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Savings Behavior and Its Implications
for Domestic Resource Mobilization
The Case of the Republic of Korea

Shahid Yusuf
R. Kyle Peters

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Shahid Yusuf is an economist and R. Kyle Peters an economic support systems analyst with the East Asia and Pacific Regional Office of the World Bank.

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Abstract

This paper focuses on the path of domestic resource mobilization in the Republic of Korea, over the past twenty years, and on the probable medium term trend.

To achieve the investment targets of the Fifth Five Year Plan (FYP), within the confines of the current environment of the world capital markets, will require a strong recovery of national savings from the depressed level which followed the second oil-price shock. The first section of this paper briefly reviews the underlying behavioral relationships which have been identified in the theoretical literature as affecting savings. From this, a number of potential explanatory variables are selected, which are tested empirically in the second part of the paper. Our empirical analysis reveals that savings behavior, in the Republic of Korea, is explained by current income, the growth of income, the rate of inflation, and the real time deposit rate. After establishing the responsiveness of savings to this set of variables, the course of domestic resource mobilization in the Korean economy is simulated according to the movements of these variables as envisioned in the Fifth FYP. The result of these simulations reveal a need for additional foreign savings, if the growth targets of the Fifth plan are to be met.

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I. OVERVIEW

There was a time when the analysis of savings behavior was one of the central concerns of development economists. Since growth required the accumulation of capital and few countries could rely to any large extent on foreign sources, economic expansion was regulated by the availability of domestic savings. By the mid 70s, however, interest in the subject of domestic savings was beginning to wane for a variety of reasons./1 Whereas capital was once the fulcrum of development, it had to a degree been overshadowed by technology which promised much the same if not superior results with far less effort and self-abnegation. Further, after years of refinement and testing, the most popular theories explaining saving behavior showed signs of exhaustion. New ideas were scarce and the paucity of data on the developing countries rendered somewhat futile the activity of empirically verifying hypotheses, forged within the institutional context of the industrial nations.

Perhaps most important was the sudden increase in the availability of foreign savings, primarily in the form of petro-dollars, following the first oil crisis in 1973. Unable to find borrowers for all funds which the adjustment in energy prices placed at their disposal, the major western banks evinced a growing willingness to lend to developing nations, considered poor risks in the past./2 The moderate pace of economic activity in the OECD countries, throughout the latter part of the 70s, which dampened the demand for loans at a time when savings were registering a modest increase,

increase, induced smaller banks to throw in their lot with the major international institutions. As a result, those developing nations whose prospects appeared favorable, either because of their performance as exporters or by virtue of their resource endowment, found that adding to the capital stock was no longer tied rigidly to the saving propensities of their citizens /3.

While the need to mobilize more resources locally remained on the agenda of planners and the lips of development advisers, the analysis of savings behavior became less urgent. Most people assumed that so long as economic growth could be sustained, through a combination of exporting, encouraging domestic business activity and overseas borrowing, savings would keep on expanding, eventually obviating the need to look abroad. Thus, the Korean Fourth Five Year Plan (FYP) which commenced in 1977, assumed that by 1981 Korea would be able to finance all of her investment from domestic savings. In fact, during the first two years of the Plan it seemed as though this goal might be realized. As shown in Table 1 and Figure 1, Gross National Savings (GNS), as a ratio of GNP, rose from 19.7% in 1975 to 27.4% in 1978 while the ratio of foreign savings to GNP fell from 9.3% to 2.3%. But the decline in business activity, which followed on the heels of the second oil price adjustment in 1979, brought savings down to 20.7% in 1980 from 27.3% in the previous year and forced Korea to rely upon foreign borrowing. Two years later, in 1982, the level of savings was still only 22%.

Since the country may need to invest, annually, an average of 30% or more of GNP over the next four years in order to attain the target growth of 7.5% to 8%, domestic savings will have to increase since the flow of capital to countries such as Korea, by way of the international banks, may be curtailed: as the problems of Poland, Mexico, Brazil and Argentina lead to a return of conservative lending policies; the need for financing large public sector deficits in the Western economies increases greatly the demand for these funds; and, a revival of business in the OECD countries multiplies the range of less risky options./4

For macroeconomic objectives to be realized, national savings must increase by at least 9% over a four year period. Since government savings, which reached 6.6% in 1981 may not grow by more than 1% of GNP, the entire increment in resources will have to come from the household and corporate sectors. Is this within the realm of possibility? How much reassurance can be derived from econometric analysis, given the character of savings data, and the possibility that some critical parameters might have been altered by a change in expectations and economic opportunities in recent years? These are the questions which are tackled in this paper.

Table 1: GROSS NATIONAL SAVINGS AND FOREIGN SAVINGS
(% of GNP at current prices)

	Gross National Savings (GNS) /a				Composition of GNS			Foreign savings /i
	Total	Household	Corporate	Government	GDS	NCT	NFI	
	/b	/c	/d	/e	/f	/g	/h	
1953	13.5	6.5	4.9	2.1	7.6	4.7	1.2	1.7
1954	10.2	4.7	5.4	0.2	5.6	3.6	1.0	1.1
1955	9.2	3.6	4.8	0.7	4.0	3.9	1.2	1.4
1956	7.3	-2.6	4.8	5.1	-2.9	9.3	0.9	-0.8
1957	13.5	4.8	4.9	3.7	4.8	7.9	0.7	0.0
1958	12.4	3.6	5.5	3.3	4.2	7.5	0.7	-1.1
1959	10.7	1.7	6.2	2.8	3.6	6.4	0.7	-0.4
1960	8.4	-1.8	5.9	4.4	0.1	7.5	0.7	-0.4
1961	11.4	-0.2	6.4	5.2	1.9	8.5	0.9	-1.4
1962	11.4	-0.9	7.8	4.5	2.4	8.1	0.9	2.0
1963	15.2	3.4	7.5	4.3	8.0	6.5	0.7	3.7
1964	14.8	3.5	6.8	4.5	8.0	6.1	0.7	0.7
1965	14.1	0.2	8.1	5.8	6.4	6.7	0.9	-0.3
1966	17.6	4.1	7.8	5.7	10.6	5.7	1.3	2.7
1967	16.1	1.3	8.2	6.6	9.7	4.8	1.7	4.1
1968	18.9	2.9	8.1	7.8	13.7	3.8	1.4	7.4
1969	22.1	7.1	8.0	7.0	17.7	3.3	1.2	7.3
1970	19.4	4.5	7.7	7.3	16.9	2.1	0.4	7.2
1971	17.1	3.6	7.7	5.8	15.5	1.8	-0.1	8.9
1972	17.4	4.2	9.4	3.8	16.1	1.7	-0.4	3.6
1973	25.0	9.1	11.7	4.2	24.3	1.4	-0.7	2.4
1974	21.7	7.0	12.4	2.4	21.4	1.2	-0.9	11.2
1975	19.7	4.1	11.5	4.1	20.2	1.1	-1.6	9.3
1976	24.3	6.7	11.2	6.4	23.7	1.3	-0.6	1.1
1977	25.8	9.1	11.2	5.5	25.7	0.6	-0.6	0.0
1978	27.4	10.9	10.1	6.3	26.9	1.0	-0.5	2.3
1979	27.3	10.3	10.0	7.0	27.6	0.7	-1.0	6.9
1980	20.7	6.2	8.6	5.9	23.0	0.8	-3.1	9.4
1981	20.4	5.3	8.5	6.6	23.3	0.8	-3.7	7.1
1982 p	22.2	6.0	9.4	6.7	25.0	0.8	-3.6	-

/a Gross National Savings = GNP + net current transfers from the rest of the world (ROW) - consumption. This differs from the definition used by the Bank of Korea (BOK) for "National Savings" (see Appendix A).

/b Total may not equal sum of the components due to rounding errors.

/c Includes private households and nonincorporated private enterprises. Depreciation on nonincorporated private enterprises is included under corporate savings because disaggregated data were not available.

/d Includes private and public enterprises, depreciation of private and public enterprises, and depreciation of nonincorporated private enterprises as noted above.

/e Includes government savings and depreciation expenses for general government.

/f Gross Domestic Savings = GDP - consumption.

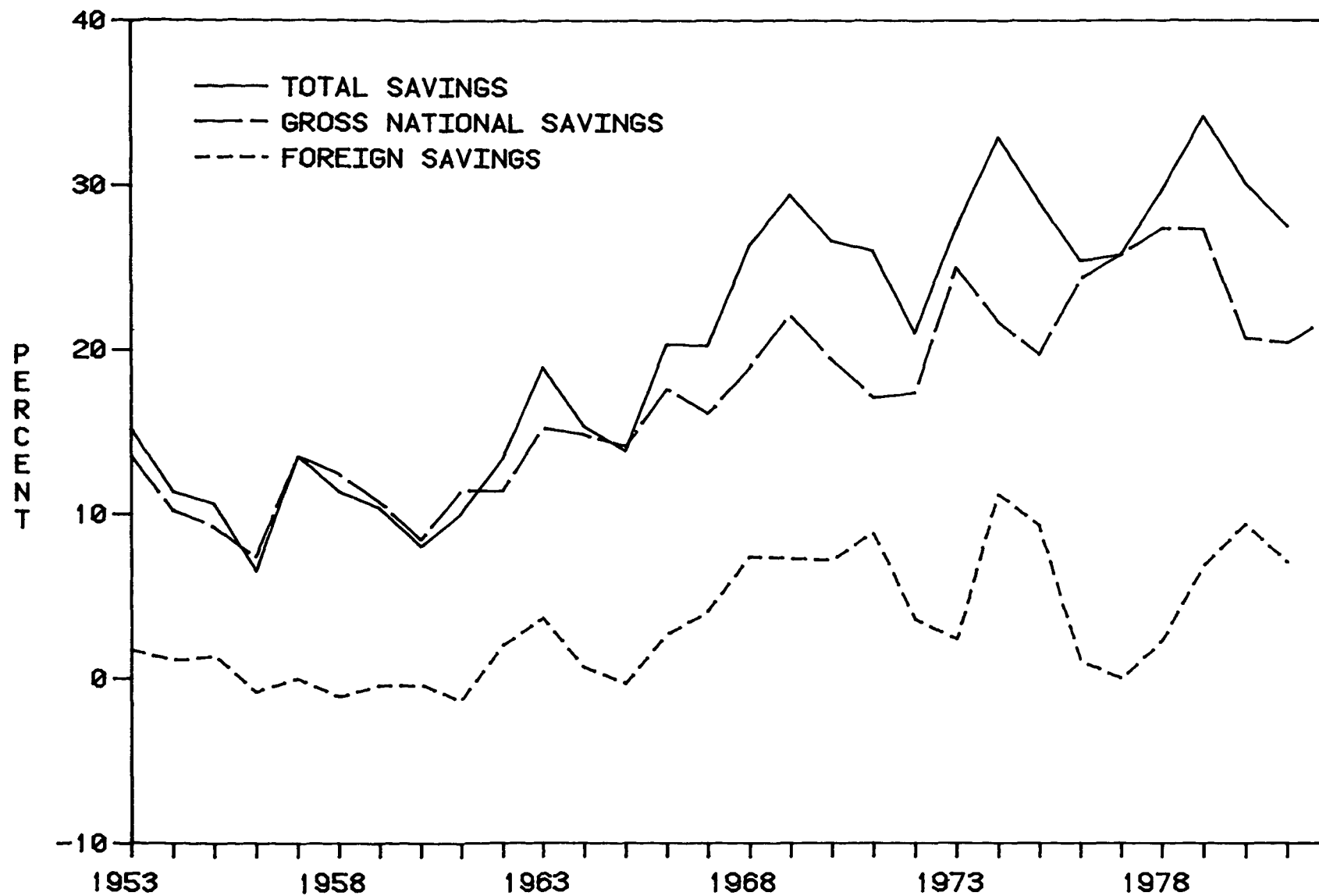
/g NCT = Net current transfers from ROW.

/h NFI = Net factor income from ROW.

/i Foreign savings are "net borrowings from the rest of the world"; net current transfers are included in GNS. The BOK definition includes NCT (see Appendix A).

Source: National Income in Korea, (1982) BOK.

FIGURE 1: GROSS NATIONAL SAVINGS AND FOREIGN SAVINGS
(AS % OF GNP)

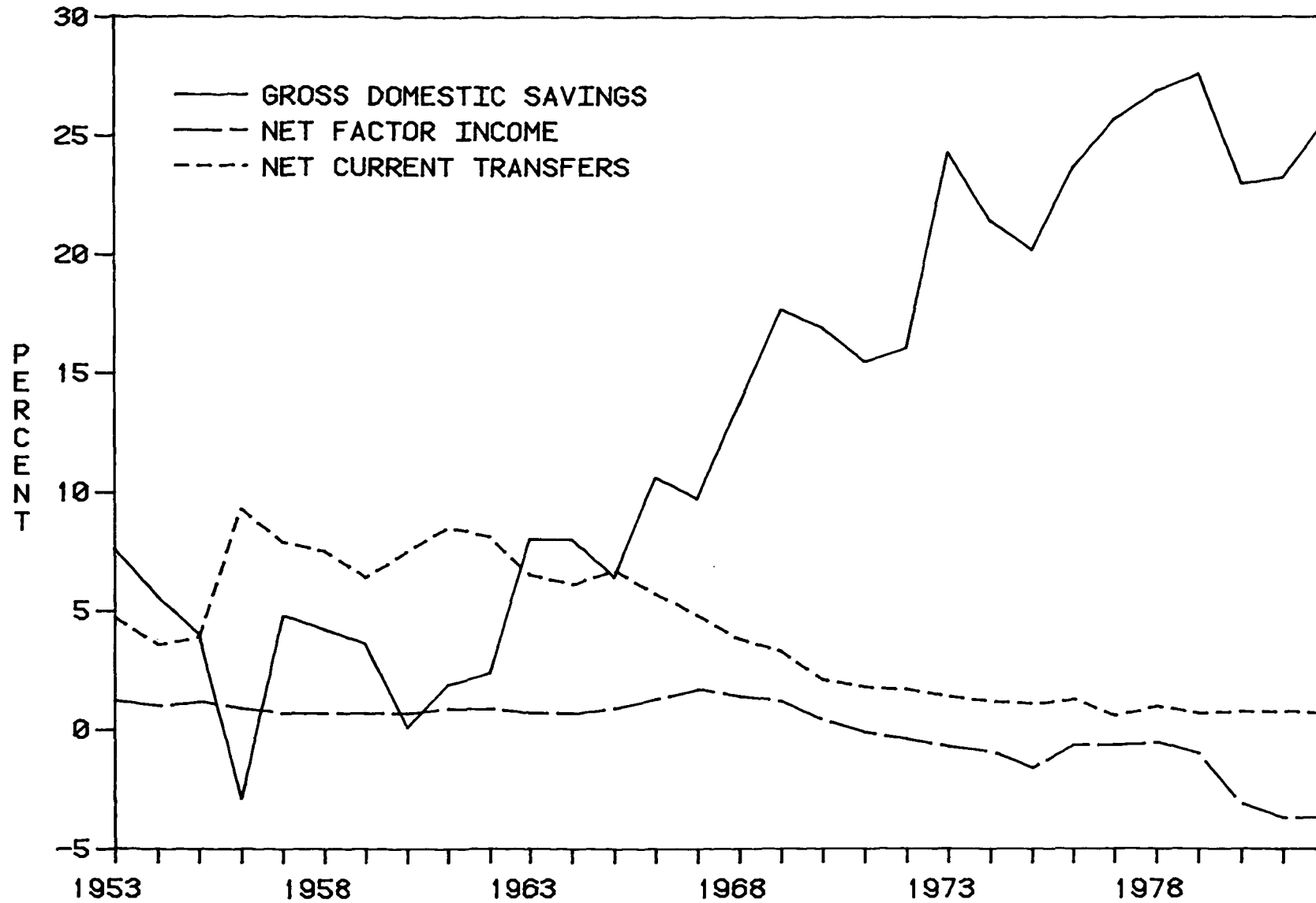


SOURCE: BANK OF KOREA, THE NATIONAL INCOME IN KOREA (1982)

II. Savings Performance in Comparative Perspective

Korea is a relative newcomer to the ranks of countries whose savings rates are above the average. Early in the sixties the level of Gross Domestic Saving (GDS) was negligible, and investment was financed largely through net current transfers from the rest of the World (ROW) (see Table 1 and Figure 2). A turnaround apparently occurred in the middle of the decade with GDS increasing from about 2% of GNP in 1962 to 17% in 1970. A number of economists, among them McKinnon, have argued that this spurt can be ascribed to the policy of posting positive real interest rates on time and savings deposits. Our own results, discussed later, suggest that savings are interest elastic, but some allowance should also be made for improvements in accounting practices in the second half of the sixties which made the measurement of income and expenditure more accurate. Furthermore, the intractability of evaluating savings in the form of real assets, as against financial savings, might have led to an underestimate of savings in the earlier years. The large outlays by Korean families on the education of children also includes elements of savings passed over by conventional definitions (see Table 2). After making due allowance for these factors, it remains that the mobilization of domestic resources proceeded at a respectable clip over the following ten years. Gross domestic savings reached 24.3% of GNP in 1973 and six years later peaked at 27.6%. Much of this increase resulted from the growth in Private savings which went from 8.3% in 1966 to 20.8% in 1973, but Government savings also increased from under 4.5% in the early 1960's to 7.0% by the end of the decade. After averaging 4% during the early 70s, they once again rose to above 6.4% in 1976 and have fluctuated around that level since.

FIGURE 2: COMPOSITION OF GROSS NATIONAL SAVINGS
(% OF GNP AT CURRENT PRICES)



SOURCE: BANK OF KOREA, THE NATIONAL INCOME IN KOREA (1982)

Table 2: EDUCATIONAL EXPENDITURES
(in Won) /a

	Urban households			Rural households		
	Education expenses	Income	%	Education expenses	Income	%
1965	5,160	112,560	4.6	4,482	112,200	4.0
1966	8,040	161,520	5.0	6,350	130,176	4.9
1967	12,600	248,640	5.1	7,945	149,472	5.3
1968	19,800	285,960	6.9	9,732	178,956	5.4
1969	19,440	333,600	5.8	11,432	217,872	5.2
1970	23,760	381,240	6.2	14,185	255,804	5.5
1971	30,120	451,920	6.7	18,363	356,388	5.2
1972	39,120	517,440	7.6	20,382	429,396	4.7
1973	43,560	550,200	7.9	24,111	480,708	5.0
1974	43,080	644,520	6.7	27,838	674,448	4.1
1975	50,880	859,320	5.9	38,443	872,928	4.4
1976	67,680	1,151,760	5.9	58,404	1,156,260	5.1
1977	71,880	1,405,080	5.1	79,252	1,432,812	5.5
1978	84,720	1,916,280	4.4	105,358	1,884,192	5.6
1979	120,396	2,629,596	4.6	146,483	2,227,488	6.6
1980	135,288	3,205,152	4.2	200,283	2,693,100	7.4
1981	166,524	3,817,224	4.4	253,348	3,687,852	6.9

/a 731 W = 1 US\$, average 1982 (line rf from International Financial Statistics).

Survey: Economic Planning Board, EPB, The Family Income and Expenditure Survey.
Ministry of Agriculture and Fisheries, The Farm Household Economy Survey.

Source: Social Indicators In Korea, 1982: p. 52 and 135.

A gross national savings ratio of over 25% is very respectable by any standards, but is well below that of some of the economies with which Korea is most frequently compared e.g., Japan and Singapore. As Table 3 shows, savings in these countries were appreciably in excess of 30% throughout much of the 70's even though the Korean economy expanded considerably faster than Japan's and maintained a slight edge over that of Singapore. If we assume that savings behavior in these nations is broadly similar and that Korea will eventually draw abreast, then it would be reasonable to expect a sustained growth in savings in the course of the 1980s as stated in the Fifth FYP. On the other hand, if we take the gap between Korean savings performance and that of the other two countries as evidence of a structural difference in attitudes towards accumulation, a plausible hypothesis, based on movements during the 1970s, one would expect a recovery of savings within the next 3-4 years to a 27% level, as occurred after the first oil shock in 1973/74, and little further increase, thereafter. The implications of these two rather divergent hypotheses for growth, BOP deficits, and foreign borrowing are quite profound.

Doubts and disagreements can be resolved through recourse to beliefs concerning the future actions of Korean households and governments. Alternatively, an attempt can be made to model savings behavior as depicted in the annual time series data stretching back to the early 1950s, and the course of future accumulation derived from parameters brought to the surface by statistical tests.

Table 3: GROSS NATIONAL SAVINGS RATIOS: VARIOUS ASIAN ECONOMIES /a
(% of GNP at current prices)

Year	Korea /b	Japan /c	Singapore
1952	-	25.6	-
1953	13.5	25.4	-
1954	10.2	22.0	-
1955	9.2	26.2	-
1956	7.3	29.0	-
1957	13.5	31.1	-
1958	12.4	28.7	-
1959	10.7	32.1	-
1960	8.4	35.2	-
1961	11.4	38.6	-
1962	11.4	34.9	-
1963	15.2	35.1	-
1964	14.8	35.1	-
1965	14.1	33.0	-
1966	17.6	34.7	-
1967	16.1	36.3	-
1968	18.9	38.1	19.7
1969	22.1	39.1	19.1
1970	19.4	39.7	19.3
1971	17.1	38.0	18.4
1972	17.4	37.8	24.1
1973	25.0	37.9	27.3
1974	21.7	35.1	25.1
1975	19.7	32.5	25.5
1976	24.3	32.1	27.7
1977	25.8	32.4	28.8
1978	27.4	32.4	28.3
1979	27.3	32.1	28.9
1980	20.7	31.7	28.9
1981	20.4	32.2	29.8
1982	22.0		

/a Gross National Savings is defined as Gross National Product + net current transfers from the ROW - consumption. See The World Bank Statistical Manual for a more complete definition.

/b This differs from national savings as shown in National Income in Korea; the Korean definition of national savings does not include net current transfers from the ROW (See Appendix A).

/c Japan changed its SNA in 1965.

Sources: Korea: BOK, National Income in Korea (1982);
Japan: Economic Planning Agency, Annual Report on National Accounts;
Singapore: Statistical Yearbook (1982).

III. Savings Hypothesis

Theories of saving have been frequently surveyed and there is little need for an exhaustive listing. We will only touch upon those that promise to cast a ray or two on attitudes toward savings and for which the necessary data can be mustered.

Among Keynesian economists the very first rung in a theory of savings, is the level of current income. How much a nation might save, depends, quite appropriately, on total earnings.^{/5} This formulation is the fundamental building block of most aggregate savings functions. But for all its considerable explanatory power, the level of income is but one of many variables impinging on the decision to save. Hence other candidates must also be canvassed. So called, "ratchet" theories of spending have proven to be a very fruitful source of ideas.^{/6} They assume that by virtue of habit, or out of sense of caution, individuals are slow to increase their consumption as their incomes grow. Therefore, the more swiftly incomes expand, the greater will be the volume of savings in an economy. One very famous variant of this notion, identified with Milton Friedman, assumes that by looking at the trend in their earnings over the recent past and by making educated guesses as to their future incomes, people derive a sum they treat as their "permanent income," a much stabler aggregate than their actual earnings.^{/7} What is spent or saved is determined by reference to their permanent income. An unexpected increase in income is treated as transitory and frequently saved. A full-blown test of the permanent income hypothesis, requires a considerable volume of data. Adding the rate of growth of GNP to the

estimating equation can, at a pinch, suffice. It is a crude proxy for the many sophisticated ideas underlying the "ratchet" theories but an adequate one, nonetheless. Another surrogate for permanent income which we also tried, was a three-year moving average of current income.

The rate of growth is not the only way of capturing, empirically, the inertia of spending patterns. A second possibility is to take the ratio of actual GNP to its three-year moving average (which can be considered as an indicator of potential GNP), the assumption being that when this ratio exceeds one by a significant margin, the growth of income is likely to be well above what most people expect, leading to a rise in savings.

Decisions to save are guided not only by income but also by the stock of assets.^{/8} As people become wealthier, the utility from postponing consumption in the current period for the sake of higher consumption in later years is likely to diminish, with the result that savings are cut back. Individuals might also have a target level of savings, which once achieved discourages them from accumulating further. This line of argument points toward a negative relationship between savings and wealth. Unfortunately, an aggregate assets variable is difficult to construct for the period of time being investigated. A rather weak alternative, for use in the household savings function, was provided by individual financial assets outstanding at the end of each year, obtained from the flow of funds tables. While we realize that this does not do justice to the hypothesis, the alternative was to proceed with the chores of model building, ignoring wealth altogether.

For years, a spirited debate has swirled around the effects of inflation on savings./9 At one level, there is the pure theorist who cannot understand why the rate of increase in prices should influence the trade-off between current and future consumption. From his perspective, savings behavior remains unaltered although the composition of savings might change. More empirically minded practitioners argue, however, that inflation by disturbing relative prices, increasing uncertainty about employment and income in the future, and in particular, reducing the value of financial assets, could lead to a spurt in savings, especially where financial assets occupy a large share in total household wealth./10 Savings would also rise, following an unanticipated surge in inflation, if individuals respond to the increasing costliness of certain items by cutting purchases, without taking account of the actual or anticipated growth of their own incomes./11 Also, monetary policies which lead to accelerating inflation can result in a transfer of resources from moneyholders to the state, thereby raising government savings./12 On the other hand, under conditions of persistent inflation, people expecting goods to grow ever costlier, might advance their purchases, by eating into their savings. They may also restructure their asset portfolios, with housing and real estate edging out financial holdings. Since prices of such items often increase more than proportionately during inflationary times, the wealth effect can serve to depress new savings. Finally, periods of high inflation, by redistributing income to those with greater saving propensities, because of the lag in wages behind prices and the transfers between creditors and debtors, can be accompanied by a growth in accumulation.

Thus, there is some ambiguity in the relationship on the theoretical plane which is echoed by the diversity of the empirical results. Alongside research, which was unable to discern any significant relationship,

there are papers claiming a positive association, while still others conclude that in fact, inflation lowers saving propensities. Since Korea has experienced a high rate of inflation for nearly three decades, it seemed appropriate to include the annual change in inflation as an explanatory variable in our model.

There is widespread faith among economists that the real interest rate should affect saving decisions by altering the trade-off between present and future consumption. But uncovering empirical traces of a rational response on the part of savers to changes in interest rates, has turned out to be maddeningly difficult. On occasion, by selectively excluding certain other variables that might mask the effects of interest rates, some assiduous researcher will discover a positive relationship, but by and large it has been hard going for the true believers. Thanks to the efforts of Edward Shaw and Ronald McKinnon,^{/13} the importance of interest rates for Korean savings has received much attention and a measure of econometric support, although the strength of their findings has not been convincingly reaffirmed by subsequent research.^{/14} Another attempt at verification seemed long overdue. Hence, we incorporated interest rates into our model.

Foreign savings offered us another opportunity of adding to our theoretical menu, but the link between foreign and national saving lacks conceptual foundations, being built largely on ad hoc rationalizations which, on occasion, have been sustained by tests. It is thought that the availability of foreign capital flows discourages government from strenuously promoting domestic resource mobilization and can displace private

savings./15 For these reasons and because Korea has attracted large flows of capital over the past thirty years, it seemed worthwhile determining whether the hypothesized negative association was sustained in the Korean case.

Lastly, since we are dealing with an economy which has plumbed the secrets of export-led growth, we attempted to test the validity of one additional view. It has been proposed by Maizels, Lee, Laumas, Papanek and others /16, that rapidly expanding exports can raise savings, because of a higher propensity to save in the export sector; the importance of export taxes for government revenues; the positive influence the tradeable goods sector can exert on marginal saving propensities in other sectors that benefit as a result of linkages; and the indirect effects arising from a more efficient allocation of resources. Although export taxes have never been a large source of government revenue in Korea, we reasoned that custom duties on imports are far from negligible /17 and as export growth is directly associated with changes in imports, it was a variable meriting inclusion in our tests. Our attempt at explaining the behavior of savings in Korea encompassed the eight variables listed above.

IV. Data

Savings behavior can be examined at several levels. Gross National Savings (GNS) represent the highest level of aggregation, including public and private savings, depreciation, net current transfers from the ROW and net factor income from the rest of the world (ROW). By excluding net current transfers and net factor income, one is left with Gross Domestic Savings

(GDS). GDS provides the best estimate of the domestic savings effort in Korea, as GNS is dominated by net current transfers from the ROW in the 1950s and 1960s. Furthermore, in the early eighties, GNS was several percentage points below GDS because of the large factor payments needed to service Korea's debt obligation (Table 2). As these transfers must be financed from domestic savings; excluding them would result in an underestimate of domestic resource mobilization. For this reason, the emphasis of our projections has been on GDS rather than GNS, although both were used in our estimating equations. Savings can be further disaggregated into three categories: government, households, and corporations. Finally, it is possible to estimate household savings, independently by netting out agriculture stocks, a large and variable item.

The National Income in Korea (1982) published by the Bank of Korea (BOK) provides annual time series on the national accounts for the period 1953-82. It includes data based on Korean definitions for national, household, government, and corporate savings, but we have conformed to the standard World Bank definitions for those items (see Appendix A, for a complete description of the savings data published by the Korean authorities and the World Bank definitions of savings). We also found it necessary to limit our econometric tests to the period 1965-82 as there was an apparent shift

in savings patterns after the mid-60s which made it risky to use the statistics for the first ten years. To determine whether this shift represented a structural change in savings behavior, we used the Chow Test to compare the period, 1953-65, with the period, 1965-82. Since the null hypothesis of no structural change in the parameters could not be sustained, all regressions were limited to the period, 1965-82./18

The question of whether or not to include the annual change in agricultural stocks, a volatile and climate related item, in the savings statistics also had to be settled empirically. There can be little conceptual disagreement with treating grain inventories as a form of saving, but they could introduce noise into the statistics, obscuring the influence of the independent variables being used. After estimating various domestic and household savings functions with and without agricultural stocks, it became clear that including inventories improved the fit and imparted stability to the coefficients.

To derive savings in real terms, we have followed the World Bank Statistical Manual: real GDS equals gross domestic income /19 minus consumption; and, real GNS equals GDS plus net current transfers and net factor income. This procedure yields a more suitable measure of real income than the more conventional approach where savings in current prices are deflated by the GDP deflator. This can be justified when one considers the changes in relative prices following the first and second oil shocks.

To convert other nominal amounts into real magnitudes, it was necessary to choose from the GDP deflator, the Consumer Price Index (CPI) and the Wholesale Price Index (WPI). Since the latter is dominated by tradeables and intermediate products, we excluded it in the first round. After considering the weighting scheme used for the CPI and taking into account both the small share of housing and the significant share of food and other items whose prices are regulated by the Government, we elected to use the GDP deflator. While its broad coverage has certain drawbacks, the GDP deflator does adequately reflect movements in the prices of services, whose share of the national product is large and growing. However, these deflators do tend to undervalue savings from a developmental perspective. As shown in Table 4, the fixed investment deflator rose more slowly than the GDP deflator from 1975 onwards. Thus, a given volume of real savings arrived at by using the GDP deflator would support a larger amount of fixed investment as measured by the cost of accumulating capital goods. On balance, however, it seemed more appropriate to stay with the GDP deflator, since from 1965 to 1975, the rate of change of the two indexes is nearly identical.

By the standards of most developing countries, Korean economic data are both abundant and of relatively high quality. As mentioned above, the national account statistics were obtained from the National Income in Korea (1982). The Economic Statistics Yearbook (1982) was the source of the time series on deposit rates, while for exports and the CPI we relied on the International Finance Statistics (IFS) issued by the IMF. All the regressions were run using ordinary least squares (OLS) unless auto-correlation necessitated a recourse to Generalized Least Squares (GLS).

Table 4: GROSS DOMESTIC PRODUCT AND FIXED INVESTMENT DEFLATORS

	<u>GDP deflator</u>		<u>Fixed investment deflator</u>	
	Index (1975 = 100)	Rate of change (%)	Index (1975 = 100)	Rate of change (%)
1960	8.63	11.2	10.90	2.9
1961	9.77	13.2	13.61	24.8
1962	11.57	18.4	15.00	10.2
1963	15.02	29.9	16.48	9.9
1964	19.50	29.8	21.70	31.7
1965	20.70	6.1	24.99	15.1
1966	23.67	14.3	27.61	10.5
1967	27.49	16.2	29.47	6.7
1968	31.96	16.2	32.31	9.6
1969	36.69	14.8	34.79	7.7
1970	42.32	15.3	40.55	16.6
1971	47.45	12.1	42.98	6.0
1972	54.82	15.5	48.30	12.4
1973	62.03	13.1	57.88	19.8
1974	80.36	29.5	80.39	38.9
1975	100.00	24.4	100.00	24.4
1976	117.86	17.9	108.01	8.0
1977	137.29	16.5	119.63	10.8
1978	165.87	20.8	136.30	13.9
1979	197.43	19.0	167.30	22.7
1980	246.69	25.0	225.87	35.0
1981	286.16	16.0	258.59	14.5
1982	309.20	8.1	270.58	4.6
Annual rate (1960-82)		17.7%		15.7%

Source: National Income in Korea, Bank of Korea (1982).

Estimation Results

We began by modelling real gross national savings behavior in logarithmic form over the period 1965-81. Various "theories" of savings behavior were tried by varying the definition of the income variable: a Keynesian model with savings as a function of current income; a simple permanent income hypothesis with savings as a function of permanent income (measured by a 3-year moving average of current income); and, a "ratchet" model with savings as a function of the ratio of current income to a three-year average of current income. This latter definition did not perform well in any of our equations and was excluded from subsequent tests. All nine variables - income (current and permanent), the growth rate, the inflation rate, financial assets (as a proxy for wealth), the real time deposit rate, the level of exports, and the amount of foreign savings - were included in our initial regression. The level of exports and the income variable were highly correlated and hence, we eliminated the export variable to avoid problems with multicollinearity. Financial assets was also discarded as it was insignificant. To capture the unusual circumstances created by the second oil shock and Korea's first serious recession in two decades, we experimented with a dummy for the period 1980-81. The results are shown in Table 5; all equations have been corrected for first-order serial correlation.

The level of Gross National Income (GNY), and our measure of permanent income are highly significant, in all equations. Current income (GNY) performs slightly better than our measure of "permanent" income, especially in terms of the standard error of the regression. Foreign savings, which is estimated as a semi-elasticity because of negative values during the sample period, has a negative coefficient as expected, but it is

Table 5: GROSS NATIONAL SAVINGS: 1965-1981
(Logarithmic Estimates)

	<u>Income</u>										
	Average	GNY	Infla-	Real TD	Foreign	Dummy	Constant	\bar{R}^2	SER	DW	rho
GNY	GNY	growth	tion	rate	savings	80/81					
	(3 yr)										
1.	1.576 (18.31)	0.974 (3.09)	1.092 (1.87)	1.082 (2.50)	-.521E-3 (0.92)		-7.04 (9.36)	0.975	0.065	1.75	0.494
2.	1.595 (15.25)	1.604 (3.84)	1.444 (1.85)	1.419 (2.54)	-.408E-5 (0.01)		-7.37 (8.29)	0.969	0.087	1.68	0.329
3.	1.537 (20.85)	1.051 (3.49)	1.284 (2.36)	1.188 (2.86)			-6.75 (10.04)	0.976	0.065	1.64	0.486
4.	1.601 (18.44)	1.578 (4.41)	1.640 (2.41)	1.644 (3.02)			-7.46 (9.27)	0.972	0.083	1.68	0.331
5.	1.570 (19.65)	0.849 (2.38)	1.189 (2.17)	1.209 (2.92)		-0.081 (1.04)	-7.01 (9.84)	0.976	0.065	1.72	0.482
6.	1.639 (16.38)	1.339 (3.01)	1.306 (1.86)	1.445 (2.75)		-0.117 (1.19)	-7.70 (8.58)	0.968	0.082	1.75	0.400

Abbreviations:

GNY = Gross National Income

TD = Time Deposit

SER = Standard Error of Regression

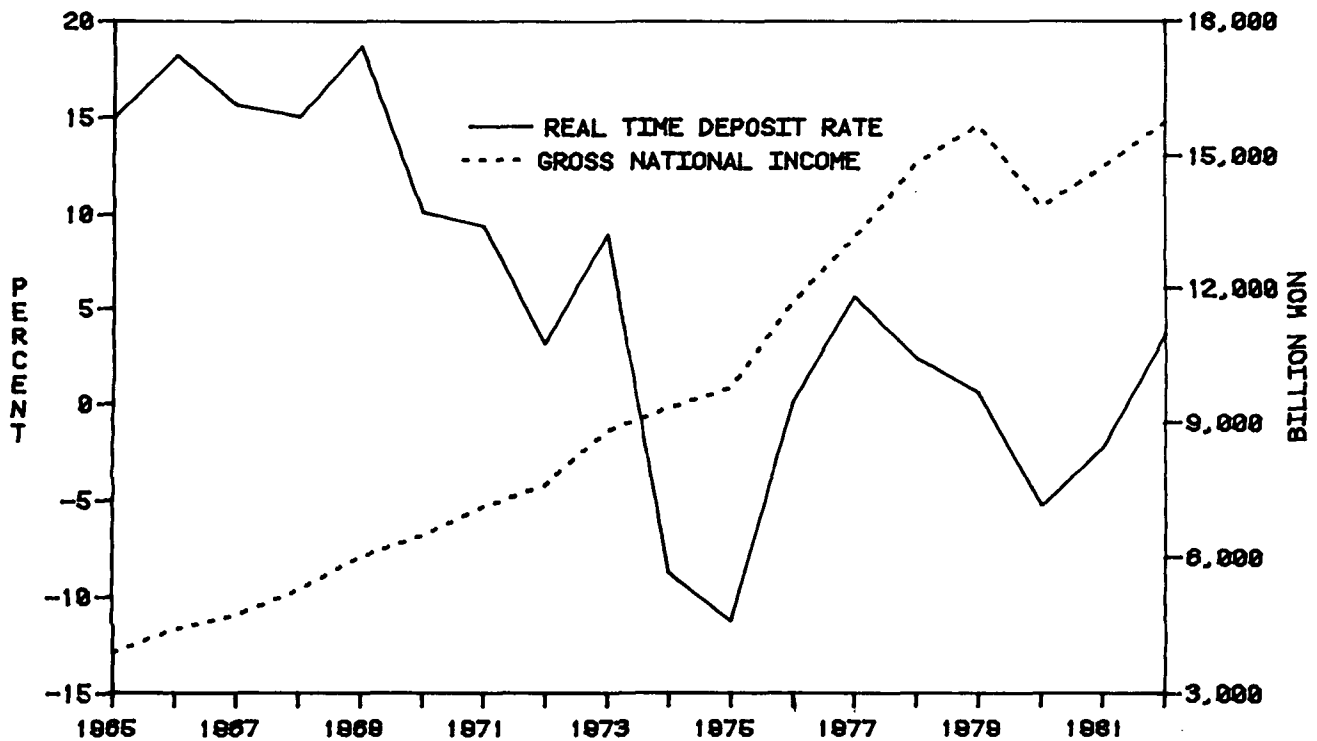
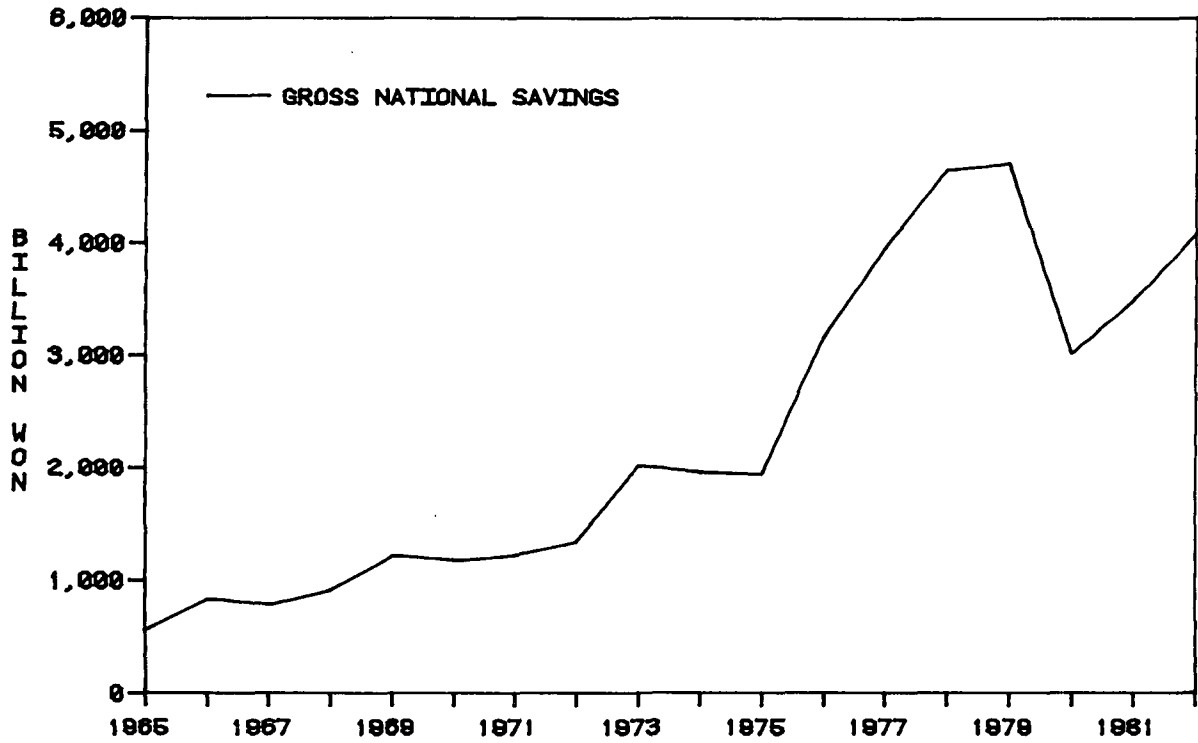
DW = Durbin-Watson statistic

rho = coefficient for first order autocorrelation correction

not significant (see equations 1 and 2). The dummy for 1980-81 is also insignificant, indicating no structural changes during the 1980-81 recession (see equations 5 and 6). Therefore, the best equations include an income variable, the growth rate of income, the rate of inflation and the real time deposit rate (see equations 3 and 4).

The importance of the income growth variable is heartening because it lends support to the ratchet theories that have been applied with considerable success to data drawn from the advanced industrial nations. Even though a positive relationship between inflation and savings was a possibility the size and significance of the coefficients was nevertheless surprising. They confirmed the importance of the Government's occasional reliance on the inflation tax to increase the flow of resources into investment and the tendency of individuals holding large savings deposits to overcompensate for the erosion of real /20 balances when inflation accelerates. In addition, the real time deposit rate is significant in all equations, signifying the importance of the real rate of return to savings behavior./21 The relationship between GNS, and the two primary dependent variables, current income and the real time deposit rate are shown graphically in Figure 3.

FIGURE 3: SAVINGS, INCOME AND INTEREST RATES



SOURCE: BANK OF KOREA, THE NATIONAL INCOME IN KOREA (1982)

Table 6: GROSS NATIONAL SAVINGS: 1965-1982
(Logarithmic estimates)

	GNY	GNY growth	Inflation	Real TD rate	Foreign savings	Dummy 1980-82	Constant	\bar{R}^2	SER	DW	rho
7	1.584 (19.52)	0.933 (2.87)	0.907 (1.60)	1.104 (2.59)	0.265E-3 (0.53)		-7.10 (9.99)	0.980	0.066	1.75	0.395
8	1.590 (21.39)	0.814 (2.25)	0.930 (1.89)	1.166 (2.87)		-0.066 (0.87)	-7.14 (10.65)	0.980	0.065	1.76	0.406
9	1.559 (24.11)	1.001 (3.44)	1.071 (2.33)	1.157 (2.88)			-6.91 (11.34)	0.981	0.064	1.75	0.405

Table 7: GROSS DOMESTIC SAVINGS: 1965-1982
(Logarithmic estimates)

	GDY	GDY growth	Inflation	Real TD rate	Foreign savings	Dummy 1980-82	Constant	\bar{R}^2	SER	DW	rho
10	1.887 (41.04)	1.504 (3.95)	1.162 (2.41)	0.450 (1.72)	0.26E-3 (0.72)		-10.46 (18.11)	0.99	0.063	1.75	-0.604
11	1.875 (92.56)	1.618 (4.02)	1.315 (2.73)	0.487 (1.80)		-0.019 (0.31)	-9.98 (24.43)	0.99	0.064	1.85	-0.548
12	1.869 (50.59)	1.712 (6.87)	1.416 (3.80)	0.503 (1.90)			-9.95 (27.31)	0.99	0.061	1.87	0.515

Abbreviations:

GDY = Gross Domestic Income
 GNY = Gross National Income
 GD = Time Deposit
 SER = Standard error of Regression
 DW = Durbin-Watson Statistic
 rho = coefficient for first-order autocorrelation correction

Because of our definition of permanent income, a three-year moving average centered at year t , we were unable to regress it over the longer period, 1965-82. The results over this time period for our best equations, using current income, are shown in Table 6. Comparing equation 3 (1965-81, Table 5) and equation 8 (Table 6), the coefficients are unchanged even with the introduction of another year; this is important when one considers that savings only recovers from the 1980 recession in 1982.

We next turned to Gross Domestic Savings (GDS) which excludes net current transfers and net factor income from the rest of the world. As previously indicated, GDS is a more accurate measure of the domestic savings effort, since, the large interest payments due on Korea's foreign debt calls for an effort at resource mobilization appreciably in excess of investment needs. It also provides us with a useful check on the tests conducted with GNS; all the independent variables identified above, except for exports, were used to explain the movements in GDS (see Table 7). The level of GDY, the real TD rate, the rate of inflation, and the growth rate are significant (see equations 10, 11 and 12); the level of foreign savings has the correct sign, but is not significantly different from zero (see equation 10). The results of these regressions are similar to the ones that we obtained from GNS although the elasticities - with the exception of the interest elasticity - are slightly higher.

VI. Future Implications

Having established the responsiveness of savings in Korea to a set of variables with respectable theoretical credentials and isolated a couple of equations with a good "fit", we thought it useful to try and predict the course of domestic resource mobilization in the Korean economy during the remainder of the Fifth FYP period. Table 8 shows the elasticities of the independent variables with respect to both GNS and GDS.

Table 8: HISTORICAL SAVINGS ELASTICITIES: 1965-1982

	GNS (Eqn 9)	GDS (Eqn 12)
Current income	1.56	1.87
Growth	1.00	1.71
Inflation	1.07	1.42
Real TD rate	1.16	0.50

In projecting future rates of saving for the period 1983-86, we assumed that: the economy will maintain a growth rate of 8%; the government will continue to be successful in controlling inflation; and, it will not depart from the policy of posting positive real interest rates. These assumptions are reflected in the base scenario, shown as Table 9.

Table 9: BASE SCENARIO

	1983	1984	1985	1986
GDP growth	8%	8%	8%	8%
Terms of trade index	99.2	100.1	99.6	99.0
Real time deposit rate	4%	4%	4%	4%
Inflation rate	4%	5%	6%	6%

Simulation of equation 12 for the 1983-86 period yields an annual growth rate of savings of 12-13%. This is 4-5% higher than our projected GDP growth and implies about a 1.5% increase in the average savings rate for the remainder of the Fifth FYP.

Evaluating the Projections

Although with equation 12, we are able to track the actual savings pattern very closely throughout the sample period, the projected savings through 1986 must still be treated with a measure of caution for econometric as well as conceptual reasons. On the econometric front, there is the concern arising out of our reliance on single equation estimates. As Leff and Sato have pointed out,²² savings and investment are determined simultaneously and estimating savings with a single equation approach risks introducing simultaneity bias into the parameter estimates. Further, we cannot claim conclusively to have identified a savings function. Our

structural parameters might just possibly be capturing an investment relationship or an amalgam of savings and investment. Our hunch is that the latter is the more serious of the two.

At the conceptual level, the performance of several variables tested was noteworthy. It is hardly surprising to find that the income level plays such a prominent role; our preference for current income over "permanent" income stems from only a slightly better performance by the former over the latter. Given the rate at which Korea's GNP has risen over the past two decades, the significance of the economy's rate of growth was expected. Of greater interest was the clear association between savings and the real rate of interest. But the low elasticity (.5) with respect to GDS suggests that the benefits for resource mobilization of higher real interest rates will be outweighed by their negative effect on investment.

Since we assume that the real time deposit rate will change no more than a percent or two in the next three years and inflation will decline, these variables, will contribute little to the savings rate. Almost all the growth arises from the rising level of income. As a consequence, we see savings climb back to the ratios prevailing in the late 1970s, the difference between the high growth scenario (8.0%) shown in the previous section and a low growth scenario (6.5%) being probably less than 1%. The figure of 28-29% would seem to be very much an upper bound, but how far it has to be shaved in order to arrive at a true point estimate, calls for very finely balanced judgment.

What other factors might impinge upon the savings propensities of households and the Government? For the period 1970-81 the marginal propensity to save (MPS) from household disposable income was 20% which is very close to that prevailing in Japan during 1972-79. Compared with marginal propensities in other countries, developed or developing, these rates are quite high. For Korean savings to increase yet more would call for changes in: (a) the age structure of the population and in family ties that fundamentally alter post-retirement expectations; (b) the scale of expenditure on consumer durables and the mode of financing; (c) the variance of bonus payments to wage earners;^{/23} and (d) the demand for education and the outlays involved. However, no major changes in age structure and family ties are in the offing over the coming four years. Since consumer financing is rather scarce, an easing of supply would if anything reduce the need for households to save in anticipation of a purchase. Thus the likely growth in the demand for household goods and cars might be balanced by the emergence of new financial arrangements. Somewhat in contrast to Japan, bonus payments to workers in Korea have tended to vary little from one year to the next and probably have affected household savings only minimally. With the Korean economy becoming more susceptible to the international business cycles this might change, but even if bonuses do start to fluctuate there is no saying whether workers will treat them as transitory income and deposit them in savings accounts.

Government savings rose in the late 60s as a result of improved fiscal policies and the introduction of new tax laws. While they have occasionally climbed above 6%, the experience of the past decade suggests that 6-6.5% may be the upper limit, given the "tax effort" the Government is prepared to make. No doubt, the plans to improve the efficiency of public sector bodies will lower administrative expenses but at the same time current revenues will expand more slowly for two reasons. First the much lower rate of inflation that has been forecast for the period 1983-86 will dampen the States' income from direct taxes. Second, the "supply side" policies adopted by the Regime has led to a lowering of tax rates, whose effects will begin to be felt from 1984 onwards. Improvements in collection will provide a partial offset, but nevertheless, the trend in revenues is not strongly upwards, and with Assembly elections scheduled for 1986, a tax increase in 1985 would appear unlikely.

Some preliminary projections that we obtained from revenue and expenditure functions indicate that government savings should average 5.0% between 1983-86. However, this does not include the savings which will accrue, in the short-term, from the policy of absorbing a part of the fall in oil prices through import duties and taxes; from improved tax administration; and, from the removal of a variety of tax loopholes. Possibly as much as 0.3% of GNP could be added to government savings by way of the energy stabilization fund over the next two years. Even after making these assumptions we can still only project government savings in the region of 7%.

What other changes might have a bearing on savings propensities? Only two factors come to mind. One is the continuing migration of people to the urban areas.^{/24} A decrease in inflation is a second. Both will have a

negative influence on aggregate household savings, although a minor one. Since farmers whose incomes are more variable than those of wage earners in the cities, save more, a fall in their number will work its way into the savings rate. With the redistributive effects of inflation much less marked, profit earners and rentiers, with high saving propensities, may find their share of the national income, stabilizing if not falling, with some modest consequences for domestic savings.

Taking all these into account, there is scant reason to expect national savings to exceed 28% even in the event of a strong and sustained upswing in business activity. Matched against the investment ratio of 31% contained in the FYP, this would presuppose an unacceptably high level of foreign borrowing, since a portion of the GDS will be diverted to finance the high level of interest costs on foreign debt. But the Fifth Plan projections are based on an incremental capital-output ratio (ICOR) which assumes a pattern of infrastructural investment which is unlikely to prevail given the recent changes in the Government's program. If the expansion of the manufacturing sector resumes with the anticipated upswing in international business activity, a growth rate of 7.5-8.5% could conceivably be attained with investment averaging between 29-30%. Should the manufacturing sector fail to recover its leading role in the economy, and growth continue to rest upon the expansion of social-overhead capital and services, the expected increase in savings coupled with the international borrowing circumstances will limit Korea's growth rate to about 7.0%.

Appendix A: SAVINGS AS DEFINED IN THE KOREAN
NATIONAL ACCOUNTS AND THE WORLD BANK
STATISTICAL MANUAL

The manner in which Korean aggregate savings data -- both national and foreign -- are constructed differs from the standard Bank definitions for these variables, as outlined in the World Bank Statistical Manual Note 6.20. The purpose of this Appendix is: (i) to explain the difference between the Korean definition of savings and the Bank's operating definitions; and (ii) to establish a crosswalk between the two definitions for analytical purposes.

For operational purposes, three definitions are employed by the World Bank for Gross Domestic Savings (GDS) and Gross National Savings (GNS). Conceptually, these definitions do not differ; however, in practice, variations in the level of savings can arise as a result of a country's accounting practices. The three definitions are presented in: (i) the Operational Manual; (ii) the CPP/UN SNA system; and (iii) the World Tables (see Appendix Table 1).

Table 1: GROSS NATIONAL SAVINGS (GNS)/GROSS DOMESTIC SAVNGS (GDS)
(in current prices)

Operational Manual	CPP/UN SNA	World tables
GNS = GDI + CAB	GNS = GDP - C + NFI + NCT	GNS = GDI + net exports of all goods and services + NCT
GDS = GNS - NFI - NCT	GDS = GNS - NFI - NCT	
where; GDI: Gross Domestic Investment CAB: Current Account Balance C: Consumption GDP: Gross Domestic Product GDY: Gross Domestic Income NFI: Net Factor Income NCT: Net Current Transfer		

Source: World Bank Statistical Manual

Note: 6.20, p. 3

From the definitions in Appendix Table 1 and the data contained in the National Income in Korea (NIK) published by the BOK, one can easily construct GNS and GDS in current prices for Korea using any one of these methods. Appendix Table 2 shows these data for the period 1977-81. For GNS, the Operational Manual and the World Tables produce an identical level of savings, whereas the CPP/UN SNA method produces a different result. This difference arises from the treatment of the statistical discrepancy; since the Korean national accounts are constructed by industrial origin, the expenditure side of the accounts contain a statistical discrepancy. The CPP/UN SNA method uses GDP minus consumption and the statistical discrepancy is included in savings. In the other two methods, savings is calculated directly from the expenditure components of GDP and therefore, does not include the statistical discrepancy. As GDS equals GNS minus NCT and NFI, in each of the three methods the same difference shows up there as well.

In the Korean presentation of savings, they are divided into two categories -- National Savings and Foreign Savings. Appendix Table 3 shows the standard Korean presentation of these savings data. NCT are considered to be part of Foreign Savings and therefore are not included in National Savings; the statistical discrepancy is included in savings. Thus at the aggregate level, National Savings, as defined by the BOK, and GNS, as defined by the Bank, differ in two respects:

- (a) the treatment of NCT (the only divergence between the CPP/UN SNA method and the Korean definition); and,
- (b) the treatment of the statistical discrepancy (since the Operational Manual and the World Tables do not include it).

The National Savings data, that are shown in Appendix Table 3, are derived from more disaggregated data at this household, corporate, and government level. Appendix Table 4 shows this detailed data. The savings data for households and private non-profit institutions are the difference between current receipts, including transfers from the ROW, and current expenditures, including transfers to the ROW (see lines 1 and 2, Appendix Table 4). Corporate savings for public and private enterprises, as shown in the distribution of national income (see line 3, Appendix Table 3), plus the depreciation of unincorporated enterprises, and public and private enterprises (see line 4, Appendix Table 4) together constitute corporate savings. Private savings is the sum of corporate and household savings. Government savings, derived by subtracting current expenditure, excluding transfers to the ROW, from current revenue, excluding transfers from the ROW, when added to the depreciation of general government and government enterprises' equals the savings of the public sector. National savings, as defined by the BOK, is the sum of Private savings and Government savings.

In the main body of this paper, we have used the CPP/UN SNA definition of savings, since it only differs from the Korean concept of national savings in the classification of NCT. In addition, our definition of Foreign Savings is "net borrowings from the ROW" (or Foreign Savings as defined by the BOK minus NCT). By adhering to the CPP/UN SNA definition of savings in converting nominal savings into real savings, we have adjusted

KOREAGROSS NATIONAL SAVINGS AND GROSS DOMESTIC SAVINGS: 1977-1981
(in billion won)

	1977	1978	1979	1980	1981
Consumption	12,743.05	16,873.25	21,343.64	27,489.39	34,085.41
Private consumption	10,754.44	14,238.73	18,106.47	23,042.61	28,532.89
Government consumption	1,988.61	2,634.52	3,237.17	4,446.78	5,552.52
Gross domestic investment	4,644.95	7,137.74	10,293.50	10,812.68	12,030.40
Fixed capital formation	4,420.88	7,023.07	9,458.18	11,240.03	12,087.17
Increase in stocks	224.07	114.67	835.32	-427.35	-56.77
Exports of goods & svcs.	5,966.79	7,714.77	8,808.61	12,945.15	17,543.58
Imports of goods & svcs.	5,967.43	8,355.58	10,745.28	15,385.90	19,326.73
Statistical discrepancy	-264.70	-339.85	-343.41	-480.82	-358.46
Gross domestic product	17,122.66	23,030.33	29,357.06	35,380.50	43,974.20
Net factor income	-101.29	-112.73	-284.98	-1,058.95	-1,577.08
Gross national product	17,021.37	22,917.60	29,072.08	34,321.55	42,397.12
Memo items:					
Current account balance	5.96	-525.29	-2,009.18	-3,224.32	-3,018.38
Net current transfers	107.89	228.25	212.47	275.38	341.85
Gross national savings					
Operational manual	4,650.91	6,612.45	8,284.32	7,588.36	9,012.02
CPP/UN SNA	4,386.21	6,272.60	7,940.91	7,107.54	8,653.56
World tables	4,650.91	6,612.45	8,284.32	7,588.36	9,012.07
Gross domestic savings					
Operational manual	4,644.31	6,496.93	8,356.83	8,371.93	10,247.25
CPP/UN SNA	4,379.61	6,157.08	8,013.42	7,891.11	9,888.79

GDP by the income terms of trade, yielding Gross Domestic Income (GDY)./25
Real GNS equals GDY minus real consumption;/26 this definition of real
savings was used for the econometric work in the later section of the paper.
Consequently, we used GDY as our measure of income rather than GDP.

KOREA

NATIONAL SAVINGS AND FOREIGN SAVINGS
(in billion won)

	1977	1978	1979	1980	1981
<u>National Savings</u>	4,278.32	6,044.35	7,728.44	6,832.16	8,311.71
Private	3,323.84	4,563.12	5,623.69	4,710.32	5,475.01
Government	954.48	1,481.23	2,104.75	2,121.84	2,836.70
<u>Foreign Savings</u>	101.93	753.54	2,221.65	3,499.70	3,360.23
NCT	107.89	228.25	212.47	275.38	341.85
Net borrowings from ROW	-5.96	525.29	2,009.18	3,224.32	3,018.38
<u>Memo Items</u>					
GDI	4,644.95	7,137.74	10,293.50	10,812.68	12,030.40
Statistical discrepancy	-264.70	-339.85	-343.41	-480.82	-358.46

KOREA

NATIONAL SAVINGS: SECTORAL BREAKDOWN
(in billion won)

	1977	1978	1979	1980	1981
1. Household & private non-profit institutions/ <u>a</u>	1,553.73	2,509.44	3,001.11	2,130.89	2,258.27
2. (of which NCT) / <u>a</u>	(82.53)	(210.20)	(192.87)	(244.98)	(287.53)
3. Corporate savings / <u>b</u>	548.26	709.18	772.31	33.39	40.63
4. Depreciation (unincorporated enter., private & public corporations) / <u>c</u>	1,304.38	1,554.70	2,043.14	2,791.02	3,463.64
5. Government savings/ <u>d</u>	901.40	1,404.05	1,997.51	2,001.97	2,693.52
6. (of which NCT) / <u>c</u>	(25.36)	(18.05)	(19.60)	(30.40)	(54.32)
7. Depreciation: Govt. enter-prices/ <u>c</u>	49.37	57.88	79.96	113.31	99.72
8. General government / <u>c</u>	29.07	37.35	46.88	36.96	97.78
<u>Memo Items:</u>					
9. Private savings (1+3+4-2)	3,323.84	4,563.12	5,623.69	4,710.32	5,475.01
10. Govt. savings (5+7-6)	954.48	1,481.23	2,104.75	2,121.84	2,836.70
11. National savings (9+10)	<u>4,278.32</u>	<u>6,044.35</u>	<u>7,728.44</u>	<u>6,832.16</u>	<u>8,311.71</u>
12. NCT (2+4)	107.89	228.25	212.47	275.38	341.85
13. GNS (11+12)	<u>4,386.21</u>	<u>6,272.60</u>	<u>7,940.91</u>	<u>7,107.54</u>	<u>8,653.56</u>

/a "Current receipts and expenditures of households and private non-profit institutions," National Income in Korea (NIK), (1982) p. 205.

/b "Distribution of National Income," NIK, (1982) p. 173.

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Footnotes

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25. For further information, see the World Bank Statistical Manual.

26. The BOK does not publish savings data in real terms amounts only nominal.

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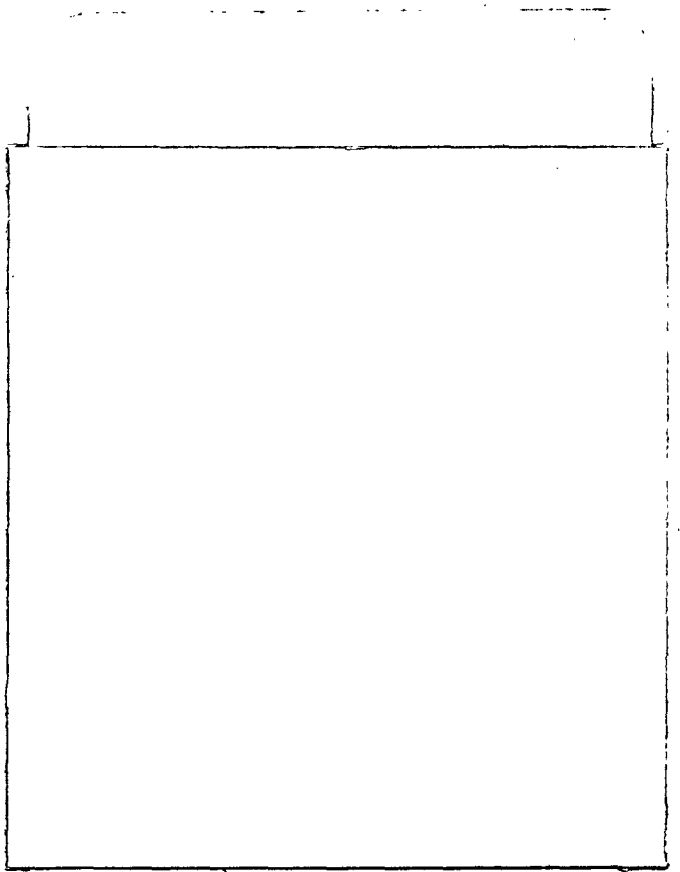
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