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INTERNATIONAL COMPARISON OF DOMESTIC SAVINGS RATES

CYNTHIA TAFT MORRIS

A.I.D.
Reference Centre
Room 1656 NS

PROGRAM COORDINATION STAFF A. I. D

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Discussion Paper No

INTERNATIONAL COMPARISONS OF DOMESTIC SAVINGS RATES

Cynthia Taft Morris
Consultant

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PREFACE

This paper is sixth in a series of discussion papers issued by the Program Coordination Staff of the Agency for International Development. The papers are designed for the use of A.I.D. headquarte and field officers and their staffs. They may provide background for discussion of policy; they may, as does the present paper, summarize in non-technical language current theoretical and empirical work in the field of development; or they may present the results of original research sponsored by the Agency for International Development. The ideas which they express are those of the individual authors and do not necessarily represent approved policy.

The following papers have been issued to date:

Indicators of Self-Help by Paul Clark (1962, Unclassified).

No. 2 Some Relations Between Economic and Military Assistance by Charles Wolf (1962, Unclassified)

No. Aid to Social Progress and Aid to Economic Development in Latin America by Everett Hagen (1962, Official Use Only).

No. Aid Strategy and Long-Term Planning in Greece, Turkey and Iran by Hollis B. Chenery (1962, Confidential).

No. Approaches to Development Planning by Hollis B. Chenery (1962, Official Use Only).

No. International Comparisons of Domestic Savings Rates by Cynthia Taft Morris (1963, Unclassified)

A key concern of the United States in administering aid for economic and social development is to encourage recipient countries to increase the proportion of national income which is saved domestically. Domestic savings represent the total domestic resources available for expanding the productive capacity of an economy. Together with private capital inflows and foreign assistance, they must be adequate to finance the level of investment desired for economic growth. 1/

The success of a less developed country in increasing domestic savings is one important indicator of the strength of its development effort. Where living standards are so low that it is not feasible to significantly raise savings at the expense of consumption, careful attention needs to be given to saving as much as possible of additions to national income. To raise the proportion of an addition to national income which is saved is to raise the marginal rate of saving. To increase the overall proportion of national income saved is to raise the average rate of saving.

Since adequate domestic savings are crucial to development, it is important to understand the reasons for differences in domestic

1/ Savings are usually defined as a residual: that part of national income which is not spent on consumption goods and services. Actual or "realized" savings are, thus, by definition, equal to actual or "realized" investment which is that part of national product (at factor cost) not accounted for by consumption goods and services. Savings and investment (as well as income and product) are "net" or "gross" according to whether they exclude or include depreciation. However, in the presence of foreign trade, actual domestic savings may diverge from actual investment by the amount of private foreign capital inflows and foreign assistance ("foreign" savings).

savings rates among countries. The purpose of this paper is to examine theories of savings which help explain inter-country differences in actual domestic rates of saving and to summarize the more significant empirical applications of these theories to inter-country variations in savings rates. Less attention will be given to changes in savings rates within countries over time since empirical studies covering sufficiently long periods are available for relatively few countries. It should nevertheless be emphasized that changes in savings rates within countries are the important concern of developing countries and of the countries giving them aid. Inter-country comparisons are useful primarily because of the indications they give of factors which are conducive to higher savings rates within a country as development proceeds.

Broadly speaking, two approaches to explaining international differences in actual rates of domestic saving may be distinguished in current literature on the subject, although the line between them is arbitrary. One approach relates real savings rates to basic structural characteristics of a country's economy such as per capita income, population and extent of industrialization or urbanization. These are characteristics which in the short period can only be changed to a limited extent by government policy. This "structural" approach emphasizes broad regularities in the relationship between savings rates and a few indicators of economic structure and stage of economic development. The second approach underlines the dependence of domestic savings rates upon such "institutional" factors as the prevalence of savings institutions and the efficiency of tax systems

or monetary and fiscal systems - factors which may be fairly directly influenced by government policy. In addition to these structural and institutional (or policy) variables affecting domestic savings rates, there is, of course, a wide variety of social, political and cultural influences which are important in explaining savings rates in particular countries but which must generally be introduced by qualitative

Structural explanations of savings are attractive in that they give a broad picture of such regularities in savings behavior as are explicable by a few basic characteristics of an economy. They leave unexplained, however, a fair number of individual cases. The reason is that their explanatory value depends upon the assumption that policy variables and broad social factors influencing savings rates are associated in a regular manner with changes in the relevant structural variables; if, for example, the efficiency of savings institutions and of tax systems always tends to improve as per capita income rises, then their influence on savings may be summarized in the theory that the rate of saving depends upon the level of per capita income; if, on the other hand, the operation of these institutional factors cannot be predictably associated with income changes, an income explanation of differences in savings rates will be inadequate.

The "institutional" approach to explaining savings concentrates upon factors which can be more readily influenced by government policy. Its disadvantages arise from difficulties common to all research on

institutional influences: it is not easy to identify the relevent intitutional variables; it is difficult to obtain satisfactory data; and institutional factors cannot be easily quantified in a manner which permits comparisons among countries. These difficulties are undoubtedly one reason why quantitative research comparing savings rates among countries has generally concentrated upon structural explanations of savings rates.

Structural Savings Theories

The basic "structural" characteristics of an economy which appear helpful in explaining inter-country differences in aggregate domestic savings rates may be grouped into several major categories: 1. the level of per capita income and wealth; 2. the extent of industrialization and urbanization and 3. the volume and character of internal demand for goods including the impact of income distributions. A number of multi-country studies have been made in recent years to test the relationship between selected variables in these categories and overall country savings rates.

Several general conclusions emerge from studies made by Houthakker (5,6), Kuznets (9,10,11) and others. 1/ (a) There is some tendancy, though not a strong one, for the proportion of national income saved to be higher at higher levels of per capita income. (b) It is

1/ See Appendix for a summary of selected emperical studies. Numbers in parentheses refer to the bibliography at the end of the paper.

fairly clear that industrialization and urbanization contribute to higher national savings rates. However, measures of per capita income and of urbanization and industrialization are so closely interrelated that efforts to distinguish their respective contributions to variations in savings rates are unreliable. (c) Finally, the changes in the character and composition of demand and in the distribution of income which often accompany rising per capita incomes exert upward pressure on consumption (downward pressure on savings) and help explain the relatively narrow range of variations in savings rates accompanying wide variations of per capita incomes.

Income and wealth as determinants of savings rates

J. M. Keynes (7) provoked widespread interest in the determinants of community savings and consumption when he incorporated in his theory of employment the proposition that consumption (and savings) are dependent in a fairly stable manner upon the level of income, the relationship being determined by psychological characteristics of human nature and by social practices and institutions which change very slowly. He suggested that, in general, - assuming tastes, income distribution and asset holdings (among other things) unchanged - a larger proportion of income tends to be saved at higher absolute levels of income; he did not indicate clearly whether he was describing behavior over time or the behavior of different income groups at a given moment in time. It seems likely that he thought it applied to both.

Empirical studies of developed countries stimulated by Keynes' General Theory led to apparently conflicting indications regarding the

relationship between consumption (savings) and income. Cross-section family budget studies indicated that the proportion of income saved tends to be larger in higher income brackets than in lower ones. Studies of the short-period response of savings to income changes showed that the proportion of income an individual saves tends to increase in response to income increases but with numerical estimates of rates of saving different from those of cross-section studies. In contract, long-period studies of a few developed economies showed remarkable constancy in the proportion of national income saved over time.

These conflicting indications have led to efforts to supplement Keynes' savings-income theory by allowing for alterations in factors which Keynes assumed unchanged throughout his analysis. For example, changes in asset holdings have been introduced to explain the stability over long periods in national savings rates(18): the tendency for individuals to save relatively less as their stock of wealth increases may offset the tendency to save relatively more in response to income increases.

Keynes' idea that the proportion of income saved tends to be larger at higher levels of income has been extended in several cross-section studies to international differences in savings rates. Studies by Kuznets, Houthakker, Wolf (23) and others do indicate a tendency - though not a marked one - for domestic savings to form a larger proportion of national product in richer countries than in poorer ones

The reason for somewhat higher savings rates in higher-income

countries is not, however, that the psychology, habits and needs of better-off populations are productive of greater thrift. As will be explained below, it appears to be rather that, on the one hand, changes in the distribution of income and population accompanying economic growth tend jointly to produce somewhat higher rates of domestic saving. On the other hand, certain institutional changes which often occur with economic growth, may also contribute to higher savings rates: for example, improvements in savings institutions, tax systems, monetary and fiscal policies. Lack of data has prevented systematic inter-country studies of the influence of assets upon savings rates. It is possible that the greater accumulated wealth of countries with high per capita incomes would help explain the small extent to which their aggregate savings rates tend to be higher than those of countries with low per capita incomes.

Urbanization and industrialization as determinants of savings rates.

The processes of urbanization and industrialization which characteristically accompany economic growth are marked by changes in the distribution of population and of income. The proportion of the labor force in nonagricultural sectors, and of the population in urban centers, tends to increase as economic growth proceeds; changes also take place in the distribution of income among sectors and among occupational groups in the economy. These interrelated changes help account for somewhat higher domestic savings rates in wealthier countries.

A tendency for the importance of profits in national income to increase may be considered one indicator of the process of industrial-

ization. Houthakker (5,6) has estimated propensities to save out of various functional categories of national income. He substantiates the familiar proposition that the propensity to save out of entrepreneurial and property income is substantially higher than out of employment income. While his analysis does not support the idea that savings out of personal disposable income (national income less taxes and corporation income plus government transfer payments) are proportionately greater at higher per capita income levels, it does suggest that total savings out of corporation income are proportionately greater in wealthier countries. His analysis suggests a mild tendency for government savings (defined as the excess of current revenue over current expenditures) to be relatively more important in poorer countries.

Kuznets, in a multi-country study of savings and investment (10), groups countries according to the share of gross national product accounted for by manufacturing and related industries. 1/ He observes a distinct association between this indicator of industrialization and domestic savings rates.

Measures of urbanization closely related to those of industrialization are the proportion of national income originating in urban centers and the proportion of urban to total population. Charles Wolf (23) suggests several reasons for expecting a positive relationship between domestic savings rates and measures of urbanization, among which, the better organization of capital markets, the higher

1/ mining, construction, transportation, communication.

occupational and educational level, the smaller size of families and the greater concentration of manufacturing (particularly capital goods) industries in urban centers. He concludes that the proportion of gross national product saved is larger in countries with higher ratios of urban income to total income; he finds a similar positive connection between savings rates and the proportion of population residing in urban centers.

Recent work by Oshima on family income distributions in four countries (16) suggests sharp differences in family income distributions between urban centers and rural areas. Oshima finds that the proportion of families concentrated at the lower tail of the income distribution is larger in rural than in urban areas. It should be noted, however, that some of the apparent discrepancy between urban and rural income may be explained by inadequate reporting of rural income in kind. Under-reporting of income together with failures to report agricultural investment may account for some of the reported difference between rural and urban savings rates.

Kuznets (10) has suggested that, as growth and industrialization take place, increases in the importance of middle-income groups showing positive savings may lead to higher total savings. The results of studies of international differences in the pattern of family incomes - for example, by Kravis (8) and Oshima (16) - are very tentative because of inadequacy and incomparability of data. Since Oshima's results do indicate that family income distributions in urban centers are characterized by a larger proportion of persons receiving above-

average incomes than are those in rural areas, one may infer the possibility of a relationship between family income distributions and savings rates. It is, however, difficult to find a measure of income distribution or of equality of income distributions suitable for testing the relationship.

Rate of growth of income as a determinant of savings

Another facet of the changes in income and population associated with economic growth is summarized in the proposition that the proportion of national income which is saved depends upon how rapidly national income is growing. Applied to inter-country comparisons, this hypothesis would suggest that countries experiencing higher rates of increase in national income tend to have higher rates of domestic savings.

It is not unreasonable to propose a connection between savings rates and the rate of growth of income, since the pattern of structural changes in both income and population may well vary according to the rapidity with which the growth process takes place. One line of reasoning supporting such a connection has been suggested by Modigliani and is based upon the "normal income hypothesis." Friedman and Modigliani are the names most commonly associated with this theory which emphasizes the dependence of individual savings upon expectations regarding future income and wealth (2,3). According to the "normal income hypothesis", the individual's choice between consumption and saving is determined by his "normal" income, that is, by the current annual equivalent of his life-time expected earnings and assets; it is not influenced by his "transitory" income, that is by unexpected increases in income which do not affect the individual's view of his life-time resources. Since

the individual's "normal" income cannot be observed, the validity of the theory has been tested by its consistency with observed reactions to total income changes. To take one example, an individual who plans his consumption as a certain proportion of the current value of lifetime resources could be expected to save relatively little of his income in the early stages of his career, to save relatively more when he reaches his peak-income period and to dissave when he retires. Then too, individuals in occupations characterized by fluctuating incomes would be likely, according to this theory, to maintain relatively stable levels of consumption in the face of short-term income changes.

Empirical studies of the United States and of a few other countries (England, Holland, Sweden) do suggest that the normal income hypothesis may help explain decisions to save for groups (such as farmers and small businessmen) whose incomes fluctuate greatly; a recent study of savings in Japan (17) suggests that such an explanation may also be valid for groups in Japan whose consumption expenditures are unresponsive to short-term income changes. Houthakker (5,6) recently found for 20-30 countries, not unexpectedly, that the marginal rate of saving (the proportion of additions to income which is saved) is considerably higher in the short run than in the long run; he suggests that this finding is at least consistent with the normal income hypothesis.

The normal income hypothesis has been combined in the following manner with the propostion that in the long run, the

proportion of national income which is saved depends upon the rate of change in national income. Assuming that each individual consumes all his income over his lifetime, then positive savings in the community as a whole arise either when population changes reduce the relative number of dissavers, in particular retired people, or when real income rises generally so that the younger and middle aged savers have larger life-time incomes than the older dissavers. Modigliani finds that, for rates of growth of national income up to 5 percent, the proportion of national income saved in the United States appears to have been a fairly regular multiple of the rate at which national income was increasing: each 1% annual growth has been associated with a 3-4% proportion of national income saved. (3,14)

Houthakker has tested the proposition that savings rates are determined (at least in part) by the rate of growth of income in his cross-section study of international differences in savings behavior. He found that the rate of growth of total income is a significant variable in explaining variations among countries in domestic savings rates.

Character and Composition of Demand as Determinants of Savings

Associated with rising per capita incomes are changes in the character and volume of demand for consumption goods (and related changes in family income distributions) which tend to reduce differences in savings rates between higher-income and lower-income countries. Nurkse has summarized one aspect of these changes in his application of Duesenberry's "relative income"

theory to explaining international differences in savings (and consumption) behavior (15). Kuznets has indicated other aspects in his multi-country study of changes in the structure and share of consumption (11).

The central idea of the relative income explanation of savings behavior, as proposed by James Duesenberry, is that individual choices between consumption and savings depend primarily on the consumption expenditures of those with whom the individual habitually compares himself. (1). Furthermore, as new goods appear on the market, they exert an upward pressure, or "demonstration effect," upon the consumption expenditures of those who see them purchased by their associates. As a consequence of this social nature of consumption decisions, the proportion of income saved by a family, once some minimum income is reached, is independent of his absolute income. Duesenberry hypothesizes that for any given relative income distribution, the percent of income saved by a family is directly related to the family's position in the income distribution and that the higher the position of a family in the income distribution, the larger the proportion of income saved. The long-run stability in the savings-income ratio in the United States is explained by the strength and frequency of contacts with new and often superior goods which create impulses to higher standards of living sufficient to offset any tendency for families to save more as income increases.

Ragnar Nurkse has applied Duesenberry's analysis of the social nature of consumption in explaining the difficulties which

underdeveloped countries have in increasing the proportion of natural income which is saved as national income rises (15). He suggests that the "demonstration effect" of contact with the new goods and methods of consumption in advanced countries exerts upward pressure upon the consumption expenditures of poor countries. Less developed countries compare their income with that of industrially advanced countries; as the gap between their level of consumption and that of rich countries increases, their capacity of save is unfavorably affected. In addition, their balance of payments may be strained because of increased imports of consumption goods. While recognition is generally made that the "demonstration effect" may help explain difficulties which poor countries experience in raising savings rates, little empirical work has been done to test its impact.

A recent study by Kuznets (11) suggests further reasons why changes in consumption standards accompanying economic growth may offset any tendency for domestic savings rates to rise in response to higher income levels. Technological innovations, by creating new consumer goods and new wants, may result in more important consumption of processed foods, **applicances** and other newer-type goods. Then too, added leisure coinciding with higher per capita product may lead to increased recreational and educational expenditures. Finally, given new products, new wants and rising per capita income, then reductions in the inequality of income distribution may keep up the share of consumption in income by raising the proportion of families to whom the new products are accessible.

"Institutional" Explanations of Domestic Savings Rates

The institutional approach to explaining international differences in domestic savings rates is a broad umbrella which includes many factors which may be fairly directly influenced by government policy. Few systematic international comparisons of these influences have been undertaken because of the difficulties involved in quantifying their importance. The data on many of them consist largely of suggestive comments on and interpretations of the experience of individual countries.

Investment opportunities as a determinant of savings rates

An important group of influences operate upon domestic savings rates through their impact upon investment. Since it is logical to expect individuals to save current income in order to obtain future income, a number of studies have been made of the relation between savings rates and returns on investment. In theory, profit-maximizing entrepreneurs equate the rate of return on additional investment to the market rate of interest; studies of savings and the rate of interest have not, however, indicated any marked relation between the two. Houthakker reports similar lack of success in explaining international variations in savings rates by differences in rates of interest (5,6). Recently, efforts have been made to relate over-all savings rates to differences in returns on investment not reflected in "riskless" rates of interest. A study by Minhas of rates of return in manufacturing for four countries indicates an unusually high return for Japan which

could help explain the unusually high savings rate in Japan (12). Studies of savings in Japan also suggest that high rates of return in that country have contributed to high rates of savings (17).

Although the quantitative importance of rates of return is uncertain, it is quite clear that savings decisions may well be influenced by investment opportunities. Even in advanced countries the size chosen by management for undistributed profits may reflect judgment of investment possibilities. Dependence of savings upon investment outlook may likewise characterize underdeveloped economies. There are frequent indications that agricultural families in certain countries save in order to expand their productive facilities, although their failure to report such investment as well as to report their non-money income makes quantification of the point difficult. A great deal of work remains to be done before widespread comparisons of rates of return on investment in different countries can be made.

Acessibility and prevalence of savings institutions

There is general agreement that the more efficient and widespread the banking and savings facilities of a country, the higher its over-all rate of savings is likely to be. Numerous studies indicate that the inadequacy of financial intermediaries in many underdeveloped countries constitutes a formidable handicap to efforts to raise savings rates (4). Recent Japanese experience underlines the positive role which an unusually effective banking system can play in siphoning small personal savings into investment channels (17).

Effectiveness of government fiscal and monetary policies

The role of the government in expanding productive capacity

is generally important in underdeveloped countries. Government fiscal and monetary policies both determine the funds available for direct government investment and influence private incentives to save and to invest.

recent study by U Tun Wai suggests several differences in the tax systems of developed and underdeveloped countries which might help account for inter-country variations in domestic savings rates. The study indicates, for example, that total tax revenue tends to be smaller compared with national income in low-income than in high-income countries. Also, relatively less tax revenue is obtained from direct personal income and corporation taxes in lower-income countries. Then too, the tax structures of lower-income countries rely heavily upon foreign trade taxes (22).

Both monetary and fiscal policies may influence private incentives to save. In particular, policies regarding inflation may affect private savings through their impact upon business confidence. International comparisons of these impacts are hazardous. One effort, Houthakker's to relate proportions of national income saved to rates of change in price levels was unsuccessful.

Other influences upon rates of saving

wide variety of factors which may well influence domestic savings rates has not become the subject of systematic international comparisons because of difficulties of data and measurement.

The quality and quantity of consumers goods available may determine the strength of upward pressures upon consumption levels as

national income increases. Where government controls over imports of consumer's goods are strict, the proportion of national income saved may be higher.

The existence of alternatives to saving such as effective systems of social security or of public assistance may reduce pressures upon individuals to save. Likewise, a prevailing custom of large families, the young ones of which support the older ones, may reduce incentives to save for old age.

The extent of opportunities for individuals to send their savings abroad (capital flight) may influence the size of domestic savings for any country in which domestic savings institutions are unattractive by reason of social, political and monetary instability. For such countries, the effective flow of domestic savings may depend in part upon the efficacy of government controls over capital flight.

Many influences upon incentives to save, some extremely important, cannot be quantified; yet judgments about their impact are necessary to explain savings levels in particular countries. Few of these influences may be mentioned here to give an idea of their significance. The entire complex of social customs, educational outlook and work habits which may be summed up in the phase "Will to Save" is crucial. A recent thorough statistical study of determinants of savings in Japan concludes, for example (17),

> One must keep in mind that the most significant reason for the high propensity to save in Japan is the traditional savings custom supported by the wide propagation of education, hardworking habits, strong will to raise the standard of living, and so on.

The forms and flexibility of economic organization are important. The extent of political and social stability is a key conditioner of business confidence. Freedom to execute private business plans and the absence of institutional barriers to investment affect incentives to save. Religious and social customs may determine whether the forms which savings take permit them to be channeled into investment projects. These are only a few of the variables the importance of which cannot be measured.

Conclusion

Theoretical and empirical work on inter-country differences in domestic savings rates suggest that a variety of factors, many closely interrelated, account for current international patterns of savings rates.

Comparative studies of selected quantitative indicators of economic structure and stage of development underline the impact of rising per capita income, urbanization and industrialization in raising domestic savings rates as development proceeds. However the quantitative indicators of these factors are too highly interrelated to make reliable statistical estimates of their relative individual importance.

It is also evident from recent comparative studies that interrelated changes in income distribution, technology, tastes and the character of internal demand for goods, which accompany economic growth, exert upward pressure upon consumption levels as development proceeds; as a result, inter-country differences in savings rates are

small compared with the wide variations among countries in per capita incomes.

Country studies of economic development emphasize the significance of institutional or policy variables in explaining savings rates. They suggest that country characteristics which may be significantly influenced by government policies, often contribute to particular deviations in savings rates rates from those which a country's economic structure would lead one to expect. Improvements in data on tax systems, financial institutions, social security systems, and other factors subject to government manipulation, are making quantitative inter-country comparisons more feasible; however, to date, little systematic exploration of these and other institutional factors has been undertaken.

Studies of quantifiable indicators of economic structure and of the effectiveness of economic institutions are helpful in explaining inter-country differences in domestic savings behavior. However, they also point up patterns of deviations in country savings rates which may well be related to social, political and cultural factors peculiar to individual countries. Study of such deviations is not easily amenable to statistical investigation and would probably require extensive qualitative information on individual countries.

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APPENDIX

The purpose of this appendix is to summarize selected empirica results of recent international comparisons of domestic savings rates. Houthakker, Kuznets and Wolf, each using a different technique of analysis, have analyzed the dependence of savings rates upon selected structural indicators of economic structure and stage of economic development. The principal materials used in all the studies are national accounts data published by the United Nations.

Kuznets, Simon, "Quantitative Aspects of the Economic Growth of Nations. V. Capital Formation Proportions: International Comparisons for Recent Years." Economic Development and Cultural Change, 8 (July 1960, Part II)

Ratio of domestic savings to national product

Kuznets observes a positive, though not strong, association between domestic savings rates and per capita income. He bases his observations upon calculations of the ratio of gross domestic savings to gross national product for some 56 countries and the ratio of net domestic savings to net national product for some 41 countries; the ratios are calculated from cumulated totals in current prices, for 1951-1957, and are based on U.N. national accounts data. He groups the countries according to their per capita incomes in 1952-1954, and calculates unweighted arithmetic means of gross and net savings ratios for each group. Table 1 below gives selected ones of Kuznets' calculations relating to domestic savings rates. The countries excluded on the lower half of the table are political dependencies such as the Belgian Congo and countries which show a high level of financial dependence upon foreign capital inflow such as Israel.

Table 1

PROPORTIONS OF DOMESTIC SAVINGS TO NATIONAL PRODUCT, COUNTRIES GROUPED BY PER CAPITA PRODUCT, POST WORLD WAR II YEARS (BASED ON CURRENT PRICE TOTALS)

	Groups of Countries by Per Capita Product							Wider Groups			
	I	II	III	IV	V	VI	VII	I	II + III	IV+ V	VI+ VII
All countries											
(1) Number of countries on line (2)	8	7	6	11	6	10	8	8	13	17	18
(2) Proportion, gross domestic savings to GNP	21.0	23.8	10.3	14.5	16.6	14.5	11.4	21.0	17.6	15.2	13.1
(3) Number of countries in line (4)	7	7	6	9	5	8	5	7	13	14	13
(4) Proportion, Net domestic savings to net national product	13.8	16.7	3.5	9.1	11.4	7.9	12.0	13.8	10.6	9.9	9.5
Excluding Politically and Financially Dependent Countries											
(5) Number of countries on lines (6) + (7)	8	7	3	8	5	7	3	8	10	13	10
(6) Proportion, gross domestic savings to GNP	21.0	23.8	15.8	15.7	18.2	13.2	12.7	21.0	21.4	16.7	13.0
(7) Proportion, net domestic savings to net national product	13.5	15.9	9.2	10.2	13.3	7.4	9.3	13.5	13.7	11.4	8.1

Source: Kuznets, "Capital Formation Proportions," Table 1, lines 9, 10, 19, 22; Table 4, lines 7,8,23,28

It can be observed from Table I that the tendency for domestic savings rates to be higher at higher-income levels is neither striking nor completely systematic. The unweighted averages for the upper 2 or 3 groups taken together are, however, higher than those for the lower 2 or 3 groups taken together.

Kuznets: ratio of personal savings to personal disposable income.

Kuznets observes (a) that the relative importance of net personal savings (households and unincorporated businesses) in net domestic savings is considerably less in low income than in high income countries and (b) that the ratio of personal savings to personal disposable income is positively associated with the level of per capita income. He divides 20-30 countries into groups and calculates unweighted averages of the relevant country ratios for each group (cumulated totals 1950-57, current prices).

Ratio of net personal savings to net domestic savings:

I	II + III	IV + V	VI + VII
57.1%	48.0% (43.9)	32.7% (46.3)	27.8% (18.8)

Ratio of net personal savings to personal disposable income:

I	II + III	IV + V	VI + VII
8.5%	7.1% (7.5)	5.2% (9.0)	3.8% (1.4)

The ratios in parentheses exclude political and financial dependencies. Table 2 on the following page gives the personal savings - personal disposable income ratios for the individual countries by groups.

Table 2

PERSONAL SAVINGS AS PERCENT OF

PERSONAL DISPOSABLE INCOME
(cumulated totals, 1950-1957
current prices)

Countries Grouped by Per Capita Product	
Group I	
1. Australia	13.6
2. Belgium	10.1
3. Canada	8.0
4. Sweden	7.5
5. United Kingdom	4.2
6. United States	7.6
Group II	
7. Denmark	9.5
8. France	4.6
9. Netherlands	7.2
Group III	
10. Austria	8.8
11. Ireland	5.2
Group IV	
12. Colombia	5.3
13. Costa Rica	4.2
14. Panama (1953-56)	-3.2
15. Union of South Africa (1953-57)	11.3
Group V	
16. Jamaica	-1.3

	Group V (cont)	
17.	Japan	15.2
	Group VI	
18.	Ecuador	4.2
19.	Honduras	7.8
20.	Peru	-3.4
21.	Philippines	-3.0
22.	Rhodesia and Nyasaland	6.7
	Group VII	
23.	Belgian Congo	6.9
24.	Morocco	7.7

Kuznets, "Capital Formation Proportions," pp. 95-6

Houthakker, H.S. "An International Comparison of Personal Savings," Proceedings of the 32nd Session of the International Satistics Institute, 1961, pp. 55-69.

The basic proposition which Houthakker is testing is that per capita personal savings are a function of (a) employee compensation (including transfers) (b) per capita income from property and entrepreneurship and (c) per capita direct taxes on households. Using U.N. national accounts data, he calculates eight-year averages, for each of 20-30 countries separately, and for all 20-30 countries together of per capita personal savings and of various functional categories of per capita personal income (1955 prices, U.S. dollars, 1955 exchange rates: years in most instances are 1950-57). He calculates the deviations from the all-country average in per capita savings and types of income of individual countries. He then analyzes by regression analysis the relationship between (a) and the excess (or deficit) of a country's per capita savings above (or below) the all-country average and (b) the excess (or deficit) of the country's per capita income of various types above (or below) the all-country average.

Houthakker's estimates of country rates of saving out of employment income indicate that they are not significantly different from zero. Per capita direct tax deviations do not help explain inter-country personal savings differences. Breakdowns of entreprensurial and property income do not give significant results.

Houthakker's most important "long-run" equation indicates that per capita personal savings tend to be proportional to per capita income from property and entrepreneurship (income of unincorporated enterprises,

lividends, rent, interest): S pers = .239 P (where S = country deviations in per capita personal savings and P = country deviations in per capita property and entrepreneurial income.) Specifically, this equation means that for every $1 that a country's per capita property income is above (below) the average for all countries, its per capita savings is likely to be 24¢ above (below) the all-country average; alternatively stated, as the deviation between per capita property income and the all-country average increases, the deviation between per capita personal savings and the all-country average tends to increase proportionately, in such a way that the savings deviation remains about 24 percent of the income deviation. It should be emphasized that the above equation, while offering as good a fit to the data as any of the equations tested, leaves many individual cases unexplained; actual savings proportions vary greatly from country to country

<u>Houthakker: estimated "long-term" rates of saving out of personal income.</u>

An alternative equation to that relating savings to property income, one which Houthakker concludes fits the data equally well, indicates that per capita personal savings tend to be proportional to per capita personal disposable income, at 8 to 9 percent.

$$S\ pers = \underset{(.006)}{.085}\,(P + L - T)$$

(where S = deviation in per capita personal savings from the all-country average and, P the deviation in per capita property and entreprenurial income, L the deviation in employment compensation p.c., and T the deviation in per capita direct taxes)

When Houthakker re-estimates this equation in a more recent paper referred

to just below, using a more complicated system of weighting, his results are not much changed:

$$S\ pers = \underset{(.011)}{.080}\ (P + L - T)$$

The results of both calculations run counter to Kuznets' conclusion, noted above, that personal savings rates tend to be higher at higher per capita income levels. In the more recent of his two papers, Houthakker specifically criticizes Kuznets' failure to weight countries by population in calculating the average savings rates for different per capita income groups. Houthakker calculates both weighted and unweighted averages of savings rates for four per capita income brackets and finds that, when weighted averages are taken, no consistent pattern relating savings rates to income levels emerges. One reason, he suggests, is the dominance (judged by population) of a single country in each p.c. income group: the U.S. with a savings rate of 7.4 in Group I; the U.K. with a personal savings rate of only 4.2 in Group II; Japan with a personal savings rate of 14.4 in Group III; and Brazil with a personal savings rate of 4.4 in Group IV.

Houthakker, H.S., "On Some Determinants of Saving in Developed and Underdeveloped Countries," Stanford Research Center in Economic Growth, Memorandum No. 20 (July 1962).

Ratio of Net Domestic Saving to Net National Income

Houthakker's estimates of domestic rates of saving support Kuznets' observation that over-all domestic savings rates tend to be somewhat higher in countries with higher per capita income. The following four equations summarize his results.

(a) $S\ private = -3.08 + .117\ Y\ private$
$\qquad\qquad\qquad (1.05) \quad (.011)$

(b) $S\ govt = .60 + .100\ ($
$\qquad\qquad\qquad (.59) \quad (.011)$

(c) $S\ dom = .135\ Y\ natl$
$\qquad\qquad\qquad (.014)$

(d) $\log C\ dom = .003 + .948 \log Y\ natl$
$\qquad\qquad\qquad (.047) \quad (.017)$

Where S is the deviation from all country-average in per capita private (personal + corporate) savings (S priv); government savings (S govt); and domestic savings (S dom); Y priv is the deviation from all-country average in per capita "private income" (national income less government income from property and entrepreneurship); Y natl is the deviation in national income; G is the deviation in current government revenue; and C dom is the deviation in personal consumption.

Equation (a) supports Kuznets' observation of higher savings-income ratios at higher per capita income levels, although the differences in estimated ratios for different income levels are small. Kuznets' observation is also supported by equation (d) which estimates that, for every 1 percent change in national income, there tends to occur only a .95 percent change in personal consumption; this indicates a tendency for the rate of savings to rise.

Table 3 on the following page presents data on net domestic rates of saving for 34 countries together with weighted and unweighted averages for various per capita income levels.

Table 3

NET DOMESTIC SAVING

(money figures in U.S. dollars of 1955 at official exchange rates)

Bracket	Country	Years Covered	Wt	National Income Per Capita	Domestic Saving Per Capita	Saving Income Ratio (%)	Means Unweighted	Means Weighted
	U.S.	1952-59	1340	1962.7	202.4	10.3		
	Canada	52-59	127	1337.1	156.5	11.7		
	New Zealand	53-59	15	1078.7	183.8	17.0		
I	Australia	52-58	65	1019.5	187.8	18.4	14.2	10.9
	Luxemburg	52-58	2	942.7	187.0	19.8		
	France	53-59	306	890.7	109.4	12.3		
	U.K.	53-59	360	855.5	85.0	9.9		
	Belgium	52-59	63	831.4	91.6	11.0		
	Denmark	52-58	31	787.7	119.3	15.2		
	Netherlands	52-59	87	582.8	122.9	21.1		
II	Austria	52-59	56	450.9	83.7	18.6	14.8	16.9
	Ireland	53-59	20	416.7	45.2	10.8		
	Trinidad	52-59	6	356.4	29.8	8.4		
	South Africa	52-59	97	308.4	57.0	18.4		
	Malta	54-59	2	307.3	59.4	19.3		
	Panama	52-58	6	303.2	-1.0	-0.3		
	Costa Rica	53-59	7	269.0	35.2	13.1		
III	Spain	54-57	116	255.8	28.7	11.2	12.2	21.2
	Jamaica	53-59	11	247.6	23.4	9.5		
	Greece	52-59	56	233.4	18.2	7.8		
	Japan	52-59	629	288.2	56.4	24.7		
	Mauritius	52-28	3	225.3	40.9	8.1		
	Colombia	53-59	91	212.8	23.5	11.1		
	Chile	52-59	49	209.2	1.7	0.8		
IV	Portugal	53-59	62	182.3	15.7	8.6	10.2	11.0
	Honduras	52-57	10	168.4	15.9	9.5		
	Brazil	52-58	355	144.6	18.4	12.8		
	Ecuador	52-59	30	143.1	15.4	10.8		
	Philippines	52-59	64	134.9	3.4	2.5		
	Rhodesia	54-59	45	126.9	24.7	19.5		
	Peru	52-58	66	109.8	1.3	1.1		
V	China (Taiwan)	52-59	65	94.5	9.9	10.5	9.5	9.1
	South Korea	53-59	154	83.7	5.6	6.6		
	Belgian Congo	52-59	102	72.1	12.0	16.7		

Source: Houthakker, H.S., "On Some Determinants of saving in Developed and Underdeveloped Countries," p. 16.

Charles Wolf, Jr., Savings and the Measurement of "Self-Help" in Developing Countries (Santa Monica, California: The Rand Corporation, 1963)

The purpose of Wolf's study is to develop quantitative indicators of self-help performance with regard to gross government and gross private domestic savings in under-developed countries. He tests a series of Multiple regression models which express savings as a function of several indicators of socio-economic structure: GNP, per capita GNP, urbanization and volume of trade. Volume of trade is included on the assumption that higher trade volumes may lead to larger revenues from trade taxes and thus larger government savings. U.N. national accounts data for 1955-60 (supplemented by data from A.I.D. regional data books) are the principal source of data. Time series are expressed in constant terms, and median values for each time series used in the regression analyses.

The regression equations which best explain variations in countries' overall savings levels are the linear and the logarithmic gross savings models.

Linear gross savings model: 34 countries

$$S = .000\,1\left(\frac{Y2}{P}\right) + .016\,(Q) + .161\,(\bar{U}_y) + .047\,*(Y) - 15.0$$

(.00001) (.055) (.026) (.010) (34.1)

where Y is GNP; P is population; Q is total exports plus imports; and U_y is urban income (in cities over 20,000). Standard errors are in parentheses, and asterisks denote coefficients which are significant

at a 20% level for a two-tailed test. R^2 (the proportion of inter-country variations explained by the equation) is .9712.

Logarithmic gross savings model: 34 countries

$$\text{Log } S = .015 \log \frac{Y2}{P} + .334^* \log (Q) + .420^* \log (U_y) + .408^* \log (Y) \qquad .551$$

(.93) (.180) (.264) (.221)

where the symbols have the same meaning as in the previous equation; R^2 is .9296.

Regression estimates for these equations for regional sub groups are also presented in the study, as are all-country and regional estimates for several alternative savings models. However, a characteristic of all the models is that their overall explanatory value (the proportion of inter-country variations in savings which are explained by all the explanatory variables taken together) is better than are their estimates of the relation between savings and each individual variable. The probable reason for this, explained by Wolf, is that various ones of the explanatory variables (for instance, per capita income and urbanization) are too closely interrelated for estimates of their individual importance to be significant.

The Table on the following page compares actual savings for 34 countries with the equation values from the linear and logarithmic gross savings models presented above. It can be seen that substantial and consistent country deviations from equation values only occur for a few countries. Wolf concludes that only for these countries are the regression results likely to be useful objective indicators of good or bad savings performance.

Table 4

COMPARISON OF ACTUAL AND PREDICTED SAVINGS, LINEAR AND LOGARITHMIC SAVINGS MODELS--
"ALL-COUNTRIES" REGRESSIONS (UN/AID DATA)

(in millions of 1960 U.S. dollars)

Countries	(A) Actual Savings (1955-60 median)	(B) Savings Predicted by Linear Savings Model (1)	(C) Linear Savings Residual (A-B)	(D) Savings Predicted by Logarithmic Savings Model (4)	(E) Logarithmic Savings Residual (A-D)
1. Latin America					
Argentina	1,696.35	1,471.16	225.19*	1,050.30	646.05
Brazil	1,607.80	1,563.59	44.21	1,155.10	-339.98*
Chile	328.51	668.49	-339.98*	492.88	-164.37
Colombia	643.70	400.34	243.36*	368.72	274.99
Costa Rica	55.62	31.76	23.86	41.38	14.24
Ecuador	100.28	73.81	26.47	79.76	20.52
Honduras	38.27	20.43	17.84	33.19	50.80
Mexico	1,550.80	1,588.40	-37.60	1,312.20	238.60
Panama	20.56	33.95	-13.39	46.25	-13.39
Peru	382.27	256.35	125.92	255.01	127.26*
2. Asia					
Burma	193.49	121.37	72.12	146.07	47.42
Ceylon	118.64	123.20	4.56	156.38	-37.74
India	3,188.00	3,193.43	-5.43	2,843.10	344.90
Korea	70.49	196.51	-126.02*	168.86	-98.37*
Malaya	283.14	173.08	110.07	215.90	67.25
Pakistan	525.36	563.48	-38.12	496.94	28.42
Philippines	267.27	441.35	-174.08*	395.05	-127.78*
Taiwan	139.82	175.09	-35.27	158.03	18.21
Thailand	300.51	235.42	65.09	250.23	50.28

(Table 4 Continued)

Table 4 (continued)

Countries	(A) Actual Savings (1955-60 median)	(B) Savings Predicted by Linear Savings Model (1)	(C) Linear Savings Residual (A-B)	(D) Savings Predicted by Logarithmic Savings Model (4)	(E) Logarithmic Savings Residual (A-D)
3. Dependencies					
Algeria	151.17	410.79	259.62*	398.60	-274.43
Barbados	9.79	-5.45	15.24	9.33	.46
British Guiana	21.31	7.14	14.17	21.14	1.76
Congo (Leopoldville)	180.07	178.85	1.22	232.59	-52.52
Cyprus	40.95	25.28	15.66	37.67	3.28
Jamaica	101.63	89.43	12.20	90.46	11.17
Malta	21.91	3.33	18.58	17.35	4.57
Mauritius	26.12	7.27	18.85	21.01	5.10
Nigeria	230.35	200.43	29.92	224.63	5.72
Puerto Rico	154.69	143.60	11.09	198.01	-43.32
Rhodesia-Nyasaland	299.05	190.02	109.04	231.68	67.38
4. Others					
Greece	320.37	387.79	-67.41	336.96	-16.59
Israel	277.56	344.36	-66.80	256.82	20.74
Portugal	260.23	316.15	-55.92	333.90	-73.67
Sudan	87.54	63.43	24.11	81.24	6.31

Note:

An asterisk indicates that the residual is significant in the sense that it is more or less than would be covered by the standard error of the regression estimate. For the linear regression, the standard error was $119 million. In the logarithmic case, the standard error has a different meaning. It represents the average deviation from the regression of the proportion: actual savings/estimated savings. Significance of the residual does not depend on the absolute amount of the residual, but on the ratio between a country's actual and estimated savings. The antilog of the log standard error for model (4), "all countries," was 1.475, which implies that for a residual to be more or less than would be covered by one standard error, the ratio of actual to estimated savings must be above 1.475 or below .678, respectively.

Source:

Table 9 in Charles Wolf, Jr., Savings and the Measurement of "Self-Help" in Developing Countries, pp 40-41