a constant fraction of retail transactions involves the use of currency and that this fraction is substantially higher than for other types of transactions, then the currency ratio would vary directly with long-run movements in the fraction of total transactions made through retail stores. Since there are no data available indicating this influence, we discarded this variable. Further, the serial correlation displayed by the equations probably reflects persistent errors in the data, or the inadequacy of the regression equations. Particularly, as explained previously, tax rate variables used in the equations do not represent correctly the amount of currency use for the purpose of tax evasion. Therefore, this fact and some combination of the discarded variables could account for a sizeable part of the variation in the M₁ currency ratio.
### Table 2
Regression Results of the $M_1$ Currency Ratio

<table>
<thead>
<tr>
<th>Equation Number</th>
<th>Regression Equation</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>D.W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$\frac{C}{M_1} = 88.2198 - 0.0006997 \text{ PRY} - 1.6194 r + 0.9811 S_2$</td>
<td>.560</td>
<td>.513</td>
<td>1.018</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(11.958)</td>
<td>(2.549)</td>
<td>(4.215)</td>
</tr>
<tr>
<td>2</td>
<td>$\frac{C}{M_1} = 79.1113 - 0.0006383 \text{ PRY} - 1.6763 r + 1.0171 S_2 + 0.1708 \text{ MT}$</td>
<td>.817</td>
<td>.543</td>
<td>.908</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(9.236)</td>
<td>(1.992)</td>
<td>(3.378)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ 0.6812 TR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$\frac{C}{M_1} = 82.7271 - 0.0007233 \text{ PRY} - 1.7063 r + 1.0016 S_2 + 0.1243 \text{ MT}$</td>
<td>.652</td>
<td>.568</td>
<td>1.182</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(9.581)</td>
<td>(2.309)</td>
<td>(4.087)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ 1.0238 TR + 0.4369 S_4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.218)</td>
<td>(1.594)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$\frac{C}{M_1} = 7.9986 + 875.84 \frac{1}{\text{PRY}} + 77.0371 \frac{1}{r} + 0.3711 S_2$</td>
<td>.593</td>
<td>.549</td>
<td>.901</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.871)</td>
<td>(3.663)</td>
<td>(2.232)</td>
</tr>
<tr>
<td>5</td>
<td>$\log \frac{C}{M_1} = 3.8183 - 0.4173 \log \text{PRY} - 0.2611 \log r + 0.0044 S_2$</td>
<td>.553</td>
<td>.508</td>
<td>.979</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.546)</td>
<td>(2.540)</td>
<td>(3.264)</td>
</tr>
<tr>
<td>6</td>
<td>$\log \frac{C}{M_1} = 3.8183 - 0.4173 \log \text{PRY} - 0.2611 \log r + 0.0037 S_2 + 0.0233 \text{ TR} + 0.0186 \text{ MT} + 0.0361 S_4$</td>
<td>.622</td>
<td>.531</td>
<td>1.130</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.546)</td>
<td>(2.540)</td>
<td>(3.264)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ 0.0233 TR + 0.0186 \text{ MT} + 0.0361 S_4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.774)</td>
<td>(3.12)</td>
<td>(1.549)</td>
</tr>
</tbody>
</table>

Note: $t$ statistic in parentheses

Supplementary list of symbols: see Table 3
Table 3
Regression Results for the $M_2$ Currency Ratio

<table>
<thead>
<tr>
<th>Equation Number</th>
<th>Regression Equation</th>
<th>$R^2$</th>
<th>$R^2$</th>
<th>D.W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$\frac{C}{M_2} = 115.884 - 0.002034 \text{ PRY} - 1.8257 r + 0.9798 S_2$</td>
<td>0.904</td>
<td>0.904</td>
<td>1.144</td>
</tr>
<tr>
<td></td>
<td>$(16.440) (7.869) (4.975) (4.499)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$\frac{C}{M_2} = 103.849 - 0.002024 \text{ PRY} - 1.8343 r + 0.9907 S_2 + 0.1306 \text{ MT}$</td>
<td>0.912</td>
<td>0.905</td>
<td>1.044</td>
</tr>
<tr>
<td></td>
<td>+ 0.6551 TR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$(0.802)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$\frac{C}{M_2} = 111.657 - 0.002102 \text{ PRY} - 1.8594 r + 0.9778 S_2 + 0.1212 \text{ MT}$</td>
<td>0.918</td>
<td>0.908</td>
<td>1.230</td>
</tr>
<tr>
<td></td>
<td>$(13.044) (6.656) (4.459) (4.132) (1.625)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ 0.9401 TR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$(1.128) (1.329)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$\frac{C}{M_2} = -43.5564 + 1903.53 \frac{1}{\text{ PRY}} + 59.983 \frac{1}{r} + 0.2240 S_2$</td>
<td>0.924</td>
<td>0.916</td>
<td>0.977</td>
</tr>
<tr>
<td></td>
<td>$(5.362) (9.289) (1.966) (2.172)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$\log \frac{C}{M_2} = 10.7815 - 2.0599 \log \text{ PRY} - 0.1467 \log r + 0.002950 S_2$</td>
<td>0.947</td>
<td>0.939</td>
<td>1.100</td>
</tr>
<tr>
<td></td>
<td>$(14.272) (11.384) (2.169) (2.233)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$\log \frac{C}{M_2} = 11.0518 - 2.2272 \log \text{ PRY} - 0.1297 \log r + 0.002442 S_2$</td>
<td>0.950</td>
<td>0.938</td>
<td>0.936</td>
</tr>
<tr>
<td></td>
<td>$(13.313) (9.428) (1.963) (1.846)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ 0.00304 $\log \text{ MT} + 0.0135 \log \text{ TR}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$(1.133) (0.173)$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: $t$ statistic in parentheses
Supplementary list of symbols: PRY = per capita real income; $r$ = interest rate
MT = monetization variable; TR = income tax variable
References


Kim, B. K. *Central Banking Experiment in a Developing Economy.* Seoul: Korea Research Center, 1965.


