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Summary of the Thesis :

A STUDY OF SAVING IN GREECE.

This thesis is concerned with saving in a developing country, Greece. The statistical information used derives from the national accounts statistics and refers to the period 1949-1968. In addition, data on household budget surveys 1957/58 and 1968/69 which became lately available are used, though they are grouped by a single criterion in six income brackets so that their usefulness for statistical testing is limited. Use is also made in a qualitative fashion of data concerning the composition of saving by form as well as factors of saving decisions of social, demographic, and cultural nature.

Attention is first given to the phenomenon of a relatively high rate of growth of the domestic saving and its ratio to income in Greece during the period 1949-1968. It is worth noting the outstanding performance of this country in terms of increase in the proportion of income saved, the actual contribution of foreign saving and the high share of the saving of the personal sector on the observed developments.

The statistical testing uses, largely, given data limitations, income, the rate of growth of income and the lagged consumption expenditure as explanatory variables of personal saving, defined alternatively to exclude and to include expenditure on purchase of consumer durables. Personal saving is used as the dependent variable in time series 1949-1968, since saving rather than consumption expenditure is independently estimated in the case of Greece, as it happens in most less developed countries.

Alternative testing is carried out by the ordinary least squares method, the Wald's method of grouping averages to cope with measurement errors of saving and income, and the method of the two-stage least-squares to remove bias because of serial correlation of the disturbance term. Use is also made of the method of the three-pass least squares to obtain consistent estimates when lagged consumption expenditure is incorporated as an independent variable. The comparison of the results of these methods is completed to some extent by the time pattern of the residuals.

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Further testing is carried out with all the variables taken as ratios to income, in the attempt to remove the possible presence of heteroscedasticity in the disturbance term. Use is also made of a system of reduced form equations of saving and income and the difference of the personal saving from the gross domestic investment expenditure as exogeneous, and in effect instrumental variable, to face the problem of two ways causation between income and saving.

The stability of the estimated saving function is investigated in terms of goodness of fit within and outside the period of observation, namely the year 1969 for which data have published lately. In addition, separate testing of the saving-income relationship is carried out for the period of inflation and reconstruction (1949-1955) and the consecutive normal period (1956-1968). The results of these two subperiods are compared in terms of testing the significance of the difference of the parameter estimates and in terms of size of the projection error and of the Theil's statistic U of forecasting performance of the projection to the other subperiod. Similarly, the problem of choice between the two concepts of saving is investigated in terms of goodness of fit within the period of observation by use of the standard error of estimate, and outside the period of observation by the forecasting performance.

The influence of the restoration of relative price stability on saving is investigated in terms of time paths of consumer and factor prices, separate statistical testing of the saving-income relationship at current prices and possible effects on the real value of wealth. Lack of data permit estimation of the effect of wealth on the flow of saving only indirectly and after transformation of the basic relationship of saving with income and lagged consumption expenditure into a corresponding relationship of personal saving with income change and lagged saving, which has been extensively used recently by Houthakker and Taylor (1966). This testing facilitates the estimation of the long-run saving-income ratio as proportional to the rate of income growth. Estimation is then made of the saving-income ratio which corresponds to the required rate of income growth for Greece to fill the gap of per capita income with E.E.C. until the year of full membership of Greece (1984). This saving ratio is compared with the capital requirements for realization of this target by Greece on the assumption of certain size of the incremental capital-output ratio.

Qualitative investigation of the influence of the rate of return (real) on saving and of the rate of return alongwith the variation of prices of five main

forms of saving in Greece during the period 1956-1965 is made, subject to limitations of data. Similar kind of constraint permits also investigation of the change in the distribution of income by size and by source and of the marginal propensity to save of farmers and of residents of towns. The characteristics of the Greek taxation system which seem to be most relevant to the observed increase in saving are also spelled out.

Among other factors considered altogether in qualitative terms are the population and value and institutional factors. Thus, special attention is given to the factors of the observed low rate of population growth during the period 1949-1968 (8% per annum), notably the fall in the birth rate and family planning, the acceleration of population movements and the changes in the age composition of the population. The value factors refer to the low degree of social stratification and the mobility of the Greek society, and to the gradual relaxation of the kinship system towards complete removal of the joint ownership of wealth and the joint saving in this developing country.

P. M. Malindretos

A STUDY OF SAVING IN GREECE

by

Paul M. Malindretos

A Thesis Submitted in support of an application
for the Degree of Ph.D. at the University of Glasgow.

1972

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The cooperative spirit of the staff of the Computing Department has been important in carrying out the statistical testing of this thesis. The eagerness of the secretarian and librarian staff of the Main and the Adam Smith Libraries are also worth noting. The understanding of the administration of the University of Glasgow, notably of the Registrar and the Clerk of the Faculty of Arts in my financial problem and the exception of fees has helped me to carry on this thesis.

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An Explanatory Note

The title of this thesis is somewhat misleading in the sense that primary concern is given to personal saving. However, the attention given to personal saving is not a matter of choice, but the result of investigation which showed a high contribution of the personal sector to the observed increase in the ratio of gross domestic saving to income in Greece during the period 1949-1968.

The thesis is divided into chapters, each of which contains a few sections and in some cases an appendix. Equations and charts are numbered by the chapter's number and own number starting from unity and running throughout the chapter. Tables are entitled by three numbers, of chapter, of section and of own number, starting from unity and running throughout the section.

The term 'saving' is used for the flow of the not consumed part of income per unit of time (year) while the term 'savings' is used as synonymous to the stock of 'wealth' or 'assets' consistently defined. The term investment, in order to avoid misunderstanding, is used in accordance with the national accounts definition of investment expenditure. Personal saving, because of statistical necessity, uses the national accounts' definition and includes alternatively gross expenditure on consumer durables except for personal utensils of any durability. Reference to the net wealth concept or other definitions of saving is definitely stated.

Main Abbreviations and Symbols

A.S.E.	for Athens Stock Exchange.
B.G.	for Bank of Greece, the Greek Central Bank.
C_t	for Personal Consumption Expenditure in the year t .
C.C.	for Currency Committee, the Supreme Monetary authority in Greece founded in 1952.
C.E.P.E.	for Center of Planning and Economic Research in Athens.
Drs.	for Drachma, the Greek currency unit which has an official parity rate of 1/30 of United States Dollar since April 1953.
E.D.P.	for Economic Development Plan for Greece 1968-1972.
E.E.C.	for European Economic Community.
F.G.I.	for Federation of the Greek Industry.
G.D.P.	for Gross Domestic Product at factor cost (F.C.) or at market prices (M.P.).
G.D.S.	for Gross Domestic Saving.
G.N.I.	for Gross National Income.
G.N.P.	for Gross National Product at market prices.
N_t	for Population in the year t (mid-year estimate).
N.A.G.	for National Accounts of Greece.
N.D.S.	for Net Domestic Saving.
N.S.S.G.	for National Statistical Service of Greece.
N.N.P.	for Net National Product.
O.E.C.D.	for Organization of Economic Cooperation and Development.
O.G.A.	for Organization of Farmers' Insurance.
O.L.S.	for Ordinary Least-Squares Method.
P_t	for the Implicit Price Index of the Personal consumption expenditure in the year t .
S_t	for Personal Saving in the year t .
S.D.	for Standard Deviation.
S.E.	for Standard Error of Estimate.
T.P.L.S.	for Three-Pass Least-Squares Method.
T.S.L.S.	for Two-Stage Least Squares Method.
U.K.	for United Kingdom.
U.N.	for United Nations.
U.S.A.	for United States of America.

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CHAPTER I

INTRODUCTION

I. 1. The Problem of Saving in Greece.

This thesis aims at providing an interpretation to the observed increase in the proportion of income saved in Greece during the period 1949-1968. Greece is a small country of South-Eastern Europe with 9 million residents and according to various indicators of socio-economic nature she belongs to developing economies of intermediate stage⁽¹⁾. In these economies the supply of saving may restrain the acceleration of the rate of economic growth to the extent it depends on capital formation⁽²⁾. On the other hand, the distinction between saving and investment decisions is easier in "intermediate" than in "primitive" economies where saving is largely in kind and saving and investment decisions are taken as a rule by the same decision maker. This piece of research may have therefore some relevance to other countries of Southern Europe and Latin America which are in similar stage of development with Greece and are also neighbouring countries of economically advanced areas of Europe and America respectively.

Greece has been no exception in facing an acute problem of saving in the early stages of its development. This problem was particularly severe in early twenties when investment demand was expanded at record rates and in late forties when law and order was restored and the consumption and reconstruction requirements from the war were tremendous. This problem in the post-war period was partly resolved by aid from the United States granted mainly through the Truman Plan⁽³⁾. Greece has achieved relative price stability since mid-fifties after the last devaluation of the drachma by 50 per cent in 1953 (average annual rate of increase

(1) See Ward B. (1963).

(2) As it is known there is a controversy about the relative contribution of fixed investment and of technological change to economic development. See e.g. Kuznets S. (1966), Currie L. (1966), Adler J.H. and Krishnaswamy K.S. (1964), Maddison A. (1970).

(3) About the methods and criteria of allocation of this aid in Greece see Ellis H. et. al. (1964).

of the implicit price index of private consumption expenditure 1.9 per cent during the period 1956-1968) and a high average rate of growth of G.N.P. at constant prices (6.3 per cent) compared with international standards during the period 1948-1968. These developments were accompanied by lifting up the ratio of gross domestic saving over G.N.P. to 20 per cent in the period 1960-1968, which has contributed to financing almost 90 per cent of gross domestic investment expenditure.

The Greek economy has followed since 1963^{a/} process of joining the European Economic Community which is going to end with full membership of Greece in 1984. It is estimated that if Greece has as a target to fulfill the gap between its per capita income and that of the E.E.C. countries by 1984, it will require an increase in the ratio of fixed investment expenditure to G.N.P. to 29-35 per cent depending on the size of the capita-output ratio⁽⁴⁾. This can be achieved by an increase in the ratio of gross domestic saving to G.N.P. to between 26 and 31.5 per cent, provided that foreign saving retains its contribution to about 10 per cent of gross domestic investment expenditure.

If the adoption of the forementioned target is not accompanied by automatic adjustment of the saving to the relevant requirements, it may lead to policies for raising involuntary saving, such as increases in tax burden, price level and foreign borrowing. This redirection of economic policy may, however, create further complications in the realization of that target or problems of social order because of redistribution of the burden of economic development

(4) These estimates were based on statistical data taken from the publication of the O.E.C.D., Observer, February 1970. The G.N.P. per capita was in Greece in 1968 \$ 860 compared with an average of \$ 2,100 in E.E.C. countries and \$ 1,850 in the United Kingdom. With a 4 per cent average annual rate of growth of G.N.P. in E.E.C. during the period 1968-1984 and .5 per cent average annual rate of growth of population, the per capita G.N.P. in 1984 will be \$ 3,580. To reach the same level of per capita G.N.P. by that time, Greece will require an average annual rate of growth of G.N.P. of 9.8 per cent, provided that population will grow by an average annual rate of .5 per cent during the period 1968-1984. Using now the Harrodian ex-post identity $G_c = s$ (where G, c and s are the rate of growth of income, the overall capital-output ratio and the saving-income ratio respectively) and supposing an incremental capita-output ratio between 3 and 3.5, the target rate of growth of G.N.P. by 9.8 per cent during the period 1968-1984 will require increase in the ratio of gross domestic investment expenditure to G.N.P. between 29.4 per cent and 34.3 per cent.

between classes or generations. Under these conditions a thorough study of saving in Greece goes beyond academic interest and is expected to serve the policy makers of this country and the preparation of future development plans.

I. 2. Past Empirical Research on the Saving Function in Greece.

Research concerning various sectors of the Greek economy has been promoted during sixties in Greece, mainly by research institutes established during the last decade. A co-ordinated effort has also been made in the form of a preparatory work for the construction of the national economic development plan 1968-1972. However, in view of the forementioned increase in the proportion of income saved and the institutionalization of saving during sixties, no serious problem of supply of saving has emerged in recent years. Under these circumstances it is observed a relative neglect of the saving function by empirical researchers in Greece.

Sporadic attention to the saving behaviour was given in the context of previous studies on the Greek economy, mainly through consideration of the consumption function. This research employs mostly data of aggregate time series and covers the last one or two decades.

Professor Suits (1963) in his econometric model of the Greek economy has not dealt with saving behaviour directly, but has derived an overall marginal propensity to consume as the sum of the individual income coefficients of six consumption items each one of them regressed linearly by the ordinary least squares method with income and lagged liquid assets from time series. The so estimated marginal propensity to consume (.83) was considered by Suits as being within the range of corresponding estimates in advanced countries. The propensities to consume for individual consumption items derived from time series were also compared with the estimates obtained from regression of individual consumption items with total consumer expenditure of the urban households (data of the budget survey 1957-1958), multiplied by the marginal propensity to consume from time series. This kind of comparison is of course subject to reservations concerning the post-Keynesian approaches on the divergence between the short-run and the long-run consumption function(5).

The regression coefficients of the lagged stock of liquid assets - defined as the total savings, time and other deposits with banks and other financial institutions plus currency outside banks - were found positive as expected in the separate regressions of time series of specific consumption expenditure items and significant at the 5 per cent level except in the case of food. These regression

(5) See e.g. Ferber R. (1967), Ackley G. (1961).

coefficients were, however, unstable depending on the combinations of the independent variables. Other independent variables used to face this instability were the lagged accumulated consumption in the preceding years as an index of stock variables and the relative price index of the commodity group; both of these have given insignificant results.

Another estimate of the consumption function in Greece is found in the Statistical Model of the Greek economy 1949-1959 by Pavlopoulos P. (1968). This is an aggregate consumption function with total income, and alternatively agriculture and other incomes ordinarily defined (namely before adjustment for taxation and transfer payments) as variables. The effect of liquid assets by use of money supply (without defining it) has turned out to be unsatisfactory, although the relevant results were not presented, which makes impossible further constructive criticism on this point.

There may be however some doubts on how much detailed was that experimentation with liquid assets, since there was an a priori judgement on this variable by saying that "it is highly improbable that liquid assets would play any role in the Greek economy because the markets for all kinds are practically non-existent" (p.39). The justification of this assertion seems to require some refinement, which was apparently considered out of the purposes of that model. On the other hand, it is pointed out that the liquid assets variable was used in this study as a proxy for spenders wealth holdings (pp. 37,39) and not for the "liquidity" of the economy in terms of the Radcliffe Report's definition. In these circumstances, some further argument might be required on the supposed function of the 'wealth holdings' variable and its relationship with the income variable and the market conditions of liquid assets. As is known, there are more than one definitions of 'liquid assets' and debt⁽⁶⁾, and there may be reservations as to whether actually their markets are practically non-existent in Greece⁽⁷⁾. It seems obvious that this type of treatment enabled escape from the need to incorporate the financial sector in the model, which would involve of course additional and complicated problems. Later on Pavlopoulos (p.87, n.4) has returned to the case of a possible relevance of wealth in saving decisions. Thus, it was attempted a reconciliation of the behaviour of residuals of this consumption function with the Ball and Drake (1964) approach to optimum saving and wealth,

(6) See e.g. Newlyn W.T. (1965), Bain A.D. (1970).
(7) See Ellis H. et. al. (1964).

Another study dealing somewhat with saving behaviour in Greece is that of Professor Ellis H. et. al. (1964). This study has not also given too much attention to saving behaviour, since the problem of supply of saving was taken as one of minor importance for Greece at that time (1950-1961). In particular an estimate of a simple linear regression of saving with real personal disposable income has given a marginal propensity to save .195. This was considered satisfactory in the sense that it was considerably higher than a corresponding figure for a number of developed and underdeveloped countries taken together, which was found by Houthakker (1961) to be .085 in the 1950's.

A brief consideration of the relatively rapidly grown stock of liquid assets in Greece was further made in the above study in the form of an analysis of tabular type. In the next stage this study has referred to the composition of saving and has carried out a great deal of discussion on the Greek capital market, namely its legal framework, the structural characteristics and its imperfections, and their restraining effects on the finance of manufacturing investment in Greece. These features of the Greek capital market were considered as the 'financial' factors of the development of the Greek economy, along with the 'real' ones to which the second half of that study was devoted. It seems plausible that this type of research gives insight particularly to the one aspect of the flow-of-funds problem and takes largely for granted the behaviour of the savers including their criteria of choice among alternative outlets of wealth.

Another study of saving in Greece by Theophanidis S. (1966) has given particular attention to the finding that the marginal propensity to save was increased by nearly 30 per cent between 1949-1955 (.163) and 1956-1961 (.206). This finding was the outcome of testing with income as an independent variable of saving. This was interpreted as "proving an important structural change" to have happened in the Greek economy in mid-fifties, which is supposed "to give lessons to other developing countries".

It is actually doubtful whether the above difference is statistically significant. Moreover, it does not seem very clear what kind of lessons other countries can draw from a possible increase in the marginal propensity to save in Greece after the end of a prolonged period of inflation, the satisfaction of the delayed consumption and the acceleration of the rate of income growth. If other variables were incorporated to count for price level and the postponed consumption, one might be quite sure that the difference of the estimated marginal propensities to save between the two sub-periods

would have been smaller⁽⁸⁾. Moreover there may be certain reservations from a statistical point of view, namely whether the number of observations (7 in the first and 5 in the second sub-period) was sufficient for drawing conclusions and making generalisations. Small number of observations or data inadequacy may be among the reasons of neglect other variables, but it does not justify conclusions about changes in the statistical population characteristics or 'structural changes' and leave unanswered the question regarding the divergence between the short-run and the long-run propensity to save.

(8) In addition the data used were provisional estimates. Revised data give insignificant difference between the marginal saving ratios of the two sub-periods under review.

I. 3. Plan of this Study and Summary of Conclusions.

The forementioned developments in Greece and the limitations of statistical data have largely dictated the structure of this thesis. Thus, a main question, under consideration arises which factors have contributed to pulling up the ratio of gross domestic saving to GDP from 7.5 per cent in the period 1949-1952 to 23.6 per cent in the period 1965-1968. We are going to focus on the rate of growth of real personal per capita income (average annual rate of 5.7 per cent during the period 1949-1968), the referred previously restoration of relative price stability since mid-fifties, the institutional and value changes and the rate of population growth (average annual rate of .8 per cent in the period 1948-1968) and the population movements toward cities and abroad (emigration)⁽⁹⁾.

Another question concerns the changes in the composition of saving which have accompanied the mentioned above tripling of the saving-income ratio in a period of two decades in a developing country like Greece. Particular aspects of this composition are a relatively high share of housing over private fixed investment expenditure (an average of almost 50 per cent during the period 1949-1968) and a similarly high share of traditional forms of financial saving, notably deposit accounts (an average of 60 per cent of the increase in claims of individuals during the period 1956-1968). We have therefore to face in this context the problem why the observed increase in the part of income which is saved was not accompanied by a significant increase in the share of non-traditional forms of financial saving, like direct debt instruments and contractual saving, which are in a great deal used in already mature economies.

Chapter II deals with a number of problems which an empirical study of saving may face in a developing economy like Greece. These problems are associated with the limitations of statistical data and the particular conditions of countries in the process of economic development. These conditions may have special nature in view of the unprecedented changes of social, cultural and demographic factors there. A question therefore considered is how these conditions are related

(9) The latter is connected with the expansion of capital inflow in the form of remittances to which we are going to refer to in the course of this study.

to the applicability of the modern hypotheses of saving which were proposed in the light of the experience of advanced economies (section II. 1).

Moreover, whatever the interpretation is, the necessity toward improving the standard of living may be more pressing in developing than in advanced economies. Priority for this improvement may be given to acquisition of consumer durables which have high prices compared with the per capita income in less developed countries. This along with the imperfections in the market for borrowing may result in a relatively long time for accumulation of down-payments, which increases the function of saving as a means to improve the standard of living. These conditions are considered from various aspects, notably from the point of view of widening the divergence between the short-run and the long-run saving-income relationship. In addition they are associated with the composition of the "capital account" of the savers which is difficult to examine in this kind of countries, in view of lack of data on the rates of return of alternative forms of savings, the disconnection of these rates, and the role of uncertainties of various kinds (section II.2).

Chapter III deals with the description of the statistical data available in Greece and the way they are treated by this study. More specifically, it discusses briefly the time series data of saving and income as given by the Greek national accounts and the corresponding data of urban household budget surveys 1957/58 and 1968/69 of household income and consumption which became lately available. The available data are compared with the definitions of saving to exclude and to include expenditure on consumer durables (section III. 1). A further problem faced there is how these data have to be used in order to isolate the effects exerted by income and other factors on saving. The assumptions which underlie the transformation of data in per capita or in real terms through division by the size of household and population and by an index of the price level and the question how these variables as well as factors, like composition of population by age, or other characteristics of social and demographic nature have to be treated, are also discussed in this context (section III. 2). It follows the problem of distinction between the short-run and the long-run saving-income relationship in connection with the available data. Among the methods adopted are the use of four-year averages, the statistical testing

of the saving-income relationship by cross-section and time series data and the incorporation in the latter, besides the current income, the rate of growth of income and the last year's consumption expenditure. A relevant question faced is how these methods can be used with the data available in Greece and how the results of alternative testing have to be interpreted in accordance with theory and similar empirical research in other countries (section III. 3).

Due consideration is thus attributed to the statistical methods applied in the attempt to obtain unbiased estimates of the saving function in Greece. It is so discussed there the application of the two-stages least squares by the use of transformed variables according to certain assumptions about the autoregressive structure of the disturbance term in order to face the possibility that the ordinary least-squares estimators are biased and inconsistent. The so-called three-pass least squares method proposed by Professors Taylor and Wilson (1964) is going to be used in facing the bias associated with autocorrelated disturbances when the lagged endogeneous variable of consumption expenditure is included. Moreover, the problem of bias of the estimates due to errors of measurement of saving and income is faced by using the method of grouping averages proposed by Wald⁽¹⁰⁾. For the same purpose and in view of the accounting practice in Greece to estimate personal saving from the investment account and the consumption expenditure as a residual⁽¹¹⁾, we are going to use saving rather than consumption as dependent variable in time series and consumption expenditure in budget survey data. The problem of simultaneous equations bias due to the two-ways causation between income and saving is faced by alternative testing of reduced form equations constructed on the assumption of a simple relationship between income and domestic investment expenditure. Moreover the problem of heteroscedasticity of the saving-income relationship is decided to be tested by transformation of the original relationship of per capita terms in ratios to income (section III. 4).

Chapter IV concerns the growth of aggregate saving in Greece during the period 1949-1968 and its distribution by saver group and by form of saving. The

(10) See Johnston J. (1963).

(11) This accounting practice seems to be used as a rule in the less developed countries. See Levy E. (1968).

method applied there is four-year averages of ratios to income, relative rates of growth and saving in per capita constant values, which are supposed to allow somewhat for cyclical variations and measurement errors of saving and income⁽¹²⁾. Disaggregation is made in domestic and foreign saving and particular attention is given to the accounting practice of excluding transfers from abroad to Greek households from foreign saving and incorporating them to the personal disposable income and saving⁽¹³⁾. In view of the acceleration of this kind of capital inflow to Greece during the period under review, the trend of the saving-income ratio is examined after deduction of the equivalent amounts in drachmas of this inflow from both personal saving and personal disposable income (section IV. 1). Considering subsequently the composition of domestic saving by saver group we carry out an international comparison, which shows the place of Greece in terms of proportion of government saving to net domestic saving to be behind the corresponding place of this country in terms of ratio of net domestic saving over net national product. Further breakdown of government saving is made to show a falling contribution of the budget in sixties, while similar breakdown of gross domestic private saving shows a fairly increasing proportion of personal saving to the total. This proportion is then compared with the corresponding ones of advanced countries. Alternative estimates follow for Greece in terms of ratio of personal saving over gross domestic saving and over personal disposable income, with saving defined to include depreciation of housing and outlays of consumer durables. The increased importance of the personal sector in the supply of saving in Greece also appears in a consolidated saving and investment account by sector, which gives the surplus and deficit of the non-financial sectors of the Greek economy in sixties (section IV. 2)⁽¹⁴⁾.

(12) Use of moving averages to isolate the trend from cyclical and irregular factors was avoided in view of the bias of this method due to the concavity of the trend. See e.g. Mills F.C. (1955).

(13) Inflow of non reexportable capital reduces the problem of external debt so that we pay only little attention to gross capital inflow and repayment of debt in Greece.

(14) Further breaking of the national accounts concept of personal saving is not possible with available data. However, information from balance sheets shows that smaller size firms have likely higher saving-ratio than big companies in Greece (Appendix IV.).

The investigation of the composition of personal saving by form is subject to the limitation of not enough material available to venture a confident opinion on the composition of saving by form by making classifications in groups of common economic characteristics to reach useful conclusions. Available data on the increase in claims of individuals during the period 1956-1968 are broken into cash, deposit accounts, securities and contractual saving. Similar breaking available for other nine countries-members of O.E.C.D. in the period 1960-1965 shows that Greece has especially low shares of contractual saving and securities against a comparable ratio of financial saving over personal disposable income. This ratio is subsequently compared with the stock per capita of main consumer durables, in which Greece is placed far behind the U.S.A., the U.K. and other countries of Europe including Spain (section IV.3).

Chapter V carries out an investigation of the causal relationship of personal saving with personal disposable income. It starts with an international comparison including 15 countries which have available data on personal saving defined to exclude and to include expenditure on consumer durables in the period 1958-1967 (section V.1). The basic aim is to show the position of Greece in terms of the ratio of saving to income, the level of per capita income and the rate of income growth. It appears that Greece has the first place in terms of average annual rate of growth of per capita income and the third one regarding the saving-income ratio when saving is ordinarily defined. On the other hand, the place of this country in terms of level of per capita income (eleventh) is close to the saving-income ratio when saving is defined to include outlays for consumer durables (tenth). Statistical testing of the saving-income ratio regressed with the level of per capita income and the rates of growth of income and population and per capita income alternatively gives significant results only with the rate of growth of per capita income when saving is ordinarily defined. Even in this case, however, less than one-third of the variance of the saving-income ratio is interpreted by the rate of growth of per capita income. Further incorporation of a measure of the cyclical variation of income (coefficient of variation of the rate of income growth) does not improve these results. This is indicative of a primary importance of other factors besides income in causing the inter-country

divergences of the proportion of income saved, which may not be sufficiently interpreted by a single saving-income hypothesis.

The relationship of personal saving with personal disposable income in Greece during the period 1949-1968 is first investigated in terms of tabular and graphical analysis (section V.2). It shows that the four-year average saving-income ratio is steadily rising following the real per capita disposable income, while this ratio is reduced on a year-to-year basis when the rate of income growth falls below certain amount (about 4 per cent). Further comparison with the expenditure on consumer durables shows a more stable rate of growth of the expenditure on consumer durables than of saving ordinarily defined and that the former rate is decreasing in fifties and increasing in the period 1965-1968 (section V.2).

Statistical testing of the personal saving with personal disposable income follows in linear form by use of time series data in the period 1949-1968 and in accordance with the discussion of chapter III. The ordinary least squares method is used in the first instance by regressing the real per capita personal saving and the proportion of income saved with the real per capita disposable income of the same year as independent variable. The significance of these results is tested in terms of standard errors of the parameter estimates, the explained proportion of the variance of the dependent variable and the presence of serial correlation of the residual term. Alternative estimates of the marginal saving-income ratio are carried out by application of the Wald method, the two-stages least squares and a reduced form which provides for the two way causation of saving with income. In addition, the saving-income ratio is tested with the reciprocal of income, and the personal per capita saving is tested with personal disposable income after deduction of the transfers to Greek households from abroad. These estimates are compared to see whether they are significantly different from the corresponding ones derived by the ordinary least squares method (section V.3).

The testing of the dynamic properties of the saving-income relationship starts with the use of budget survey data and comparing the obtained results with those of time series. The possible inconsistency between these results is interpreted as reflecting divergence between the short-run and the long-run saving-income relationship which requires some further investigation. Alternative testing of the saving-income ratio is therefore carried out with the ratio of the current to last peak income and of the current to last year's

per capita income. This testing does not achieve to explain significant proportion of the variance so that to favour any particular post-Keynesian hypothesis of saving. Incorporation of the rate of growth of real per capita disposable income besides its level does not change significantly the regression coefficient of the per capita income. The net contribution of the rate of income growth is associated with the institutional and behavioural frame and can get a number of alternative interpretations according to theory⁽¹⁵⁾. Incorporation of lagged real per capita consumption besides real per capita disposable income of the same period as an independent variable in section V.4 is treated in such a way to help as possible towards a choice between alternative hypotheses of saving. Application is made of the ordinary least squares method, the two-stages least squares and the three-pass least squares, to examine to what extent we can get unbiased and consistent estimates of this kind of relationship. The merits of alternative hypotheses are investigated in terms of statistical significance of the intercept, the time pattern and the presence of serial correlation of the residuals and the value of the regression coefficient of income from different combinations of the independent variables.

The estimated short-run marginal propensity to save when lagged consumption is incorporated is compared with the corresponding estimate from budget survey data in terms of difference at the 5 per cent level of significance. Similarly the derived long-run marginal propensity to save from the the relationship of per capita income and last year's consumption expenditure is compared with the corresponding estimate when only current per capita income is employed. Assurance about the closeness of these alternative estimates is followed by an evaluation of these results in accordance with the discussion of chapter III. More specifically, the regression coefficient of the lagged consumption is identified as the difference of the coefficient of the speed of adjustment of the consumption expenditure and alternatively of the permanent income from the unit. Also the estimate of the long-run marginal saving-income ratio is alternatively treated as the parameter estimate of the permanent income, to indicate a small contribution of

(15) See e.g. Farrell M.J. (1959), Suits D.B. (1963), Ferber R. (1967), Friedman M. (1957), Duesenberry J.S. (1949).

the transient component of income in aggregate time series in comparison with cross section data. Consequently, the ratio of the regression coefficient of the latter data to the estimate of the long-run marginal saving ratio may give a measure of the ratio of the variance of the permanent income to the variance of measured income⁽¹⁶⁾. The value of this ratio is compared with the corresponding ratios derived by empirical studies in advanced economies, like the United Kingdom and the U.S.A. and furthermore a number of factors are noticed to justify the differences thereof.

The goodness of fit by use of the forementioned statistical methods is investigated in terms of standard errors of the regression coefficients, coefficient of determination and time pattern of residuals within the period of observation and in terms of forecasting performance outside the period of observation. Thus, the forecasting performance of the regressions of the real per capita saving with real per capita income and last year's consumption is examined for the year 1969 in terms of ratio of the forecast to the actual value and of Theil's coefficient U. In so far as the error of the forecast is below 10 per cent, while the Theil's U is found to approach zero, it indicates a satisfactory forecasting performance of the estimates.

In view of the ambiguity of choice among alternative modern theories of saving, we have proceeded toward some consideration of a number of other factors besides income and lagged consumption, in chapters VI and VII. The concentration on these factors is not based on prior acceptance of any hypothesis of saving from the so far statistical testing, but aims at further investigation of the merits and demerits of each of them. In addition, we have the opportunity to investigate the contribution of certain special factors to the observed increase in the proportion of personal income saved in Greece during the period 1949-1968.

Section VI.1 concerns the influence of the restoration of relative price stability in Greece since mid-fifties. Particular attention is given

(16) This treatment is based on the relationship (3.10) of Friedman M. (1957) p.32) and has been extensively used by empirical researchers in other countries. See e.g. Walters A.A. (1968). Parallel estimation of the function of the total variance of income regarded as permanent is made by use of a formula derived as a function of the parameters of the equation determining permanent income and the auto-correlation structure of the income series (see appendix III).

to the relationship between consumer and factor prices, the role of price expectations and the possible presence of moderate money illusion in the form of not equal realization of the increase in prices as the increase in money incomes. Further statistical testing is carried out with current per capita income and the implicit price index of the personal consumption expenditure as separate variables. This testing aims at a comparison of the estimates of the regression coefficient of the current per capita income with the corresponding one of the real per capita personal disposable income, and of the regression coefficient of the price level with the constant intercept of the saving-income relationship in real per capita terms. These results are going to be related with the size of the direct independent influence of the changes in the consumer prices on real per capita saving, and the question whether the strong inflation up to 1955 has been one of the most important restraining factors of saving. The merits of the 'monetarist' and the 'structuralist' schools of inflation in Greece (17) are examined with regard to the special links of this country with abroad, which become favourable to personal saving particularly under conditions of relative price stability.

The relationship of the changes in the price level with personal saving in Greece is further examined in terms of possible positive influence of the restoration of relative price stability to the replenishment of the lost real value of the 'liquid assets'. Statistical testing is, however, difficult to give a significant regression coefficient of the real value of 'liquid assets', in view of a high intercorrelation of this series with income and the possibility that 'liquid assets' are not a satisfactory proxy of the consumer's wealth. Nevertheless, simple transformation of the supposed relationship of saving with income and wealth into a relationship between saving, income change and last year's saving enables indirect derivation of the parameter of wealth (18). The presence of bias because of incorporation of the lagged endogeneous variable, i.e. last year's saving, is checked by parallel application of the T.P.L.S. method.

(17) For the controversy between the structuralist view of inflation in developing countries which is maintained by the United Nations (E.C.L.A.) and the so called monetarist school maintained by the International Monetary Fund, see e.g. Oliveira Campos R. (1961).

(18) Extensive use of this kind of transformed relationship was made recently by Houthakker H.S. and Taylor L.D. (1966) in empirical testing for the U.S.A. and Canada.

The assumption of a proportional relationship of wealth with lagged consumption gives further the opportunity to estimate indirectly the wealth-consumption ratio in Greece, which is compared with the corresponding estimates of this ratio for the United Kingdom and the U.S.A. carried out by Ball R.J. and Drake P.S. (1964). The possibility of a higher wealth-consumption ratio in Greece than in the U.K. and the U.S.A. is attributed to the present stage of development of the Greek economy and the observed relatively low level of stocks of major consumer durables per capita.

Expressing moreover the long-run saving-income ratio in a proportional relationship with the rate of growth of the real per capita income in accordance with the above results, facilitates the evaluation of the feasibility of the target of Greece to fulfill the gap of its per capita income with the E.E.C. countries by 1984 from the point of view of adequate supply of saving, i.e. whether the supply of saving becomes an important constraint to the realization of this target.

In addition, the relationship of saving with income change and lagged saving is tested in aggregate real terms. The goodness of fit of this relationship - in terms of standard errors of the regression coefficients, standard errors of estimate transformed into the same variable and forecasting performance for the year 1969 - is compared with the corresponding one of the relationship in real per capita terms. If the choice from the comparison between the relationship in aggregates and in per capita terms is difficult, it is going to raise doubts about the significance of the influence of population growth and of the merits of the life-cycle hypothesis of saving in Greece.

The possible relationship of personal saving with the rate of return on savings in Greece is examined in section VI.2.1 to the extent that data permit. Lack of a representative rate of return leads to the use of the rate of interest on savings deposits compared with the increase in the consumer price index in qualitative terms. The estimated real rate of interest seems to be more closely associated with the ratio of the change in savings deposits over income than with the ratio of personal saving over income. This is attributed to a small influence of 'the rate of interest' on personal saving and in part to the possible small representativeness of the savings deposits rate.

The divergence of the savings deposits rate and the rates of return of four other main saving forms in Greece (namely bonds, shares, gold sovereigns and housing) is revealed by the available estimates of the average net return of each of these saving forms during the period 1956-1965. The net return is defined to include capital gains and to exclude capital losses and taxation of a typical individual. A rough estimate of the accumulated volume of these saving forms during the period 1956-1965 does not show a particularly close relationship with the vector of the net returns of the same period. Among the factors responsible for this not particularly close relationship, the use of scattered information makes possible the variation of prices during the same period in terms of coefficient of variation (ratio of the standard deviation over the average). The so estimated variation of prices seems to help the interpretation of the composition of saving by form during the period 1956-1965. In so far as price variations in the past are related with the subjectively estimated uncertainty by the Greek savers, they seem to be risk averters. This is, however, hardly sufficient to show how exactly the decisions to save and to distribute saving by form are in accordance with the theory of assets choice under conditions of uncertainty⁽¹⁹⁾.

The question of the relevance of the income distribution to the saving function in Greece is investigated in section VI.3. Insufficient breakdown of the income of households before taxes by the national accounts gives limited information about the distribution of income by source and by type of recipient. More specifically, the breakdown of total income goes as far as the farm and non-farm income for the whole period 1949-1968, while the income from labour is given separately only for the period 1954 onwards. The latter is downward biased because it does not include wages and salaries of hired labour in the rural country which is lumped into farm income. The pensions to the farmers are excluded from the farm income and included into the income from wages and salaries of other sectors. In addition, income from urban property and entrepreneurship is given in one number, though it is shared among all wealth owners in a modern capitalistic state. These conditions raise certain reservations to the

(19) For the recent developments of the relationship of the theory of saving with the theory of decision making under conditions of uncertainty see Phelps S.E. (1967), Sandmo A. (1968), Uzawa H. (1968).

observed reduction of the share of farm income, including transfers from abroad and the parallel increase in the share of the income from labour including transfers from the government since 1954.

Statistical testing of personal saving with farm and non-farm income is made after deflation by the implicit price index of the personal consumption expenditure and adoption of certain simplifying assumptions about population⁽²⁰⁾ and taxation of income⁽²¹⁾. These assumptions are examined through parallel testing with aggregate personal disposable income and income of households before taxes and by appropriate comparison of the regression coefficients of income. The statistical testing shows a relatively high marginal propensity to save from farm income, similarly to empirical findings in advanced countries. This finding is pointed out in the case of Greece in view of the relatively low per capita farm income and the observed decline of the share of the farm income to the total during the period 1949-1968. This phenomenon does not seem to be solely attributed to the variability of the farm income in this country. Among other favourable factors to farm saving are the low assets-income ratio, the acceleration of the monetization in farming, the exemption of the farmers from income tax duty and the extension of the services of the Postal Savings System to the provincial country.

Further combination of the constant marginal propensity to save of urban income grouped by size in cross-section data and the comparable farm and non-farm marginal propensities to save from time series, suggests that this propensity may be fairly stable at different levels of income. Constancy of the marginal propensity to save by income size consists of a source of increase in the inequality of the income by size through time. Comparison of data on tax records for the years 1957 and 1967 in terms of coefficient of inequality shows only a moderate increase of the inequality of the income distribution by size between these years. After this increase the coefficient of inequality of the income distribution in Greece is very close to the one found for the United Kingdom and lower than the corresponding ones in other advanced countries, like West Germany, Netherlands and Denmark. A similar comparison in terms of the

(20) Population is used as a deflator in the relationship in per capita terms but we have not available continuous data on the number of farmers and of urban residents to use them as separate deflators.

(21) Taxation on personal income was excluded from the personal disposable income used in prior statistical testing. The problem that the data on income distribution are given before taxes is simplified in view of the fact that the ratio of taxes on income over income does not increase fast and that farmers are virtually exempted from taxation on income.

proportion of income in the first three quartiles puts Greece nearer to the advanced than to less developed countries. These comparisons do not permit us to come to the conclusion that the increase in the proportion of income saved in Greece during the period 1949-1968 is largely attributed to high inequality of the income distribution by size in this country.

Section VI.4 points out the main characteristics of the Greek taxation system which are relevant to saving decisions. These characteristics include a particularly low share of direct taxes on income, low ratio of net transfers excluding social security contributions to income⁽²²⁾ and seemingly high tax evasion from income tax. Greece also resembles to other less developed countries in terms of absence of capital gains tax or any property tax of regular nature. Property is taxed only when it is transferred in the form of gift, dowry, inheritance or selling which is subject to a transaction tax. Minimum subsistence and dependants' allowances are coupled with separate taxation of the income of wife and the forementioned exemption of the income of farmers from tax obligation. Contributions to social security and life insurance premiums are also exempted from income tax and the same happens with income from certain forms of saving, such as savings deposits and government bonds.

Chapter VII presents the composition of population by age and other characteristic features of demographic and institutional nature relevant to the observed increase in the saving-income ratio in Greece. Section VII. 1 is concerned with the main factors of the fall in the rate of growth of population, namely the fall in the rate of births and the increase in net emigration since 1950. The observed fall in the rate of births compared with other factors, such as increase in the rate of marriages, decline in the average size of family and increase in the proportion of literates, is treated as indicative of family planning similar to the impetus of family limitation in the U.K. and the U.S.A. in the last century. This impetus appears alongwith increase in education and is associated with saving for this purpose especially of farm's families aiming to improve the quality of the human wealth.

The increase in the rate of emigration during the period under review consists of a part of a massive phenomenon of population movements away from

(22) Social security contributions are considered in terms of a re-distribution effect on income and of an influence on saving thereof.

villages, which is a characteristic of developing economies (section VII.2). Urbanization is examined in terms of positive influence on the income and saving of the farmers and also as initiating saving for accommodation of the workers in the towns⁽²³⁾. Attention is also given to the fact that the observed increase in emigration from Greece in the post-war period has directed mainly to countries of West Europe, notably West Germany, in which emigrants do not seem to plan to stay permanently. This is examined in terms of a possible relation to the observed increase in the remittances in the form of transfers to the Greek households from abroad (section IV.1). The contact of the emigrants of European countries with domestic residents is further considered as a factor of gradual extension of the 'demonstration effect' in Greece.

The change in the composition of population by age is investigated in section VII.3. Particular developments are the fall in the proportion of children under 14 years of age and the nearly offsetting increase in the proportion of elderly over 65 years and the minor gain of the working age group (15-64 years). The fairly stable share of the working age group is considered in terms of whether it is sufficient to provide an interpretation of the increase in the saving ratio in accordance with a particular hypothesis of saving. This question is related to certain special conditions in Greece, namely the fast increase in the female active population - which implies that the share of the working age group understates the change in active population - the increase in the share of the age group of 40-64 years of age in connection with a wage structure strongly attached to the years of employment. These conditions favour the formation of a life-cycle pattern of income, against which there are other factors exerting a counterbalancing effect. The latter group of factors includes the possible positive correlation of the family size with the age of peak income, i.e. before retirement, because of late marriages in Greece, the often continuation of certain income flow after retirement because of post-retirement jobs, and the possibility of considering children's education as an earning asset at retirement. It is examined to what extent the latter group of factors prevents the life-cycle variation of income in Greece. It is also faced the question whether the assumption of constant

(23) The possibility that later relaxation of urbanization and completion of accommodation of the workers in the towns may exert a negative influence on personal saving in the long-run is also considered in this context.

consumption throughout life applies to this developing country. Thus, the variation of actual saving of groups of households with different composition in number of adults and children is compared with the corresponding estimated series of saving on the assumption of constant consumption and of different weights to household members other than the head⁽²⁴⁾.

Section VII,4 pays attention to certain characteristic features of the value and kinship system of Greece which are most relevant to saving decisions. More specifically, it is examined there how joint the family system is and whether it constitutes an important disincentive to work and to accumulation of wealth through saving and the possible exceptional cases where joint family decisions are related to the accumulation of wealth. The aspects of the value system which are examined as most relevant to saving decisions in Greece are the social mobility and the virtual absence of a system of social stratification based on cast and the gradual extension of education as a means of social distinction and prestige, especially by poor farmers and the expanded middle class in towns.

(24) This consists of the only possible treatment of the 'equivalent adult' problem with the available data in Greece. See for this problem in Prais S.F. (1953) and Houthakker H.S. (1952) and for a similar treatment elsewhere see Fisher M.R. (1956) and Kelley A.C. and Williamson J.G. (1968).

CHAPTER II
PROBLEMS OF STAGE OF DEVELOPMENT

II. 1. Level of Saving

It is often maintained that among the main features of the less developed countries is the proportion of their income which is saved. This is of lower order of magnitude than the usually found in the advanced countries and the composition of saving by form is also different⁽¹⁾. The question is whether there are any special conditions in the less developed countries at the same stage of development as Greece, which differentiate the relative importance of the various factors that determine the flow of saving and the forms which it takes⁽²⁾.

Certain qualifications are of course necessary in considering this kind of question. Thus, being aware of the dangers of generalizations, we have concluded that a rough specification of the relevant conditions that differentiate the range of economies in which Greece belongs would be fruitful for an analysis of saving in a particular country. Such a specification is expected to be useful to a reader who may be accustomed to the environment of advanced countries in going through this thesis. More specifically, we aim at presenting the most important aspects of this study and the way some of the relevant problems are faced. In other words, it is attempted here an attachment of the main modern hypotheses on saving to the conditions that are prevailing in the less developed countries of intermediate stage of development. We attribute of course emphasis to those characteristics which were more pervasive in Greece since the last World War.

(1) See Adler J. H. and Krishnaswamy K.S. (1964) Bauer P.T. and Yamey B.S. (1957), Furtado C. (1963), Higgins B. (1959), Kelley A.C. and Williamson J.G. (1968), Leibenstein H. (1957), Maddison A. (1970), Sen A. (1970), Lewis W.A. (1955).

(2) It is speculation whether the volume of saving in relation to income differs so much or the composition of saving by form is mainly different among advanced and less developed countries. See Firth B. and Yamey B.S. (1969).

We are engaged more precisely with a relatively narrow range of economies in which Greece belongs, namely, those which stand further from the margin of 'subsistence' rather than with economies of the primitive agrarian type (3). One may roughly identify the former kind of economies by saying that the ties of the family system are relaxed, so that kinship is not further one of the most important disincentives to save (4); in addition the system of social values is changed toward more materialistic nature, and the time horizon of the savers is prolonged, which acts as a factor reducing the 'time preference' and promoting the inducement to save (5). This type of changes along with the rise in per capita income may lift up its proportion saved, for a given rate of growth of aggregate income and of population, which are associated in a cause and effect fashion with the forementioned institutional changes.

Relative scarcity of 'capital' is commonly considered as one of the characteristic features of economically underdeveloped regions (6). It is also believed that possibilities for raising substantially voluntary saving are limited by the low level of per capita income (7), which implies the well known vicious circle of poverty. In addition lack of statistical data in the less

-
- (3) The notion of subsistence level seems dubious if one turns from the physical nutrition requirements to consumption decision making by individual human beings, and even more so as time passes. There are indications which may show that the per capita income is likely above the subsistence level in many less developed countries. One was supposed to be the rising population of these countries (Hagen E. /1967/). This was alternatively, however, attributed to a natural law of resistance of animal species when it is threaten to vanish. Another indication might be that a wide range of goods in less developed countries may be held as savings, though a sophisticated western observer might be tempted to characterize them as consumption (e.g. blankets, gold or silver bracelets, zinc wash boilers, raw grain, or cooked meals). They are in part used as working capital for payments of workers engaged in capital formation by the owner or sometimes they are borrowed. See Firth R. and Yamey B.S. (1969).
- (4) As it may yet be for instance in countries of Asia and Africa.
- (5) For the possible relationship of 'time preference' with per capita income and 'civilization' see Harrod R.F. (1948).
- (6) It has been so maintained that the central problem of economic development is to convert the economy from the one of saving and investing 4 or 5 percent of its national income to save about 12 to 15 percent of national income or more. See Lewis W.A. (1955).
- (7) Therefore, it is infered, the ratio of domestic saving to income can rise substantially only by government taxation and/or by inflation; the influence of the latter is in fact subject to the mathematical form of the saving function. See United Nations ECAFE (1964).

developed countries - and the view that we are still to get more knowledge on saving behaviour in advanced countries - have a negative effect on a thorough study of the saving function in the former countries. Certain qualifications were made, however, in the publications related to the problems of economic development, which deserve an attempt^{to/} to systematise here.

The view about a close relationship between the low level of saving and the percapita income in less developed countries stems on a particular hypothesis of saving, namely the "absolute income hypothesis", as is now known the Keynesian approach to consumption and saving⁽⁸⁾. In fact, it is a further more restricted version of that hypothesis which is relevant to that relationship. Thus, it is frequently alleged that income is, as a rule, less equally distributed in less developed countries than in most advanced ones. It is obvious that if the absolute income hypothesis applies and the static saving-income relationship is linear and non-proportional, the income distribution by size is irrelevant to the size of the saving-income ratio. If, on the contrary, that relationship is non-linear, the less equal the distribution of income the higher will be the saving-income ratio. If the latter mathematical form of the saving-income relationship prevails in the less developed countries and their income is less equally distributed than in advanced ones, the saving-income ratio in the former countries might have been more comparable with the one of the latter countries.

However even in that case there is a difficulty with the forementioned potential advantage of the less developed countries. This is attributed to the fact that the highest individual incomes in the less developed countries are received from land and house rents. Inequality in such countries arising out of relatively high rental incomes seems to lead to conspicuous consumption, hoarding luxury housing, monuments, etc.⁽⁹⁾. In so far as things happen that way, the behaviour of the saving-income ratio depends heavily on the definition attached to the concept of saving, on which we come back later on. If a broad definition of saving is adopted the size of saving may not be too low, as

(8) See Keynes J. M. (1936)

(9) See Lewis W.A. (1955), Leibenstein H. (1957), Kindleberger C.P. (1958), United Nations (1957).

saving is channelled toward less 'productive' forms of investment expenditure. It has so been maintained that a more equal distribution of income by size in underdeveloped countries might result in a more rapid rate of capital accumulation if the greater equality were achieved at the expense of rents and in favour of larger shares to owners of productive capital equipment⁽¹⁰⁾.

A further positive interpretation of the behaviour of the rentiers in less developed countries is given by a suggested version of the 'relative income hypothesis' by Nurkse for international comparisons⁽¹¹⁾. According to Nurkse, the possible low size of the saving-income ratio in less developed countries of the present time is largely attributed to the contact with the current standards of living with advanced countries, which operates in the form of an international 'demonstration effect'. This view can lead to pessimistic prospects about the long-run saving-income ratio in less developed countries, in so far as the terms of trade change against them and the gap of their percapita income from that of advanced economies widens.

However, the view of Nurkse presupposes first of all that a world saving-function exists, and that it has a specified form which does not change anyhow. It seems more realistic to say that the development process involves changes in the whole system of values and of institutions, which may make imitation in consumption standards stronger and stronger by facilitating the spreading of the demonstration effect⁽¹²⁾. Nevertheless, that spreading does not lead necessarily to a reduction of the saving-income ratio in less developed countries. Thus, it may be alternatively assumed that the inequality of income among nations results

(10) See Lewis W.A. (1955). The Cambridge-England School has further suggested that there is a distribution of income at which the system produces the 'required' amount of saving, provided that the marginal propensity to save out of profits accrued to 'capitalists' exceeds the one out of wages, salaries and property income of the 'workers'. See Robinson J. (1965), Pasinetti L. (1961).

(11) See Nurkse R. (1953).

(12) Particular influence so may come from the improvement in transport and communication, tourism, emigration, etc., through improvement of the contact between different consumption standards. Before that stage the international demonstration effect is relevant only to residents of ports or foreign educated. See Johnson D.W. and Chu J.S.Y. (1968).

in a larger saving-income ratio in low income countries, because they are aware that this is the best way to catch up with high income countries (13). Moreover it was maintained that the international demonstration effect may modify the work-leisure pattern in less developed countries. More specifically, increase in the contact with consumer goods or fixed assets which attach prestige to their owner, creates a target of a higher level of consumption which may induce additional productive effort (14). This by itself makes consumption somewhat independent of income, rather than the opposite way of causation which assume often empirical studies on the subject (15).

If changes in the age structure are relatively strong in a particular country and era, the 'life cycle hypothesis of saving' may raise its share in interpreting the behaviour of the saving-income ratio (16). It has to be pointed out, that in so far as demographic structure is defined to include the town structure of a country, the possibility of vast population movements makes hard the assumption of that hypothesis about given 'time preference' and 'tastes' throughout life to apply. Thus, population movements, being virtually inseparable from the change in the system of values, may constitute a factor of changes in a country's composition of population by age, through their influence on the rate of fertility and mortality at various ages and the rate of emigration (17). In addition, the rate of growth of active population and of the level of employment may not be in a simple relationship with the rate of births and with the growth of the total population, because of backwardness of the education system or not appropriate orientation of it,

(13) This conclusion was drawn by Bruton H.J. (1955).

(14) In this respect the effort of raising the living standard stimulates economic development of the less developed countries. See Bauer P.I. and Yamey B.S. (1950).

(15) This way of causation results in the need of association of saving with consumption besides income. See Suits D. (1963), Ackley G. (1961). Though, as Professor Suits maintains, the dependence of income on consumption may be relatively high in advanced economies, there are not a priori reasons to reject this kind of relationship in a developing country.

(16) For this hypothesis see especially Modigliani F. and Brumberg R. (1954).

(17) It is recognized that the rate of emigration is in part affected by conditions of the demand for labour in the emigrant recipient countries. Anyway, the life cycle version of the so-called normal hypothesis of saving (See Fayel M.J. (1959)) may loose some of its importance under conditions of a small developing country which has strong links with abroad. Emigration per se, for instance, raises the per capital income and saving, while it may have various short-run and long-run implications to economic growth and to the main motives of saving.

and time required for the new born to fall into the labour force. These circumstances may divert from the simplifying assumption of the life-cycle hypothesis of saving, that the rate of growth of population along with the output per man - and their sum being approximately the rate of growth of aggregate income - sufficiently interprets the long-run saving-income ratio. It seems rather required to investigate, to the extent that data permit, the various components of the growth of population along with its composition by age, in view of the likelihood that the pattern of these changes differs by country and era (18).

In less developed countries in particular, income earnings may be strongly attached to age so that the peak income is succeeded at the late working age and declines thereafter. Family size may also be correlated with age and reaches its peak at middle age declining thereafter, as children establish independent households. Thus the average propensity to save tends to be higher when the head of the family is young or approaching retirement. Nevertheless the life-cycle consumption pattern may be affected in an environment of extended family systems by the possible treatment of children as the means for accumulating future productive earning assets which satisfy income requirements at retirement (18a). The forementioned possible extension of the demonstration effect in less developed countries is, on the other hand, more likely to affect the consumption pattern of younger householders rather than the elderly who are used to the traditional way of life. In addition the average saving-income ratio may not fall after retirement fast, insofar as the elderly undertake post-retirement jobs.

Education and/or extension of the demonstration effect and the kinship system are some of the factors which may influence 'tastes' between

(18) See E. G. Eizenga W. (1961).

(18a) There has been little attempt to apply the life-cycle saving formulation in such conditions or in a situation of uncertainty regarding earnings and life span. See Kelley A. C. and Williamson J. G. (1968).

consumption and saving throughout life, which are assumed stable by the life-cycle hypothesis of saving. The separate influence of each of these factors and the net influence of them differ of course by country and era.

On the other hand, it is the substitution of 'transitory' for 'permanent' component of income which sufficiently interprets the rise in the saving-income ratio in developing countries, Friedman maintained⁽¹⁹⁾. It is, of course, hard to test this hypothesis especially in developing countries in view of the lack of cross-section data on consumer finances and time series data for a long period as a rule in these countries. At this stage one may raise some reservations on the forementioned generalization of Professor Friedman. Thus, if a developing economy has conditions of steadily high tariff protection, there may be doubts about a significant rise in the share of the transitory component of income as per capita income grows up. Even more so, to the extent that economic development reduces the volatile fluctuations in domestic production and incomes and increases insurance against various contingencies, this also happens.

Professor Friedman had actually discounted this kind of reservations by accepting that development process may also be accompanied by rise in the permanent component of income. He said that in this case there is an offsetting positive influence on the measured saving-income ratio from the increased rate of return on domestic capital (which is one of the factors that determine the proportionality ratio k)⁽²⁰⁾. The question for us is whether the rise in the saving-income ratio under such circumstances is not mainly the result of increase in the real rate of return on saving but is attributed to possible changes in the demographic structure or changes of sociological and cultural nature, or provision for heirs. Factors of demographic or sociological nature affect the expected income, as Friedman implies, and in addition are in an interplay with changes in the value system and in tastes, as it was noticed already.

(19) See Friedman M. (1957).

(20) Except if the growth has external stimulus that gives little or no role to domestic capital, in which case there may be no offset and the saving ratio may fall. See Friedman M. (1957), p. 234.

The possible rise of the saving-income ratio in developing economies takes of course place alongwith changes in the distribution of income by size, by source or by type of recipient. We have seen already that the distribution of income by size is irrelevant to the level of the average saving-income ratio of a community in a particular period of time, if the marginal saving-income ratio is the same in all levels of income. Constancy of the marginal propensity to save does not prevent 'rich' to get richer and 'poor' to get poorer, provided that high measured income is identified with the rich and low measured income with the poor. This implies that insofar as the absolute income hypothesis applies, there will be ceteris paribus a tendency of the inequality in income distribution by size to increase through time.

To the extent that there is no tendency for inequality of income to increase, this may not be in favour of the absolute income hypothesis. It was suggested by Friedman (1957) that inequality of income has to be considered with regard to income over a large fraction of the human life, namely with expected rather than measured income. In accordance with this view, the negative saving at low measured income reflects the fact that measured income is not a valid index of wealth and of expected income. It implies that inequality of observed income overstates substantially the inequality of permanent income and is not indicative of widening the gap between the rich and the poor over longer periods of time.

The possible high inequality in the distribution of observed income by size in underdeveloped countries is attributable by Friedman to differences in permanent income status, which has no effect on the saving-income ratio. Historically the process of development tends to produce a smaller degree of inequality in measured income and to substitute inequality arising from transitory factors for inequalities of permanent income status⁽²¹⁾.

We make here the further specification that whether the fall in inequality in measured income is accompanied by sufficient substitution of inequality of transitory for permanent income status, depends on the type of the process of economic development. Developing economies of this century may have quite different conditions in terms of international and

(21) See Friedman M. (1957), p. 235.

domestic competition compared with the today advanced countries during the period of their industrialization. Government intervention in the form of protection and prevention to the 'freedom of entry' in developing economies of today may act - apart from its influence on the rate of economic development - against the forementioned substitution of transitory for permanent income.

The last modification of the Friedman's position is difficult to ascertain, in view of the lack of data on the distribution of permanent and transitory incomes, whether or not their totals can be somewhat estimated. Friedman maintained, on the other hand, that the determinants of the proportionality ratio between permanent income and consumption are not independent of the size distribution of income. Those factors include age, size of family, education and the ratio of non-human wealth to income. True, the interdependence between these variables and the distribution of income may cancel out to some extent in aggregates;⁽²²⁾ However, they may follow patterns of change in developing countries which make that interdependence not quite of secondary importance.

It is inferred that the possible tendency of the income inequality to reduce in developing countries may be not quite independent of factors of social, cultural and demographic nature because of the size of their changes. This kind of changes constitutes in fact an integral part of the development process, more certainly so than the possible fall in the inequality of distribution income. Under these circumstances investigation of this kind of factors may be especially useful in interpreting the income distribution and its possible influence on the saving-income ratio. It may lead to doubts about the view that the disaving at low income levels is due solely or mainly to the higher permanent than measured income. This view does not seem to attribute sufficient importance to physical needs and to institutional and value system and of cultural changes.

Otherwise stated, that kind of institutional changes determine the speed of adjustment of consumption to the rate of growth of income in developing countries. If this adjustment is not complete within the period of observation, the flow of saving is closely related to the rate of growth

(22) See Friedman M. (1957), p.19.

of output. Low rates of saving are so both the cause and the effect of low rates of growth of real income in less developed countries, and high rates of saving are an integral part of self-sustaining growth⁽²³⁾.

The association of the institutional factors with the lags of the consumption expenditure has another implication for a relevant study in a less developed country. Thus, because of small sample size or errors of measurement of available data in such a country, exact estimation of the speed of adjustment of consumption to changing attributes may be extremely difficult. However useful further insight into the problem of 'irreversibility' and 'asymmetry' of the consumption-income relationship can be obtained by a thorough qualitative analysis of institutional and demographic factors of saving.

(23) See Ball R. and Drake P. (1964), p. 70.

II. 2. Composition of Saving by Form

As a point of departure it may be noticed here that the composition of saving by form is related with the volume of saving in terms of the theory of investment criteria of economic development⁽²⁴⁾. We may refer here to one of the most relevant of these criteria for our question, namely the criterion of the 'maximum per capita reinvestment quotient'. This criterion stresses on a composition of investment expenditure that maximizes the incremental ratio of 'capital' to 'labour', say C/L , as a factor of increase of the output per worker (say O/L)⁽²⁵⁾. More specifically this criterion suggests, contrary to what is commonly believed, that investment in housing and community infrastructure can affect towards reducing the rate of population increase—chiefly the mortality rate and secondarily the fertility rate—namely the denominator L . It will also help in creating the environment within which the 'quality' of the factor of production 'labour' will be improved, so that productivity and per capita saving will rise.

In essence, this criterion stresses on the possibilities of automatic increase in voluntary saving in less developed countries through certain composition of investment expenditure and without need for resort into devices of forced nature, like taxation and/or inflation.

In the type of economies we are interested in the savers have largely stopped to be identified with the investors in fixed capital, as it is the case in agrarian economies⁽²⁶⁾.

(24) For a survey of the investment criteria see United Nations, ECAFE (1964).

(25) It was more specifically objected that the capital turnover and the social marginal productivity criterion emphasize on the incremental output-capital ratio (say O/C) and overlook that its long-run rise may be followed by a corresponding fall in the capital-labour ratio (C/L) which leaves unaffected the per capita output.

See Galenson W. and Leibenstein H. (1957), p. 350.

(26) It has been suggested that saving out of wages, salaries and peasant incomes is affected by the availability of savings institutions and the organization of the capital market. See Lewis W.A. (1955). Wage and salary earners may find that outlets for saving are severely restricted, thus producing relatively low marginal and average saving rates for this class. See Kelley A.C. and Williamson J.G. (1968).

Saving in the form of non-business inventories of foodstuffs, other primary products and precious metals gradually lose share in favour of saving in financial forms (27). This takes place in the form of increase in the degree of 'monetization' of the economy and financial intermediation, which virtually reduce saving in kind to farm inventories and to the owner-constructed housing. Thus, holding of inventories in excess of the normal production and current consumption requirements is shifted to created financial 'assets' (28), which have more attractive terms for the savers, due to their specific characteristics of 'safety', 'liquidity' and 'yield' of money income and/or real services. (29)

Increase in the proportion of saving held in financial form in developing economies has been attempted to be shown empirically as a characteristic feature of the process of economic development (30). These attempts are consistent with the Gurley and Shaw thesis (1968) that financial growth stimulates the flow of saving, which is conveniently attributed to an ordinary 'income effect' and a 'substitution effect'. Thus, as the new savings forms have a higher yield, lower risk and other desirable characteristics, the return on saving, namely the exchange ratio between current and future consumption, rises. This substitution effect will

- (27) The indicated change can be thought of as a bend-like one with volatile sometimes variations depending on the rate of current inflation and of the expected fall in the value of 'money' and of savings in the form of constant currency values, the rate of financial innovation, etc.
- (28) The term 'asset' has accepted much discussion in the literature so that its definition to be especially difficult. Here assets are identified as forms of savings.
- (29) Another relevant question, in a long-run analysis of saving by form is whether the new forms savings and the development of the financial sector was the result of a market response to the demand for corresponding services by the savers or as a supply leading form of financial development or, more likely for developing countries of today, of government intervention and planning. For a discussion in these lines relevant to less developed countries see Patrick H.T. (1966).
- (30) See United Nations ECAFE (1962), p.8.

be offset by the income effect which derives from the rise in income after turning to saving forms of higher yield. It seems likely that the income effect will be outweighed by the substitution effect in favour of saving in the long-run, as targets are raised and the horizon of conceivable alternatives expands (31).

In addition, there is the characteristic of 'assets' to be only imperfect substitutes each other. This constitutes first of all a factor promoting the flow of saving especially in developing countries. Needless so to say that life insurance is as a rule in this type of countries by no means transformed to cash by selling it in the case of 'a raining day', and that stocks, housing and other durables may require too long time to be sold at acceptable to the owner price, apart from possible relatively high transaction costs and inconvenience, because of backwardness of the resale markets or stamp duties introduced by governments.

The backwardness of the social security systems and of the imperfections of the 'capital markets' add to the favourable factors of personal saving and to the internal business investment finance in the developing economies we are interested in (32). As social security and life insurance expand and family security arrangements are relaxed, the 'hump' saving - an expression introduced by Sir Roy Harrod (1948) - changes forms in favour of contractual saving and may, though not necessarily, promote the development of the capital market broadly defined.

Particularly, government control on the composition of the portfolio of social security funds and of life insurance companies in the purpose of combating inflation in developing economies, may become an obstacle to the expansion of non-bank forms of debt instruments and savings (33). It adds difficulties to the application of the diversification rule by the savers - provided they are predominantly risk averters - and to the development of competition within the capital market.

(31) See especially Patrick H.T. (1966).

(32) Backwardness of the capital market may constitute on the other hand an important restraining factor of business investment in fixed capital. See Ellis H. et al. (1964).

(33) On the importance of contractual saving in the capital market in an advanced country like United Kingdom see e.g. Morgan E.V. (1967), pp. 3-18.

Given the level and the rate of growth of per capita income and the relative yields of financial forms of savings, the share of financial saving to the total may be not the 'desired' one - namely the one which corresponds to the saver's attributes and tastes - in a given period of time. The financial saving at hand may be planned to be used in part for downpayments to buy tangible savings forms when the minimum amount of the former is completed. Saving for this purpose may take serious dimensions in developing nations provided that the individuals have given priority to durables in their planning to improve the standard of living with later adjustment in the quality of food and personal services⁽³⁴⁾. Consequently, the stock of financial savings outstanding in a given instant of time may be in part the result of the 'disequilibrium' of the capital account of the savers⁽³⁵⁾.

This indicates a disequilibrium process in the accumulation of wealth, which in turn involves some rather special problems for the type of economies we are interested in. For one thing it adds to the difficulties of specifying and quantifying the relationship of 'the rate of interest' with the proportion of income that is saved because of the possible non-marginal size of that disequilibrium, given indivisibilities, market frictions, etc. More specifically, exceptionally high rate of accumulation of financial saving can be in part the result of a rise in the 'real' rate of return out of it - namely after deflation by the fall in the value of 'money' in the period under consideration - or of a rise in the degree of monetization of the economy, defined

(34) That ordering of priorities may be due to an extension of the demonstration effect, which can favour modern durables like cars, TV sets, cookers, washing machines and furniture. Alternatively it may be attributed to other factors, like the increase in the proportion of female active population, etc.

(35) The term 'disequilibrium' is here referred to the composition of savings by form, given tastes, relative yields, etc., though it is present in this case along with the less than desired amount of wealth, which consists of one of the causes to saving. Usually positive saving, being the result of divergence between actual and desired total resources, brings about changes in the composition of the balance sheet, so that both its volume and composition are changed simultaneously. Hence the flow aspect of the volume and composition of saving by form has to be studied comprehensively in an empirical research on the subject. The distinction by Keynes (1935) of the decision about the flow of saving from the one about the form in which saving is allocated is useful particularly for academic purposes.

as the proportion of the gross domestic product that passes through the market, to the extent it requires transaction balances.

A part of the possibly increased share of financial saving can further be the result of disequilibrium in the capital account of the household sector, associated with the forementioned capital market imperfections and the indivisibility of consumer durables. To the extent that this is the cause of the rise in the proportion of personal income that is held in financial form in a particular period of time (which is treated by national accounting as household saving) it may be followed by an exceptionally high dis-saving in later periods of time⁽³⁶⁾. Thus, given the ordinary definition of saving to exclude expenditure for purchase of new consumer durable commodities, the possible disproportional rise of the former for downpayments to be accumulated will be counted as a rise at present and fall in the future of the ratio of saving to income of the personal sector⁽³⁷⁾. Offsetting in part influence will be of course exerted by new householders-savers and business saving in the same period. Nevertheless, these circumstances can be considered as an additional factor of instability of saving in the kind of economies of intermediate stage of development.

This instability adds difficulties to the study of the long-run saving function in such case and to the financial or non-financial forms it is channelled. A simplified stock adjustment assumption will so consist of only a rough approximation to reality. Thus, increase in financial saving to accumulate downpayments for purchase of a flat or a car or other appliances may be positively associated with the existing stock of 'liquid' assets, contrary to what one might be prepared to expect⁽³⁸⁾. Obviously this association is vague since it leaves out of account the factors of the demand for wealth and its major parts, taking them wrongly as independent of the flow of saving⁽³⁹⁾.

(36) Except of course if that disaving is overoffset by persistently rapid rates of growth in incomes.

(37) It has to be in mind that sharp change in the rate of purchase of consumer durables can be the result of even modest change in the relationship of the effective demand of the services of durables to income. Shifts between durable expenditures and liquid saving may be one of the most important factors of the year-to-year variability in consumption expenditure.

(38) The positive lagged wealth coefficient is otherwise attributed to disequilibrium rather than change in tastes in that case. See for this kind of distinction in Crockett J. (1964), Houthakker H.S. and Taylor L.D. (1966). That disequilibrium in the household capital account implies that 'liquid' assets, whatever defined, are a non-satisfactory proxy of wealth especially under these circumstances. For a more broad discussion on this matter see Ackley G. (1961).

(39) For this kind of criticism of the research on the saving function in U.K. and U.S.A. See Ball R.J. and Drake P.S. (1964), Crockett J. (1964).

Thus, for instance after the purchase and full-payment of the planned tangible durables, there may be a readjustment of other consumption commodities which can involve drastic fall of the saving-income ratio, ceteris paribus⁽⁴⁰⁾. This reasoning presumes that consumer durables are put in first order of priority in the process of adjustment of consumption against non-durables, which is an open question.

Moreover, because of the low level of development of the capital market, and the consequent loose connection of its different parts, one cannot easily get without guesses a satisfactory interpretation on the question of the composition of saving by form. Leaving aside the problem that data on the relative rates of return are rarely available through time, the exceptionally high dispersion and the disconnection of these rates in such an environment make difficult the use of a 'representative' rate of return in the sense of a mean average to associate it with the rise in the flow of saving and its ratio to income⁽⁴¹⁾. We can hardly, on the other hand, investigate under such circumstances the possible relationship of the term structure of interest rates and the composition of saving by form. It is not precluded, for instance, in view of special frictions in the capital market, or expectations about the value of 'money' in the future, to have opposite movements in a relatively long period of time -or anyway not quite related ones- of deposit accounts, bonds or house ownership if capital gains are included.

In these circumstances we can only take one rate of return, say the interest rate on deposit accounts, which are one of the most important financial forms of saving in terms of size in countries like Greece, and relate it to the saving-income ratio in period averages after deflation for the interim changes in the cost of living. This kind of discussion in terms of period averages, being subject to reservations of the forementioned type, can throw some useful

(40) Deferred consumption and 'forced saving' because of direct control of personal consumption during the war and growth in consumer wealth relative to the growth of income resulted in elevation of consumption relative to income after the war in U.K; In Greece galoping inflation has levelled the real value of financial savings and forced the satisfaction of deferred consumption out of current income which led to abnormally low saving in early post-war period. See more in chapter IV.

(41) It was maintained by Higgins B. (1959) that in countries where personal saving has started to play an important role, effective interest rates may have significant quantitative effect on saving.

insight to the long-run factors of the flow of saving as removing in part erratic short-run movements associated with the frictions referred to already.

On the other hand, the relative volume of the main forms of saving in the period in which data are found can only be examined if taxation and capital gains or losses are taken account of the comparison of the relative rates of return. In addition some measure of the variation of prices with available data has to be used as possible somewhat associated with the subjectively estimated uncertainty, insofar as the savers are predominantly risk-aversers and the diversification rule applies.

CHAPTER III

PROBLEMS OF STATISTICAL TESTING

III. 1. Available Data and Definition of Consumption and Income

After the discussion about the conditions which prevail in the less developed countries in the stage of development of Greece and are mostly relevant to saving decisions, we have to go now on selecting the appropriate data in this country and use them in the attempt to give empirical content to theory. The required material for this purpose has to be a body of data which will enable us to derive stable patterns of behaviour reflecting saving decisions in this country. A question therefore is whether there are available time series and cross-section data close to the definition of saving and income and other factors of saving decisions according to theory.

The annual publication of the national accounts of Greece since 1948 gives us the opportunity of obtaining data on aggregate personal saving, corporate saving and gross domestic saving, as well as personal disposable income for the period 1948-1968^(I). These figures are estimated and presented in accordance with the standardized system of national accounts as it was published by O.E.C.D. (1959). Before we engage ourselves with the question of bias of these estimates, we need to concentrate somewhat on the definition of saving according to theory, mainly from the point of view of the problems that arise to this empirical research.

Saving originates, as it is known, in the private and public sectors of the economy and the inflow of capital. The private sector consists of households and non-profit institutions and unincorporated business (household sector) and private corporations (corporate sector). The government sector comprises the central and local government and public corporations (not those which operate under the legal form of private corporations). The definition of saving equals to personal disposable income minus consumption expenditure,

(I) In the year 1948 civil war continued in Greece after the end of the World War II, and order was restored by the beginning of 1949. For this reason the year 1948 is excluded from this analysis, though we miss to some degree of freedom.

while business saving is equal to undistributed profits, and government saving is defined as current revenue minus consumption expenditures, subsidies and transfers.

This division between the sectors should not be taken to reflect completely different motivations for saving. Thus, in the household sector, the unincorporated business and self-employed save in part for business purposes as the corporate sector does. Similarly the corporate sector may, as it happens in the Greek case, include also public corporations which may have not quite the same motivations to save as corporations of private ownership and management. We shall concentrate our attention in the following to the definition of household or personal saving which has been the most important component of the increase in total saving in Greece during the period 1949-1968.

It has to be pointed out that whatever definition of saving is maintained by theory, it is consistent with a corresponding concept of production and consumption. This has the importance for this study in a developing country that the process of economic development is associated with a shift of activities of the housewives from the home to the market place. The possible increasing entrance of the housewives to the labour market, given the national accounting practice to exclude home-services from the national product, results in some overstating the long-run trend of the real percapita income and on extension of the saving-income ratio, provided that the saving-income relationship is non-proportional. The overstatement of this ratio may be however mainly of short-term nature, insofar as the entering of housewives into the labour force aims at substitution of house appliances for domestic services. The latter needs time, as was noticed already, for accumulation of downpayments and more so given the usually lower salaries of females than those of males⁽²⁾. Therefore this source of bias may not be significant in the estimate of the long-run saving-income ratio, especially if saving is broadly defined to include expenditure for purchase of new consumer durable commodities.

As it is known, the residual concept of saving—defined as a difference between the flows of personal disposable income and of personal consumption expenditure in a given period of time—has been criticized from various

(2) Nationwide there may be complementary action of downpayments of economic units, so that the net saving to rise more regularly because of partial offsetting of saving and debt incurrence which is counted as dis-saving.

respects, notably for its attachment to the length of the time unit, the neglect of the net capital gains and losses and the rigid distinction between consumption and investment expenditure⁽³⁾. The latter distinction corresponds to specific definitions of 'capital' and 'wealth' which have to be consistent with the definition of the flows of income and saving. It has also to be stressed that this distinction either in terms of 'stocks' or in terms of 'flows' has to be attached to existing conditions and stage of economic development. Consider so the implication of the definition of consumption expenditure to include expenditure for purchase of consumer durables except housing which is treated as fixed investment expenditure along with other construction. Purchase of durables by previously accumulated financial saving and/or borrowing is not required for enjoying their services under conditions of perfect markets⁽⁴⁾. Existence of the latter would disconnect the planned pattern of the personal consumption expenditure from the decision to save, which would serve in that case other motives, notably retirement, contingencies, and bequests. Inconveniences and transaction costs associated with frictions in the markets of durables and their services differentiate the relative rates of return of owner-use and of rentals and fix the level of 'rent' at the margin, given the 'tastes'. The degree of imperfection of the re-sale market along with the technical and economic durability of each durable commodity fix the share of its consumption and investment components and consequently its power as a 'store of value'.

The conclusion is that to decide which of the durable commodities have to be included into the investment expenditure and saving presupposes a detailed study in the particular place and time and for each one commodity. This kind of solution is precluded here because of lack of statistical data in the country we are interested in. Therefore, we have to adopt for our purposes the definition of the national accounts for consumer durables which includes all of them with life longer than a year, except for personal utensils of any durability. We are going to treat this expenditure group as follows: First, we will add the so-defined expenditure for purchase of consumer

(3) See e.g. Friend I. and Jones R. (1960), Friedman M. (1957), Ackley G. (1961), Arena J. J. (1964).

(4) For a discussion in these terms see Tobin J. (1965).

durables to the national accounts concept of personal saving and make a comparison of the movement between the two series, namely of aggregate personal saving excluding and including expenditure on consumer durables.

This empirical criterion of choice of the definition of saving in Greece is considered preferable to the alternative of neglecting the expenditure on durables altogether. For one thing this neglect would have to face the objection that it does not enable sufficient testing of all saving hypotheses, some of which have adopted the definition of saving to include expenditure on purchase of consumer durables⁽⁵⁾. In addition, many consumer durables, notably cars, bicycles, etc., are used for both household and business purposes, especially by small business and self-employed persons in less developed countries, including Greece. This makes one to expect relatively high degree of substitution⁽⁶⁾ between consumer durables and ordinarily defined saving, although this substitutability also depends on other factors, like the level of development of the capital market, credit and fiscal policies, and the time period used.

Insofar as we have reasons to expect that outlays of consumer durables include a component of business investment and saving, we have decided to investigate parallel to the concept of personal saving also the total domestic private saving in Greece which includes saving of corporations, alongwith consumer durable outlays. Because of the possibility that saving decisions are taken out of total income including consumed 'capital' namely depreciation allowances, we shall make some use of the concept of aggregate private saving and income in 'net' and in 'gross' e.g. including capital consumption charges.

The latter have to include strictly speaking also depreciation of consumer durables, which has to be subtracted from outlays for their purchase to derive the 'net' expenditure on acquisition of consumer durables. We have, however, decided to avoid the adventure of estimating depreciation

(5) See Friedman M. (1957).

(6) Broadly speaking every commodity is a substitute for any other, given the appropriate budget constraint. There is usually a cluster of supposed close substitutes which are investigated together in theory and empirical research. The latter attempts to find out whether there is actually a chain of substitutabilities in the cluster that differentiates it from other commodities and commodity groups.

charges on consumer durables, in view of lack of information about their physical use and economic obsolescence due to fashion or technological change. It is not expected that the upward bias in the measure of saving including consumer durable outlays because of non-subtraction of depreciation charges is significant -though it will be somewhat rising through time- in view of the relatively low stock of most consumer durables per head in countries like Greece.

An international comparison of personal saving in Greece and other less developed and advanced countries will also have the disadvantage of different bias by country from the inclusion of depreciation of durables in the broadly defined saving. This kind of bias in the saving-income ratio of Greece with saving broadly defined, will be toward understating the relative position of that country compared with advanced countries. This is due to the relatively low overstatement of the saving-income ratio in the former country, because of the relatively low stock of durables and of their depreciation in comparison with mature countries. On the other hand, this understating of the relative position of Greece in terms of saving including consumer durable outlays is at least in part offset by an overstating of that position, with personal saving ordinarily defined. This latter overstating of the ordinary concept of personal saving is associated with the national accounts definition of the personal sector to include self-employed and unincorporated business in less developed countries like Greece⁽⁷⁾. In view of these offsetting influences in the two concepts of saving, we may rely more on an international comparison with personal saving defined to include consumer durable outlays, than with the ordinary definition of saving.

The household budget survey in Greece offers now another piece of information on income and consumption at family level. The use, however, of this source of information is subject to a number of limitations related to the definitions of consumption and income, in this survey, the cover of the sample, and the errors of reported income and consumption. Nevertheless these limitations are not exceptional in this country, and similar limitations have not prevented an extensive use of household budget surveys data by empi-

(7) Therefore, the comparison of the saving-income ratios with the national accounts concept of saving has to be accomplished by a comparison of the proportion of the personal to the private domestic saving.

rical researchers of the consumption function in other countries. We make a careful examination of these limitations before using these data for our purposes.

The sample of the Greek household budget survey 1957/8 comprised 49 towns of over 10 thousand inhabitants each in 1951. This covered 2,842 thousand households representing 37 percent of the population in 1951. The 10 larger towns were supposed to have marked variations in socio-economic characteristics, so that all of them were included in the survey. From the rest 39 towns and for the sake of reducing the costs, 15 towns were selected in a random drawing, with probability of inclusion proportional to the number of inhabitants of each town.

As it is known, there is a number of differences in the definition of consumption and income between national accounts and household budget surveys. We cannot proceed, however, into a complete adjustment of the definition of consumption and income of the household budget survey to the definitions of the national accounting, in view of the fact that the income and consumption data of the budget survey are not available in sufficient detail⁽⁸⁾. Nevertheless, we may reach some conclusions about these differences indirectly, through reference to the definitions of the household unit and its consumption and income in the budget survey. In addition, we shall make some adjustment to the consumption expenditure of the budget survey which is permitted by available data.

Household is defined in the budget survey to include persons living in the same dwelling unit, whatever their legal relationship or their profession. Therefore, apart from the intricacies related to the definition of dwelling unit, the household sector in the budget survey includes non-financial unincorporated business (as belonging to household heads), as the national accounts define the personal sector. The household sector in the budget survey excludes, on the other hand, business corporations as the personal sector of the national accounts does, but the former also excludes non-profit making institutions, which are, however, included in the latter. Insofar as the non-profit making institutions have relatively high ratio of

(8) For this kind of work in U.S.A. see Friend I. and Schar S. (1959).

current expenditure to income, that exclusion may result in some downward bias in the average and possibly the marginal consumption-income ratio in the budget survey (9).

Income of household is defined to include income in cash and in kind from any source and by every member of the household. Double-counting within the household is, however, avoided by disregarding money transactions between household members. Though saving out of income in cash may be different in size and form from the one out of income in kind, we have not data to check these differences. Altogether consideration of the income and saving in cash and in kind is not a very important defect of this study, in view of the particularly high 'degree of monetization' of the Greek economy, as we shall have the opportunity to see later on (chapter IV). On the other hand, it may be reminded that decisions for the total amount of household consumption and saving are taken simultaneously.

Income in the Greek household survey is recorded after deduction of the operational expenses of the business and before taxes. Therefore, that income is overvalued compared with the national accounts concept of personal income by the amount of direct taxes. This consists of a source of downward bias of the average consumption-income ratio and possibly of the marginal such ratio, provided that the marginal rate of taxation is high (10). If the marginal tax rate does not increase fast with income, because of low progressiveness or tax evasion as we shall see later on, that downward bias may be offset by the understatement of the reported income, as we shall see later on (section 4).

One major adjustment of the consumption expenditure of the household

(9) This has to be considered in combination with other sources of errors of measurement of consumption and income in budget survey which are discussed in section 4.

(10) Thus, if we have C, Y and T for consumption, income before taxes and taxes respectively, the marginal consumption-income ratio is given as follows:

$\frac{C_1 - C_0}{Y_1 + T_1 - (Y_0 + T_0)}$. If the marginal tax-rate is $\frac{\Delta T}{\Delta Y} = t$, the marginal consumption-

income ratio equals to $\frac{\Delta C}{\Delta Y(1+t)}$. Therefore, the higher the t, the higher will be the downward bias of the marginal consumption-income ratio.

budget survey is possible with the available data. It consists of deduction of the item of 'miscellaneous spending' which comprises mainly gifts and charities-namely transfer payments between households- legal expenses and payments for Christenings, weddings and funerals. Expenses of the latter kind are too high for some households in the period of the survey which distorts the average bracket consumption given the size of the sample. Also, the miscellaneous item includes superannuation, social insurance contributions and life insurance premiums, which are treated as saving rather than consumption in the definition of the national accounts⁽¹¹⁾.

The budget survey data are available in groups classified by size of income of the household (in six brackets), by occupational status of the head (in employers, employees, self-employed and retired) and by occupation of the head in ten categories. These groupings deprive us the opportunity of comparison of within groups and between groups consumption elasticities. Not only we do not enjoy the ideal of having direct observations on each and every household, but we have not either the 'second best' case where though dealing with groups we have one table with all relevant variables at once. Even more so, given that the Greek data are not classified by any two characteristics e.g. income and household size or household size and age of the head. A main inquiry therefore is how to choose the tables and what should be the method of analysis.

(11) If we had a sufficient breakdown of miscellaneous spending, some of its items should also exclude from income.

III, 2. Problems of isolating the effect of income and other factors

As it is known, one of the main problems of an empirical analysis of the consumption function is to get unbiased estimates of the influence of income and other factors⁽¹²⁾. Difficulties to approach this target arise from the fact that the variables used for those factors represent series of sample data which are usually correlated with income. For this reason researchers have innovated various techniques designed to minimize the bias of the estimates due to intercorrelation of the variables, which presupposes careful prior investigation of the available information.

The first observation to be pointed out here refers to the differences of the available to us time series data in Greece and the cross section ones, i.e. that the latter are given in terms of household units. We could, on the other hand, express aggregate data of consumption and income in per-household terms if the total number of households was available throughout the period 1949-1968. Since this information is offered only for the population census years 1951 and 1961, this dictates to us use of per-capita terms for the sake of comparison of the results. Moreover, use of per-capita terms in the budget survey data is necessary because, as it was noticed already, we have only six income brackets available, which prohibits use of more than one independent variables, such as the size of the household.

The transformation to express original data in per-capita terms aims at removing the variable of the size of population and/or household and is common in empirical studies on the subject. More specifically, the usual cross-section consumption-income relationship in per family terms is given as follows:

$$C_i = f(Y_i, u_i) \quad (\text{III. 1})$$

where $i = 1, 2, \dots, n$ families.

(12) See e.g. Friend I. (1960), Suits D. (1963).

It is then transformed to a relationship in per capita terms through division of consumption and income by the size of family n_i :

$$\frac{C_i}{n_i} = F \left(\frac{Y_i}{n_i}, u_i \right) \quad (\text{III. 2})$$

Similarly, the relation of aggregate personal/consumption expenditure with personal disposable income from time series is commonly given as follows:

$$\left(\frac{C}{P} \right)_t = c \left[\left(\frac{Y}{P} \right)_t, u_t \right] \quad (\text{III. 3})$$

also

It is transformed into a relationship in per capita terms through division by the estimate of mid-year population, which gives the following relationship:

$$\left(\frac{C}{NP} \right)_t = C \left[\left(\frac{Y}{NP} \right)_t, u_t \right] \quad (\text{III. 4})$$

If we disregard for the moment aggregation bias involved in (III. 3) and (III. 4), we have to make some qualifications for the transformation of both cross-section and time series data in per capita terms⁽¹³⁾. Thus, this transformation is based on the assumption of homogeneity of the population and of households. It means that consumption and income are proportionately influenced by the size of household and of population correspondingly, and that a proportional change of income and of population in the same direction leaves unaffected the per capita consumption expenditure. In addition, consumption and income in time series (III. 3), are expressed in real terms through division by the same deflator P_t , which is supposed to express the appropriate measure of value and involves the assumption of absence of 'money illusion' in the behaviour of individuals as consumers. In plain words, this assumption means that a proportionate rise (or fall) of Y_t and of P_t leaves unaffected their ratio $(Y/P)_t$, as a result of which the real value of consumption $(C/P)_t$ remains constant.

Provided that the P_t and Y_t change proportionately within the selected time unit period, we need further to know how big that change is, because this may affect expectations about the future rate of growth of P_t , insofar as these expectations are elastic in Hicksian terminology⁽¹⁴⁾. The expectation of future growth in P_t can well affect $(C/P)_t$ even if $(Y/P)_t$ is held constant. In

(13) Similar relationships are also often used with the ratio of consumption or saving to income as dependent variable. For the main differences between those two relationships see Ferber R. (1967). See also section 4.

(14) See Hicks John R. (1965).

addition, the question is whether the rise in P_t results in equal proportionate rise in all incomes and not simply in their total, in view of the possibility of differences in the marginal consumption-income ratio by size or source of income, or the form it takes. These differences imply that the regression coefficient of income in (III. 3) or (III. 4) consists of a weighted average of the distribution of Y_t ⁽¹⁵⁾. If there are not great changes in the distribution of income at the time of increase in the consumption-income ratio it may indicate that the consumption-income relationship, say (III. 4), has not significant aggregation bias. This question about different marginal consumption-income ratios can be further examined by breaking down the income variable to the extent that data permit⁽¹⁶⁾.

In addition, the changes in P_t may exert other kinds of indirect influences on real consumption notably through change in the real rate of return on savings and change in the real value of the part of wealth which is in constant money values. Therefore, we have to investigate these possible influences on real consumption, which derive from changes in P_t and are not incorporated into the variable of real income. This can be done by addition of relevant variables into (III. 4), or by careful investigation of the behaviour

(15) See more Klein L.R. (1953).

(16) Appropriate breaking down of income can also help in interpreting consumption behaviour by alternative hypotheses. Thus, a variant of the absolute income hypothesis consists in separating real income into two parts, disposable labour income y_{1t} , and disposable non-labour or property income, say y_{2t} and assuming a linear relationship to real consumption expenditure, c_t , we have:

$$c_t = a_0 + a_1 y_{1t} + a_2 y_{2t} \quad (\text{III. 5})$$

On the other hand, the life-cycle hypothesis has been also presented in the following form:

$$c_t = b_1 y_{1t} + b_2 A_t \quad (\text{III. 6})$$

where, A_t is a measure of the net worth.

Transformation in first differences of (III. 5) and (III. 6) respectively gives: $\dot{c}_t = a_1 \dot{y}_{1t} + a_2 \dot{y}_{2t}$ (III. 7)

$$\text{and } \dot{c}_t = b_1 \dot{y}_{1t} + b_2 \dot{A}_t = b_1 \dot{y}_{1t} + b_2 \dot{y}_{2t} \quad (\text{III. 8})$$

Comparison of the results from testing (III. 7) and (III. 8) can shed some light on the contribution of the absolute and the life-cycle hypotheses of saving. See Ando A. and Modigliani F. (1963).

of the residuals of this relationship, insofar as data for those variables are scanty, and consideration of major changes in those variables by use of dummy variables, subject to certain limitations. (17)

On the other hand, the forementioned transformation of consumption and income data in per capita terms overlooks the possible influence of the composition of population by sex, age, education and other social and demographic characteristics.

Insofar as measured data on these other variables are available, the relationships (III. 2) and (III. 4) can take the following form correspondingly (18)

$$\frac{C_i}{n_i} = F \left(\frac{Y_i}{n_i}, z_i, u_i \right) \quad (\text{III. 9})$$

$$\left(\frac{C}{NP} \right)_t = C \left[\left(\frac{Y}{NP} \right)_t, z_t, u_t \right] \quad (\text{III. 10})$$

where, z_i and z_t are conglomerates of those other variables for which data are available in cross-section and time series respectively. The term z includes so a series of variables of demographic, social and economic nature, which are in practice, as a rule, intercorrelated with income. So their net effect is difficult to isolate, especially when the sample size is not sufficiently high. In the latter case, use of a system to include all kinds of relationships is often out of the possibilities of the available data.

More specifically, information about the demographic characteristics of the population in Greece is available for time series only at census dates, namely the years 1951 and 1961. Use of aggregate population N_t , and the rate of its growth in time series can show the possible influence of the rate of growth of population on the saving-income ratio. As it is known, a particular theory, namely the life-cycle hypothesis of saving, maintains that if population grows at a constant rate, there will be a proportional increase in the younger households which save to the older ones which are in their dis-saving age. Insofar as it leaves unaffected the average output per worker,

(17) Attributing alternatively to income the effects of correlated variables gives valid predictions only if all time trends remain unchanged, or change in the same way leaving the interrelationships among the relevant factors unchanged. We have therefore to isolate the trend effects from the effects of income growth especially when growth rates are not constant or when the implications of alternative growth rates are examined.

(18) See Crocket J. (1960), Ferber R. (1967).

aggregate real income and saving will grow at the same rate as population, and the saving-income ratio will be held constant. Thus, the rate of growth of population will be positively correlated with the saving-income ratio, apart from short-term variations of the latter⁽¹⁹⁾.

If the rate of growth of population is relatively low and fairly constant or slightly decreasing, we cannot easily isolate the independent influence of the rate of growth of population on the saving-income ratio. We have to resort under these circumstances to a qualitative analysis of the change in the composition of population between census dates and of the possible changes in the system of values which affect the 'tastes' between consumption and saving throughout life and are assumed constant by the life-cycle hypothesis of saving⁽²⁰⁾.

On the other hand, studies of budget surveys on consumption and income make sometimes a modification of the deflator of the household data n_i (III, 9) to account for the household composition, by transformation of the household size into standardized units of adult equivalents⁽²¹⁾. Apart from the complications involved in this kind of transformation, the available budget survey data in Greece do not include a classification of income and consumption by age group and family size, so that we are unable to attempt that transformation. However, the household budget survey 1957/8 includes a separate table (number 13) with classification of consumption by number of adults (over 16 years of age) and children (under 16 years of age). We can therefore make some crude testing of the assumption that the average consumption remains constant over the life-cycle.

On the basis of this assumption we shall estimate the average per capita consumption and multiply this by the size of families with different composition as above. This will give a series of estimated household consumption with equal weight to all household members. Alternative series can further derive by attributing weights, one for the first household member and .75 for each additional member or .50 correspondingly⁽²²⁾. Comparing then the variation

(19) See e.g. Ando A. and Modigliani F. (1963).

(20) Ibid., p. 56.

(21) This method has been thoroughly investigated by Houthakker (1952) and Prais (1953).

(22) These weights are most commonly used in practice. See Fisher M.R. (1956).

of these estimated series with the variation of actual consumption and saving (in terms of standard deviation) can give some further indications about the applicability of a basic tenet of the life-cycle hypothesis of saving in the case of Greece.

The limited possibilities of the use of additional variables with the available groupings of the budget survey data in Greece impose further the need for careful investigation whether use of grouped consumption and income data involves significant bias in the regression coefficient of income. Thus the grouping can affect the variance of the transitory component of income so that to get a coefficient nearly to the permanent income, i.e. upward biased⁽²³⁾. It has been, however, pointed out that this grouping by size of income may not substantially reduce the variance of the transitory component of income, since on the average -if permanent and transitory components are uncorrelated- the lower brackets will have negative and the upper brackets positive deviations from the normal⁽²⁴⁾. It has to be reminded in addition that the non-income factors as used in regressions with cross-section data do not include other household characteristics like attitudes toward future versus present consumption or toward provision for unforeseen contingencies, which are not measurable with current techniques and so cannot be handled in a single budget survey.

(23) The opposite objection has been, on the other hand, maintained when ungrouped data are used and other non-income factors are incorporated, i.e. that the latter are correlated with permanent or normal income so that the coefficient of the income variable is unjustifiably lowered. See Eisner R. (1960).

(24) See Crocket J. (1967).

III. 3. The length of the time unit

The problem of isolating the influence of income on saving from that of other factors is directly related with the time unit selected. The available data in Greece fix the year as the time unit in this study. We do not therefore concentrate on problems of seasonal variation of the consumption expenditure⁽²⁵⁾. For a period as long as a year consumption expenditure is likely less independent of income than for say quarterly periods, but the degree of that dependence is influenced by a number of factors of longer-run nature, as was referred to the previous section. The statistical series of saving is bound to be determined by the relative variation of the income and of the consumption within the year.

In so far as income is held constant, changes in consumption will come entirely out of current saving or of disposition of assets accumulated in the past. The implied association between consumption and saving is however difficult to reveal if income is relatively rapidly growing, as it may happen in a developing economy like Greece. In these circumstances, a question is whether the year-to-year changes in saving are mainly the result of a lagged adjustment of the consumption expenditure or of the current increase in the attributes. In view of the fact that Greek economy follows a four-year cyclical movement⁽²⁶⁾, it is expected in the first instance that four-year average of the saving-income ratio will reduce the short-run irregularities of the saving that are associated with current income movements⁽²⁷⁾. However, the four-year-average of this ratio is not particularly illuminating because for one thing the cyclical movement of income may not have a constant length⁽²⁸⁾. Moreover the four-year average saving is affected by whether income was at relatively high level in the start or in the end of the four-year period. This is due to the fact that saving

(25) See Zellner A. (1957), Suits D. (1963).

(26) See Drakatos C. (1967).

(27) For a similar treatment in the United States see Goldsmith R. (1956).

(28) If moreover the trend is non-linear, it has to be estimated by the least-squares method rather than the method of moving averages. See Mills F. (1955).

which is the numerator of the saving-income ratio is affected by the adjustment of the consumption expenditure to the changes in income, which may not be completed in a year's time.

The problem of substitution of consumption for saving is going to be considered in that stage by investigation of certain major components of consumption on the one hand, and of the composition of saving by main form on the other. Thus, disaggregating the personal consumption expenditures into durables and non-durables is based on the assumption that for annual time period any individual group of consumer commodities comparable with consumer durables can be substitute for any other or for saving⁽²⁹⁾. If, however, in the process of adjustment of consumption first order is given to durables rather than to food or services, then it is probable that a part of personal saving of a given period is planned to finance later purchase of durables. Fortunately, as it was maintained, we can avoid the more complicated business of a thorough investigation of any major group of consumer spending by the already mentioned broadening of the definition of personal saving with durable outlays and relating both definitions with the supposed attributes of saving.

Consumption is treated in the first case as a function of the income of the same period of time, whether from cross-section or from time-series data. It is now well known that the marginal consumption-income ratio may be fairly steady over long periods of time and significantly higher (and the saving-income ratio significantly lower) than the corresponding one from cross-section data. Similarly the cross-section estimate of the constant intercept of consumption is usually higher (and the constant term of saving lower) than the corresponding one from time series.

This inconsistency between budget studies and time series analysis is sometimes faced by addition of a trend factor besides income in the statistical testing of the consumption-income relationship from time series⁽³⁰⁾. This trend factor is supposed to reflect sufficiently the compound influence of changes of demographic, social and cultural nature⁽³¹⁾. An alternative way is to assume that consumption in the period t is affected by all past incomes and not solely by

(29) More generally, the longer the time period the higher can be the degree of substitution between durable and non-durable commodities and the lower the substitution of both with saving. See Friend I. and Jones R. (1960), Suits D. (1963).

(30) See Smithies A. (1945); Ferber R. (1953).

(31) For reservations on the use of time by empirical researchers see Prest A.R. (1949), Ferber R. (1953).

current income (putting $(C/NP)_t = c_t$ and $(Y/NP)_t = y_t$ in (III.4) for simplicity):

$$c_t = f(y_t, y_{t-1}, y_{t-2}, \dots, y_{t-n}) \quad (\text{III.11})$$

Assuming a linear form of this relation we get

$$c_t = c_0 + \sum_{i=0}^n a_i y_{t-i} \quad (\text{III.12})$$

where $a_i < a_{i+1}$,
however

It is obvious that the last relationship is virtually non-testable, since it reduces to unacceptable level the degrees of freedom. Alternatively, it is usually assumed that a_i declines in geometric progression in successive periods as follows:

$$a_i = h^i a_0 \quad (\text{III.13})$$

substituting now for a_i in (III.12) gives the following relationship:

$$c_t = c_0 + a_0 \sum_{i=0}^n h^i y_{t-i} \quad (\text{III.14})$$

In this relationship, the parameter estimate of current income (a_0) is called short-run marginal consumption-income ratio and the $\sum a_i$ equals the long-run marginal consumption-income ratio. Provided that there is sufficient number of observations, the last relationship can be tested with lagged one year income, and then with lagged one year and two years incomes etc., up to the combination that does not improve further the results. Thus, if we take for simplicity only current and last year's income we get:

$$c_t = c_0 + a_0 y_t + a_1 y_{t-1} + u_t \quad (\text{III.15})$$

Since by definition $y_{t-1} = y_t - \Delta y_t$, this relationship can take the following form:

$$c_t = c_0 + (a_0 + a_1) y_t - a_1 \Delta y_t + u_t \quad (\text{III.16})$$

The corresponding relationship in terms of consumption-income ratio is given as follows:

$$\left(\frac{c}{y}\right)_t = b_0 + b_1 y_t + b_2 \frac{\Delta y_t}{y_t} + u_t \quad (\text{III.17})$$

As it is known, much of the controversy of the Keynesians and of the modern consumption theorists relies upon the relevance of the current income and of rate of income growth in consumption and saving behaviour, though each hypothesis gives a different interpretation to the relevance of the rate of growth of income. A particular hypothesis, namely the relative income hypothesis, has suggested that current income is of secondary importance to consumption and saving compared with the ratio of the current to the highest income attained previous to

$$\text{the year } t(y_t/y_0) : c_t = a_0 y_t + a_1 \frac{y_t}{y_0} \quad (\text{III.18})$$

If the secular relation between consumption and income is one of proportionality, the proportion of income saved will depend only on cyclical factors⁽³²⁾ i.e.

$$\left(\frac{c}{y}\right)_t = a_0 + a_1 \frac{y_t}{y_0} \quad (\text{III.19})$$

An alternative testing⁽³³⁾ is to attribute to lagged consumption rather than to income the influence of the past on the current rate of consumption and saving. We can so express c_{t-1} as a function of y_{t-1} and all the preceding values of y and then multiply by h in (III.14) which gets:

$$h c_{t-1} = h c_0 + a_0 \sum_{i=1}^{t-1} h^i y_{t-1-i} \quad (\text{III.20})$$

Subtracting now the last relationship from (III.14) and simple transformation gives

$$c_t = c_0 (1-h) + a_0 y_t + h c_{t-1} \quad (\text{III.21})$$

In this relationship a_0 continues to be the estimate of the short-run consumption-income ratio, while the long-run one is given by the ratio $a_0/1-h$, which derives on the assumption that $c_t = c_{t-1}$ ⁽³⁴⁾.

As Klein (1958) has maintained, that kind of model with current income and lagged consumption as variables can get more than one interpretations. So, it can alternatively derive through a simple linear adjustment hypothesis of consumption expenditure as follows:

$$c_t - c_{t-1} = B(\bar{c}_t - c_{t-1}) + u_t \quad (\text{III.22})$$

where, B , is the constant fraction of adjustment of current consumption to the discrepancy between the desired consumption (\bar{c}_t) and its volume in the previous year, c_{t-1} .

Solving for c_t , this relationship is written as:

$$c_t = B\bar{c}_t + (1-B) c_{t-1} + u_t \quad (\text{III.23})$$

Suppose now that the unobserved magnitude of \bar{c}_t is given by the following relationship

$$\bar{c}_t = a_0 + a_1 y_t \quad (\text{III.24})$$

Substituting (III.13) into (III.12) yields

$$c_t = B a_0 + B a_1 y_t + (1-B) c_{t-1} + u_t \quad (\text{III.25})$$

(32) See Duesenberry J.S. (1949).

(33) See Klein L.R. (1958), Brown T.M. (1952).

(34) Professor Ball and Drake (1964) have maintained that this assumption is consistent more appropriately with stationary conditions. See more in Appendix III.

A similar kind of relationship can alternatively derive from the simple form of the permanent income hypothesis⁽³⁵⁾: $c_t = a_1 y_t^e + u_t$ (III.26)

where u_t is 'transitory' consumption, which is assumed to be a random variable that is uncorrelated with y_t^e . Moreover, y_t^e is defined as follows:

$$y_t^e - y_{t-1}^e = B(y_t - y_{t-1}^e) \quad (III.27)$$

which easily gets

$$y_t^e = B y_t + (1-B) y_{t-1}^e = B \sum_{r=0}^{\infty} (1-B)^r y_{t-r} \quad (III.28)$$

Replacing now y_t^e in (III.26) gets

$$c_t = a_1 B y_t + a_1 (1-B) y_{t-1}^e + u_t \quad (III.29)$$

The term $a_1 y_{t-1}^e = c_{t-1} - u_{t-1}$ (III.30)

derived from (III.26) and put in (III.29) gives the following relationship:

$$c_t = a_1 B y_t + (1-B) c_{t-1} + [u_t - (1-B) u_{t-1}] \quad (III.31)$$

Adding a constant term a_0 we get the following linear non-proportional consumption function with current income and lagged consumption as arguments:

$$c_t = a_0 + a_1 B y_t + (1-B) c_{t-1} + [u_t - (1-B) u_{t-1}] \quad (III.32)$$

Insofar as a_0 is significant and residuals are serially correlated from statistical testing, it will not be in favour of the permanent income hypothesis.

Presence of serial correlation of the residuals is interpreted in (III.32)

as due to that u_{t-1} is identified with the transitory component of last year's consumption, which is an effect correlated with measured consumption (c_{t-1}) of the same year. Thus the disturbance term and an independent variable, last year's consumption, may be positively correlated rather than independent. This is a source of downward bias of the estimate $(1-B)$ ⁽³⁶⁾. To remove this source of bias we are going to use more complicated statistical techniques, as discussed in some more detail in the next section.

Consumption expenditure may further be broken into a permanent component (c_t^e) and a transitory component (c_t^I) which are determined as follows:

$$c_t = c_t^e + c_t^I \quad (III.33)$$

$$\text{where } c_t^e = a_1 y_t^e + u_{1t} \quad (III.34)$$

$$\text{and } c_t^I = a_2 y_t^I + u_{2t} \quad (III.35)$$

(35) Further modification of this form by Stone R. and Rowe D.A. (1962) consisted in adding wealth separately to permanent income as an argument of consumption expenditure. See also El-Mokadem (1969). As is known, Friedman (1957) has defined permanent income as the discount of the present value of the future income streams (wealth). Anyway, data on wealth are not available in Greece, so that its inclusion as a variable of the consumption function is prohibited.

(36) It is shown that this downward bias is the larger the greater is the importance of the transitory component of consumption in terms of size and variance. See Friedman M. (1957), Walters A.A. (1968).

With the transitory component of income defined as

$$y_t^I = y_t - y_t^E \quad (\text{III.36})$$

Substituting for c_t^E , c_t^I and y_t^I in (III.33) gets:

$$\begin{aligned} c_t &= a_1 y_t^E + a_2 (y_t - y_t^E) + u_{1t} + u_{2t} \\ &= (a_1 - a_2) y_t^E + a_2 y_t + u_{1t} + u_{2t} \end{aligned} \quad (\text{III.37})$$

Taking now account of the definition of y_t^E from (III.28) it gives:

$$c_t = (a_1 - a_2) B y_t + (a_1 - a_2) (1 - B) y_{t-1}^E + a_2 y_t + u_{1t} + u_{2t} \quad (\text{III.38})$$

The term $(a_1 - a_2) y_{t-1}^E$ is in accordance with (III.37) equal to

$$(a_1 - a_2) y_{t-1}^E = c_{t-1} - a_2 y_{t-1} - u_{1(t-1)} - u_{2(t-1)} \quad (\text{II.39})$$

Therefore, the relationship (III.38) can take the following form:

$$\begin{aligned} c_t &= \left[(a_1 - a_2) B + a_2 \right] y_t + (1 - B) c_{t-1} - (1 - B) a_2 y_{t-1} \\ &\quad + \left[u_{1t} + u_{2t} + (1 - B) (u_{1(t-1)} + u_{2(t-1)}) \right] \end{aligned} \quad (\text{III.40})$$

This is a testable form of consumption function with current and lagged income and lagged consumption as variables. The residuals of this relationship are also serially correlated, while its testing is possibly complicated insofar as there is strong correlation between y_{t-1} and c_{t-1} . An alternative method to compare the influence of the permanent and transitory components of income⁽³⁷⁾ is to take as a proxy of the former some estimate of the trend of income and its deviations from measured income as a proxy of the transitory income component. This can be done through estimation of a moving-averages of income or of a least squares estimate of the trend of income, particularly in case the trend departs from linearity. Thus, we have as an identity:

$$y_t = \hat{y}_t + (y_t - \hat{y}_t) \quad (\text{III.41})$$

where \hat{y}_t is the estimate of the trend derived as follows:

$$\hat{y}_t = A y_t \quad (\text{III.42})$$

Then we test a consumption function of the form:

$$c_t = a_0 + a_1 \hat{y}_t + a_2 (y_t - \hat{y}_t) + u_t \quad (\text{III.43})$$

Comparison will be made of a_1 and a_2 with the prerequisites of the permanent income hypothesis, namely that a_2 is zero and a_0 is insignificant, and computing the coefficient of separate determination of the two independent variables.

Cross-section testing of consumption and income per capita may also give under reasonable assumptions an estimate of the short-run marginal propensity

(37) For the suggestion of this method see Friend I. and Taubman P. (1966).

to consume on the basis of the relationship (III. 2)⁽³⁸⁾. This can offer some insight to possible inconsistency between cross-section and time series as in other countries, notably U.S.A. and U.K. It has to be pointed out that our purpose is not limited into finding out that somewhat similar inconsistency prevails in another country, Greece. We have in addition to provide a solid interpretation of the difference between the so-called short-run consumption function which derives from cross-section data and the long-run consumption function which may derive from time-series.

As it has been noticed already, we might succeed elimination of the influence of non-income factors and get the pure income effect from survey data through incorporation of other family characteristics if sufficient data were available. We should therefore expect after that elimination to get the net effect of the income variable which is commonly termed as the long-run marginal propensity to consume. This may however only roughly represent actual conditions, given that the eliminated influence of non-income factors in cross-section concerns distributional influences. On the other hand the possible shift of the short-run consumption function in time incorporates the trend-like effect of change in tastes whether it represents distributional changes, like urbanization or shifts in the occupational distribution, or community changes in tastes due to rising standards of living or availability of new products, etc. However, non-income factors in time-series including lagged income and/or consumption expenditure wipe out the regression coefficient of current income from the influence of change in overall tastes.

It is not, of course, ruled out that the main distributional characteristics of the population follow a trend-like change similar to that of the overall change in tastes. It is only under these circumstances that we can get corresponding values of short-run and long-run marginal consumption-income ratios from cross-section and from time series data. However this is not sufficient to provide a satisfactory interpretation of the consumption function.

(38) Had we available sufficient data for other than income variables, i.e. the factor z_i on the relationship (III. 5) we might get a consistent estimate of the long-run marginal consumption income ratio derived from time-series. See Crocket J. and Friend I. (1960), Suits D. (1962).

in terms of separating the changes in the distributional characteristics from the overall changes in tastes concerning the choice between consumption and saving. A crucial question is whether distributional characteristics bear massive changes in a developing country like Greece and whether these changes affect favourably the saving especially in the short-run. If this eventuality is not cleared up we may get the wrong impression that the increase in the saving-income ratio in a particular period of time is attributed to changes in tastes or other factors of longer-run nature.

Distributional and taste changes can be considered as factors affecting the stability of the saving function over time. This kind of stability is usually tested in terms of significance of the difference between the regression coefficients of testing in two consecutive periods of time, i.e. the pre-war and the post-war period. Data are not available in Greece for the pre-war period but the period 1949-1968 may be divided into two subperiods, namely the period of inflation and reconstruction from the war damages 1949-1955 and the period thereafter 1956-1968. It is recognized that the length of these two subperiods is not sufficiently long to draw conclusions about the stability of the saving function in Greece. It is therefore imperative not to rest on testing the significance of the difference of the regression coefficients of income and of the constant intercepts between these two sub-periods⁽³⁹⁾.

In addition, the estimates of each sub-period are going to be used for forecasting saving in the next sub-period. Three measures of the errors of forecast are going to be used for the judgment of the forecasting performance in a complementary fashion as follows. First, the average error of forecast in the other sub-period is going to be compared with the standard error of the estimate. Second, the average ratio of the forecasts to actual saving is going to be estimated and third the statistic U of Theil (1961) is used, which is defined as follows:

$$U = \frac{\sum [P_i - A_i]^2}{\sum P_i^2 + \sum A_i^2} \sqrt{2}$$

where P_i is the predicted value, A_i is the actual value and U takes values between zero (perfect forecasting performance) and unity (no forecasting performance).

(39) The significance of the difference of the regression coefficients of the two sub-periods in relation to the regression coefficient of the entire period 1949-1968 is going to be tested by the Chow's method which is also found in Johnston J. (1963), pp. 137-8.

These measures are going to be used for the goodness of fit outside the period of observation for the regression of each one sub-period and for the comparison between the results of the regressions in the forementioned two sub-periods. Differences in the forecasting performance between the regressions of the two sub-periods is going to be taken as an indication of instability of the saving function whether or not the parameter estimates of these regressions differ significantly. This treatment is imposed by the possibility that factors other than current income may have changed their influence on saving, though the regression coefficient of income may be held fairly stable.

The marginal propensity to save of the saving-income relationship from time series incorporates, of course, the influence of other factors, so that the comparison of this propensity between the two sub-periods may be considered sufficient rather than the above use of the forecasting performance. However, the latter is necessary to show how efficiently the regression coefficient of income and the intercept incorporate the non-income factors in the two sub-periods. So, the not equal representation of the non-income factors is interpreted as a factor of instability of the saving-income relationship in time series.

III. 4. The problem of obtaining unbiased estimates

One of the main problems of the statistical testing is to achieve unbiased and consistent estimates of the income and other factors of consumption and saving in Greece. For this purpose we use a linear form of stochastic relationship of saving with income and other factors, and apply the least-squares method at the first stage. As it is known, the least-squares estimators are unbiased and consistent insofar as first, the residuals (say u_i) are random variables with zero expectation

$$E(u_i) = 0 \quad (i=1,2,3,\dots,h) \quad (\text{III. 44})$$

second, the u_i 's have the same expected variance for all possible sets of values of the independent variables

$$E(u_i^2) = \sigma^2 \quad (\text{III. 45})$$

and third the u_i are pairwise uncorrelated or otherwise the mathematical expectation of the product of any two of them is zero:

$$E(u_t u_{t+s}) = 0 \quad (\text{III. 46})$$

for all t and for all $s \neq 0$.

If the last condition does not hold, we may obtain unbiased estimates of the parameters but at the same time a serious bias of their sampling variances by use of the least-squares method. This eventuality reduces the validity of the usual tests of significance and the predictive capacity of the estimated relationship⁽⁴⁰⁾.

If there is serial dependence of the disturbance term and this is not attributed to incorrect specification of the form of the relationship, we may attempt to remove that dependence. These attempts are based on the assumption that the form of the autoregressive structure of the disturbance term, is a first-order one,

$$u_t = \rho u_{t-1} + \epsilon_t \quad (\text{III. 41})$$

We can then estimate ρ by computing the least-squares regression as follows:

$$\hat{u}_t = \rho \hat{u}_{t-1} + \epsilon_t \quad (\text{III. 48})$$

The original series of the dependent and the independent variables are

(40) See Johnston J. (1963), p. 179.

then transformed by use of the estimated coefficient r into the form $(X_{it} - r X_{it-1})$ and simple least-squares are again applied to these transformed variables⁽⁴¹⁾. This procedure can go on the third round and so on, until a random set of residuals results. We then compute the standard errors and test the significance of the estimates from the so transformed data.

This method is, however, unable to remove the bias of the estimates when lagged consumption is added as a variable. For in that case the assumption of the independence between the disturbance term and the explanatory variables is violated. Presence of autocorrelated disturbances and of lagged variables highlights, according to Professor Johnston⁽⁴²⁾ one of the striking weaknesses of the current state of econometrics, in that the joint result of several complications cannot be inferred as the sum of their separate results.

We are going to make use of the so-called "three-pass least squares" method, which has been suggested by Professors Taylor and Wilson (1964) and is designed to remove bias due to serial correlation when lagged variables are included. Thus, suppose that we have the following relationship of stochastic nature (with variables measured as deviations from their means):

$$c_t = ac_{t-1} + by_t + u_t \quad (\text{III. 51})$$

By applying least-squares to this relationship we get a consistent estimate of the parameter b . If the residual term is serially correlated as in equation (III, 48), then the equation (III, 51) takes the following form:

$$c_t = ac_{t-1} + by_t + r\hat{u}_{t-1} + e_t \quad (\text{III. 52})$$

In the second pass the equation (III, 52) is estimated with $c_t - by_t$ as the dependent variable and c_{t-1} as an independent variable along with u_t lagged one period from the first pass. This gives a consistent estimate of a . This estimate of a and the earlier estimate of b from the first pass are subsequently used to obtain a consistent estimate of \hat{u}_t . This estimate is then lagged one period and is substituted for \hat{u}_{t-1} in equation (III, 52).

(41) Thus, substituting for u_t from (III, 48) to the relationship $c_t = c_0 + c_1 y_t + u_t$ we get: $c_t = c_0 + c_1 y_t + r\hat{u}_{t-1} + e_t$ (III, 49)

From the former relationship u_{t-1} is found to be equal to $u_{t-1} = c_{t-1} - c_0 - c_1 y_{t-1}$. Therefore, (III, 49) takes easily the following form:

$$c_t = c_0 + c_1 y_t + r c_{t-1} - r c_0 - r c_1 y_{t-1} + e_t$$

$$\text{or } c_t - r c_{t-1} = c_0(1-r) + c_1(y_t - r y_{t-1}) + e_t \quad (\text{III. 50}).$$

(42) Ibid., p. 216.

In the third pass the equation (III.52) is estimated through the ordinary least squares method.

In addition, we shall work with testing in terms of first differences of the original data⁽⁴³⁾. As it is known this is a common procedure in time series, which serves to reduce the serial correlation of the residuals and the degree of multicollinearity, which is attributed to intercorrelation between the independent variables. This method removes, of course, the movements of all the variables which are dominated by their common trend when we deal with actual values. On the other hand, when dealing with first differences we are primarily focusing on short-run or cyclical variations. Therefore, the regression coefficient of income is expected to be close to the value of the short-run marginal saving-income ratio, and to show largely the influence of the transitory component of income. Thus, the relationship of first differences, while serving other purposes, it does not provide sufficient information in the case of the saving function where long-run influences may greatly differ from short-term ones. This can be easily shown by assuming a linear stochastic saving-income relationship as follows:

$$c_t = c_0 + c_1 y_t + u_t \quad (\text{III.53})$$

Differentiating in time we get

$$\dot{c}_t = c_1 \dot{y}_t + \dot{u}_t \quad (\text{III.54})$$

The last relationship in terms of first differences is linear and proportional whether or not the relationship of original values is non-proportional. On the other hand, the equation (III.54) is easily transformed into

$$c_t = c_{t-1} + c_1 \dot{y}_t + \dot{u}_t \quad (\text{III.55})$$

If we substitute c_{t-1} from the equation (III.53) referred to the period $t-1$, we easily get back to the same relationship with current income as the only independent variable. This means that the relationship in first differences, though it contains lagged income, is not equivalent to the relationship that includes explicitly lagged income or other lagged independent variables. Therefore, the information obtained from the relationship in first differences concerns the change in the financial circumstances of the savers which may affect their consumption expenditure in the future. In addition, consumption expenditure is affected by the asset position and possibly debts in-

(43) For use of this method in prior empirical research on the consumption function in the United States see especially Ando A. and Modigliani F. (1963).

herited from the past and other factors of stock nature, which are removed in the transformation to first differences⁽⁴⁴⁾.

A special cause of getting biased and inconsistent estimates by application of the least squares is errors in variables. Thus, if the independent variable (s) is (are) measured without error while the dependent variable is subject to measurement errors, the latter are included in the disturbance term. On the other hand, we may assume that the observed values of both consumption and income, c_t and y_t , consist of their true values, say c_t^* and y_t^* respectively, and an error component as follows:

$$c_t = c_t^* + e_t \quad (III.56)$$

$$\text{and } y_t = y_t^* + v_t \quad (III.57)$$

Suppose now that the true values are connected by the relation

$$c_t^* = c_0 + c_1 y_t^* + u_t \quad (III.58)$$

Substituting the equations (III.56) and (III.57) into the equation (III.58), it gives:

$$c_t = c_0 + c_1 y_t - c_1 v_t + e_t + u_t = c_0 + c_1 y_t + w_t \quad (III.59)$$

$$\text{where } w_t = -c_1 v_t + e_t + u_t$$

It is obvious that the assumptions for the application of the least squares are not met since w_t is not independent of y_t . If we assume that c_t and y_t are measured as deviations from their means, in which case the constant term c_0 vanishes, then application of least squares to the equation (III.58) will give the following estimate of c_1 :

$$\hat{c}_1 = \frac{\sum c_t y_t^*}{\sum y_t^{*2}} \quad (III.60)$$

Lack of true data forces us to estimate c_1 from the equation (III.59) as follows:

$$\begin{aligned} \hat{c}_1 &= \frac{\sum c_t y_t}{\sum y_t^2} = \frac{\sum (c_t^* + e_t)(y_t^* + v_t)}{\sum (y_t^* + v_t)^2} \\ &= \frac{\sum c_t^* y_t^* + \sum y_t^* e_t + \sum c_t^* v_t + \sum e_t v_t}{\sum y_t^{*2} + 2 \sum y_t^* v_t + \sum v_t^2} \end{aligned} \quad (III.61)$$

Insofar as the errors e_t and v_t are distributed independently of one another and of the true values c_t^* and y_t^* , the last three terms of the numerator and the middle term of the denominator will tend to zero as the sample size

(44) Empirical studies sofar in U.S.A. tend to show that the effect of income change may interact partly with income expectations and partly with liquid assets and may be asymmetrical. See Ferber R. (1967).

increases indefinitely. Thus, the limiting value to which \hat{c}_1 tends in probability is

$$\text{plim } \hat{c}_1 = \frac{\hat{c}_1 \sum y_t^*{}^2}{\sum y_t^*{}^2 + \sum v_t^2} = \frac{\hat{c}_1}{1 + \frac{\sigma_v^2}{\sigma_y^2}} \quad (\text{III.62})$$

It shows that $\text{plim } \hat{c}_1$ is an underestimate of \hat{c}_1 even for very large sample size, and that the magnitude of this downward bias depends on the ratio of the variance of the error term to the variance of the true value of income.

As far as the budget survey data available, the use of grouped data eliminates much of the random variability in measurement errors and in true values. There still appears to be systematic downward bias in income data from household surveys, in so far as infrequent or irregular receipts tend to be forgotten or because of deliberate understatement of reported incomes, mainly other than wages and salaries. If the absolute understatement of income is constant over income classes, a correct estimate of the regression coefficient of income may be obtained using data grouped by income class, for the error term is then constant in a linear regression⁽⁴⁵⁾. Thus, if consumption expenditure is reported without error (i.e. we have $c_i = c_i^*$), and income only is subject to error (i.e. $y_i = y_i^* + v_i$), the regression coefficient of income, say c_1 , will be given as follows:

$$c_1 = \frac{\sum c_i y_i}{\sum y_i^2} = \frac{\sum c_i^* (y_i^* + v_i)}{\sum (y_i^* + v_i)^2} = \frac{\sum c_i^* y_i^* + \sum c_i^* v_i}{\sum y_i^*{}^2 + 2 \sum y_i^* v_i + \sum v_i^2} \quad (\text{III.63})$$

If v_i is stable, then it will have zero covariance with the true values of consumption and income and zero variance. Therefore the second term of the numerator and the second and third terms of the denominator vanish, so that we get an unbiased estimate of c_1 . However, under these assumptions, the constant intercept is upward biased, since it is given by the following formula:

$$c_0 = \bar{c} - c_1 \bar{y} = \bar{c}^* - c_1 \bar{y}^* - c_1 \bar{v} \quad (\text{III.64})$$

and $\bar{v} < 0$ because $v_i < 0$, in view of the assumption that income is under-reported. Insofar as reporting errors are disproportionately large in both the low and the high income brackets, the assumption of stable under-reporting consists of a rough approximation to reality.

We have reasons to suspect that the forementioned bias is relatively large especially when consumption is used in our case as the dependent variable over time.

(45) In a logarithmic (linear in logs) relationship, a constant percentage understatement would permit an unbiased estimate of the income elasticity.

Thus, we have in Greece, as in most less developed countries, independent estimates of saving rather than personal consumption expenditure. In that frame, personal saving is calculated from the investment account and personal consumption is residually estimated from personal disposable income. The consumption so computed, i.e. as income minus an independently estimated figure for saving, contains in effect the same measurement error with income. In that case the covariance between the error terms of consumption and of income may involve a bias of unknown magnitude in the regression coefficient of income \hat{c}_1 . In addition, by regressing consumption expenditure with income it is quite difficult to separate the errors of income and consumption from the transitory components of these variables, in the term $\sum e_t v_t$ in (III.61)(46). For these reasons saving will be used as dependent variable in time series. We do not make of course the assertion that the estimate of saving is fully independent from the estimate of income, in which case we should have $\sum h_t v_t = 0$ where h_t is the error of measurement of saving, i.e.

$$s_t = s_t^* + h_t \quad (III.65)$$

Supposing a stochastic relationship of the true values of the form

$$s_t^* = s_0 + s_1 y_t^* + u_t \quad (III.66)$$

and substituting the equation (III.57) for y_t , the equation (III.66) takes the following form:

$$s_t = s_0 + s_1 y_t + u_t + h_t - s_1 v_t \quad (III.67)$$

The estimate of s_1 is given by:

$$\hat{s}_1 = \frac{\sum s_t y_t}{\sum y_t^2} = \frac{\sum s_t^* y_t^* + \sum y_t^* h_t + \sum s_t^* v_t + \sum v_t h_t}{\sum y_t^{*2} + 2 \sum v_t y_t^* + \sum v_t^2} \quad (III.68)$$

Insofar as there is no correlation between the true values and the error terms, equation (III.68) takes the form: $\hat{s}_1 = \frac{\sum y_t^* s_t^* + \sum v_t h_t}{\sum y_t^{*2} + \sum v_t^2} = \frac{s_1 \sum y_t^{*2} + \sum v_t h_t}{\sum y_t^{*2} + \sum v_t^2} =$

$$= \frac{s_1 + \frac{\sum v_t h_t}{\sum y_t^{*2}}}{1 + \frac{\sum v_t^2}{\sum y_t^{*2}}} \quad (III.69)$$

Considering the ratio of the second terms of the numerator and the denominator of the equation (III.69) we find it to be equal to $\frac{\sum v_t h_t}{\sum v_t^2}$. This

(46) These difficulties are less serious in the case of cross-section data, insofar as income and consumption are there independently estimated and saving derives residually and not independently as in the case of savings surveys. For a discussion along these lines see Friedman M. (1968).

means that the bias in the estimate of s_1 depends on the covariance of the error terms of saving and income compared to the variance of the error of measurement of income. The latter is positive, which introduces a downward bias in the estimate of s_1 , while the sign and size of the former are unknown, which involves speculation about the kind and the magnitude of the bias in the estimate of s_1 .

In the attempt to remove the bias due to errors in variables we have to point out that the forementioned methods of transformed variables and of the three pass least squares may also be expected to contribute to that end⁽⁴⁷⁾. In addition the method of grouping of observations, as it was suggested by Wald, is going to be used for that purpose⁽⁴⁸⁾. This method suggests the grouping of the observations of all variables which are subject to error into as many subsets as there are parameters to be estimated. The subset averages for each variable replace the original observations, and a least squares equation is fitted. This first step yields an approximate estimate of the original parameters, which are further improved by successive iterations, utilizing the behaviour of the estimated residuals of the fitted equation. Insofar as we have two variables, namely saving and income, we observe that the Wald's method, assumes an even number of observations, $n=2m$, in our case 20, and start with the re-ordering in ascending magnitude of the independent variable income and estimating the subgroup means:

$$\bar{y}_1 = \frac{1}{m} \sum_{i=1}^m y_i, \quad \bar{y}_2 = \frac{1}{m} \sum_{m+1}^n y_i \quad (\text{III.70})$$

$$\bar{s}_1 = \frac{1}{m} \sum_{i=1}^m s_i, \quad \bar{s}_2 = \frac{1}{m} \sum_{m+1}^n s_i \quad (\text{III.71})$$

Wald's suggested estimates for the regression coefficient of income (say a_1) and for the constant intercept a_0 , are:

$$\text{est of } a_1 = \frac{\bar{s}_2 - \bar{s}_1}{\bar{y}_2 - \bar{y}_1} \quad (\text{III.72})$$

$$\text{est of } a_0 = \bar{s} - a_1 \bar{y} \quad (\text{III.73})$$

(47) This is due to that the disturbance term may also contain a component due to measurement error in the dependent variable. See Johnston J. (1963), p.178.

(48) It is usually suggested substitution of the explanatory variables subject to error with suitable estimates which may be derived from a separate least squares regression or through "extraneous methods". Resort to this kind of treatment is not permitted with our data, while the maximum likelihood method was avoided because we do not want to speculate on the value of the ratio of the variances of errors of variables saving and income. As it is known information of the size of that ratio is necessary for the use of the maximum likelihood method, which also assumes that the errors in variables have a normal distribution in the population. See Johnston J. (1963).

It has to be pointed out that the least-squares method may lead to biased estimates when one or more independent variables are related to the dependent variable by other simultaneous relations. In our case income may be not entirely pre-determined so that it is correlated with the residual term. To remove this source of bias in the regression coefficient of income we are going to make use of an instrumental variable which is not correlated with the residual term of the saving function⁽⁴⁹⁾. Such a variable is selected the difference between gross domestic investment expenditure (say x_t) and personal saving (s_t), i.e.⁽⁵⁰⁾.

$$o_t = x_t - s_t \tag{III.74}$$

Taking now the residual term of the equation (III.67) as γ_t and multiplying both sides of this equation by o_t , summing up and assuming that s_t , y_t and o_t are measured as deviations from their means, we easily get

$$s_1 = \frac{\sum s_t o_t}{\sum y_t o_t} \tag{III.75}$$

provided that $\sum \gamma_t o_t = 0$. The relationship (III.75) is expected to obtain an estimate of s_1 free from bias due to correlation of the income with the residual term. An identical estimate of s_1 can alternatively derive by the method of the reduced form equations⁽⁵¹⁾, on the assumption that the Harrodian model of income formation applies roughly in the case of Greece so that:

$$y_t = a_1 x_t + z_t = a_1 s_t + a_1 o_t + z_t \tag{III.76}$$

Putting now y_t from (III.76) to (III.67) and s_t from (III.67) to (III.76) we get the following relationships (with variables taken as deviations from means)

$$s_t = \frac{a_1 s_1}{1 - a_1 s_1} o_t + \left(\frac{1}{1 - a_1 s_1} \gamma_t + \frac{s_1}{1 - a_1 s_1} z_t \right) \tag{III.77}$$

$$y_t = \frac{a_1}{1 - a_1 s_1} o_t + \left(\frac{a_1}{1 - a_1 s_1} \gamma_t + \frac{1}{1 - a_1 s_1} z_t \right) \tag{III.78}$$

The equations (III.77) and (III.78) give respectively:

$$\frac{a_1 s_1}{1 - a_1 s_1} = \frac{\sum s_t o_t}{\sum o_t^2} \text{ and } \frac{a_1}{1 - a_1 s_1} = \frac{\sum y_t o_t}{\sum o_t^2} \tag{III.79}$$

Dividing the first over the second of the last two equations gets a value of s_1 identical to that of the relationship (III.75). It means that instead of direct use of the method of instrumental variables we can/

(49) See Johnston J. (1963), pp. 165-168.

(50) For the adoption of a similar assumption see Modigliani F. (1970).

(51) For the conditions of equivalence of the instrumental variables with the reduced form method see Johnston J. (1963).

get values for s_1 and e_1 by solving a system of two equations with regard to the s_t and y_t .

It is also observed that this attempt to remove errors due to the use of a single equation may also remove bias attributed to the errors in variables. In this way the parameter estimates may not be violated by intercorrelation between the independent variable and the error term. Nevertheless, we can make also in that case use of the forementioned Wald's method⁽⁵²⁾.

According to the forementioned second assumption (III.45), application of the least squares method requires some knowledge regarding the manner in which the variances of the disturbance term may differ, insofar as they do so. The simplest way is to replace the common disturbance term by one which asserts that the differing variances are merely different multiples of a constant variance by a multiplication factor. In so facing the problem of heteroscedasticity of the disturbance term empirical studies concerned with household saving or expenditure relationships in other countries usually assume that the variation in saving increases with increases in income. We may then either attribute different weights to the various sizes of the independent variable (weighted least-squares method)⁽⁵³⁾, or assume that the standard deviation of the residual is proportionate to income, i.e.

$$\sigma_t = h y_t \quad (\text{III.80})$$

It implies that the disturbance term variances in the relationship with original values are multiples of a constant variance where the multiplication factors are squares of the income values. Take now (III.67) in a simplified form as follows:

$$s_t = s_0 + s_1 y_t + \gamma_t \quad (\text{III.81})$$

and dividing both sides by y_t we get the following relationship:

$$\frac{s_t}{y_t} = s_0 \frac{1}{y_t} + s_1 + \frac{\gamma_t}{y_t} \quad (\text{III.82})$$

According to (III.80), the standard deviation, and hence the variance, of the error term in (III.82) will be constant. The estimates of the relationship of

(52) This method fails if the errors in the explanatory variables in the original model, and hence in the reduced form model, produce multicollinearity or a high degree of intercorrelation among the explanatory variables, in which case the method of extraneous information is suggested. See Fox, K. (1968), p. 440.

(53) See Johnston J. (1963).

the saving-income ratio in (III.82) can then be compared with those of the relationship with original values of saving and income (III.67). Thus, the constant intercept in (III.82) is comparable to the regression coefficient of income in (III.67), and the regression coefficient of the variable $1/y_t$ in (III.82) is an estimate of the constant intercept in (III.67). We can further make the same kind of transformation of original values to ratios to income after incorporation of last year's consumption as a variable in accordance with (III.25):

$$s_t = s_0 + s_1 y_t + s_2 c_{t-1} + u_t \quad (\text{III.83})$$

Division now of both sides of the last relationship by y_t gets the following relationship:

$$\left(\frac{s}{y}\right)_t = s_0 \frac{1}{y_t} + s_1 + s_2 \frac{c_{t-1}}{y_t} + \frac{u_t}{y_t} \quad (\text{III.84})$$

The relationship (III.84) gets also residuals with constant variance and estimates which are comparable with those derived from (III.83). The constant variance of the disturbance term in (III.82) and (III.84) makes the estimates of these relationships especially useful for prediction purposes. It is reminded that the problem of prediction of saving is related to the stability of the saving-income relationship, which does not get a unique definition by empirical researchers. For our purposes the definition of stability of the saving-income relationship includes the explained part of the variance, the size of the parameters and the standard errors of their estimates which determine their confidence intervals. The stability of the parameter estimate of income can be further tested in time series where sufficient number of observations is available by assuming alternatively that s_0 and s_1 are linear functions of variables other than income (z_t)

$$s_1 = f(z_t) = b_0 + b_1 z_t \quad (\text{III.85})$$

$$s_0 = \phi(z_t) = q_0 + q_1 z_t \quad (\text{III.86})$$

Substituting for s_1 and s_0 in (III.81) we get the following relationships respectively:

$$s_t = s_0 + b_0 y_t + b_1 y_t z_t + \gamma_t \quad (\text{III.87})$$

$$\text{and } s_t = q_0 + q_1 z_t + s_1 y_t + \gamma_t \quad (\text{III.88})$$

Insofar as the results of these last two relationships are worse than those of the relationship (III.81) then we have to conclude that there are not sufficient indications that the parameter estimates s_0 and s_1 are greatly unstable.

Furtheron, (III.87) and (III.88) can also be estimated by expressing them in ratios to income to secure a constant variance of the disturbance term and compare them with the results of the relationship (III.82). These testings cannot lead, however, to solid conclusions in view of the forementioned intercorrelation of income and other factors of saving and the uncertainty about the stability of this intercorrelation in the future.

The choice between alternative tests of linear relationship is first made in terms of the explained proportion of variance namely the coefficient of multiple determination, and of the significance of the regression coefficients. That significance is tested through comparison of the ratio of the regression coefficients to their standard errors with the $t_{k,a}$ value of the Student's distribution, since the size of our sample consists of less than 30 observations⁽⁵⁴⁾. Insignificant regression coefficient(s) lead(s) to rejection of the relationship whether or not the coefficient of multiple determination is significant⁽⁵⁵⁾.

The significance of the coefficient of multiple determination is tested in the form of the null hypothesis and by comparison with the $F_{v_1, v_2, \alpha}$ ratio of the Snedecor. Strictly speaking, the coefficients of multiple determination are comparable between two regressions only if the latter have the same number of variables and the same mathematical form of relationship. If the number of parameters equals the number of observations the coefficient of multiple determination equals to unit and loses its practical importance. If the number of parameters is smaller than the number of observations the coefficient of multiple determination tends to be overstated and may be corrected for the degrees of freedom.

It has been pointed out that high values of \bar{R}^2 may give little information as to the validity of the theory of consumption⁽⁵⁶⁾. Since the marginal propensity to consume always exceeds .5 it has been maintained by Ferber that

(54) The Student's t is taken as $t_{k,a}$ where k is the degrees of freedom $(n-p-1)$ and a , the level of significance.

(55) If all the regression coefficients are insignificant, the coefficient of multiple determination is unlikely to be too high.

(56) See Duesenberry J. (1949), Ferber R. (1953), Suits D. (1962).

the discriminatory value of the coefficient of determination may be increased by the use of saving as the dependent variable. The significance of the divergence between two comparable coefficients of determination is tested by transformation of the corresponding correlation coefficients by the Sir Ronald Fisher method⁽⁵⁷⁾. In cases we have to make comparison of the goodness of fit with not exactly the same dependent variable, i.e. saving in per capita v.s saving in aggregate terms, the fit has to be translated into the same dependent variable. For this purpose use is made of the standard error of estimate, which consists of the estimated standard deviation of the dependent variable when the explanatory variables are held constant. The standard error of estimate of the relationship in aggregate terms is divided by population to become comparable with the standard error of estimate in per capita terms.

If data were available for the prewar period we would carry out separate statistical testing of the saving function for that period and compare the forecasts from this function with actual post-war saving. The goodness of fit within the period of observation 1949-1968 is not examined solely in terms of the significance of the coefficient of determination in so far as it has as a rule high values and is held fairly stable in alternative testings. The graphical presentation of the residuals helps also in part the investigation of the problem of goodness of fit, besides other purposes, i.e. the serial correlation of the disturbance term.

As an additional measure of the goodness of fit used is the accuracy of the predictions and the forecasting performance of the estimated relationships in the year 1969 for which data have been published⁽⁵⁸⁾. The forecasting performance is so investigated not by use of past values and the trend but in terms of assessment of the structural relationship. We therefore make alternative forecasts by use of the parameter estimates derived by the application of different econometric methods. These are point forecasts based on the assumption of stability of the estimates of the structural relationship in time and calculated as follows:

$$\hat{s}_{t+1} = s_0 + s_1 y_{t+1} = \bar{s} + s_1 (y_{t+1} - \bar{y})$$

(57) See e.g. Mills F.C. (1955), pp.303-9.

(58) See National Accounts of Greece, 1960-1969, No 20, Athens 1971.

The ratio of the forecast over the actual value of saving and the ratio of the error of forecast to the standard error of estimate are also going to be used here, besides the Theil's statistic U.

The goodness of fit of the two definitions of saving is going to be compared in terms of standard errors of estimate. This criterion is of course subject to the objection that if income is arbitrarily divided into two parts and each of them is regressed with income, one can make the standard error of the one regression as small as he likes by making one of the two parts sufficiently small. This kind of objection loses however ground in our case since the choice between the two alternative definitions of saving is based on theoretical considerations with regard to the way households treat consumer durable goods. As it has been pointed out already⁽⁵⁹⁾ if:

$$s.e. s_2.y \geq s.e. s_1.y$$

the following condition will also be true:

$$s.e. c_1.y \geq s.e. c_2.y$$

where s.e. stands for the standard error of estimate, s_1 and s_2 are saving excluding and including expenditure on consumer durables and $c_1 = y - s_1$ and $c_2 = y - s_2$, with $y = s_1 + c_1 = s_2 + c_2$.

The saving concept which obtains comparatively low standard error of estimate is supposed to give a more 'stable' saving function than the alternative concept. The term stability is used here for the goodness of fit with two different definitions of the dependent variable rather than for assessing the regression results with the same dependent variable over time as in the last section. The above inequalities imply that the greater is the stability of s_2 vs. s_1 the greater is the stability of c_2 vs. c_1 and vice versa.

In view of the problems of scale implicit in the standard error of estimate, we consider now another alternative test of the stability of the saving function defined as above. This consists of regressing separately, s_1 , $d (= s_2 - s_1)$ and c_2 on y and then correlating between the residuals of s_1 on y and of d on y and between the residuals of d on y and c_2 on y and comparing the results. We do not need however to carry out the relevant computations, since this alternative testing seems equivalent to the above comparison of the standard errors with the

(59) See Friend I. and Jones R. (1960 a).

simple linear model used. Thus, if u_1 , u_2 , and u_3 are the residuals of s_1 , d and c_2 on y respectively, then it is reasonable to expect:

$$b_{u_1 u_2} = b_{s_1 d}$$

$$\text{and } b_{u_3 u_2} = b_{c_2 d}$$

With given y , a unit, say, increase in d will result in the same sum of decreases in s_1 (by $b_{s_1 d}$) and in c_2 (by $b_{c_2 d}$). If therefore $b_{s_1 d} > b_{c_2 d}$ (or $b_{u_1 u_2} > b_{u_3 u_2}$), it is easy to prove that

$$b_{s_1 d} < -\frac{1}{2}$$

This condition will be true if and only if

$$s.e.s_2 y < s.e.s_1 y$$

Therefore the comparison of the standard errors of estimate gives a simple test of the stability of the personal saving as a linear function of income and of the relative substitutability of durables with ordinarily defined saving vs. expenditure on non-durables and services.

Given that c_2 is large relative to s_1 there is reason to expect that the comparison of $b_{s_1 d}$ and $b_{c_2 d}$ is biased in favour of $b_{c_2 d}$. This creates difficulties in the case we find $b_{c_2 d} > b_{s_1 d}$ or $b_{s_1 d} > -\frac{1}{2}$, when we will have $s.e.s_2 y > s.e.s_1 y$. In other words, if the latter inequality is shown by the results, it will imply the former inequalities subject to a bias in favour of $b_{c_2 y}$. To face this bias of scale which is implicit in the standard error of estimate we are going to divide it by the average saving in the period 1949-1968 as happens usually in the case of standard deviation, to derive the coefficient of variation. Similar division of the standard error of estimate is also made by the standard deviation to show the relative variation of the non-explained part of the variance in comparison with the total variance of personal saving.

APPENDIX III

Limitations of the Values of the Parameters.

Specification of the limiting values of the coefficients of the saving function is necessary before getting into statistical testing for the appropriate interpretation of the obtained results. It has to be reminded that the absolute income hypothesis in its original form and further elaborations have assumed that the sum of the partial marginal propensities to consume from income is less than unity⁽⁶⁰⁾.

The value of B either in equation (III.22) or in equation (III.27) is subject to the following condition:

$$0 < B < 1 \quad (III.89)$$

On the other hand, substitution of y_t^e for the weighted sum of current and lagged income from (III.27) to (III.26) gets the following form

$$c_t = a_1 B \sum_{r=0}^{\infty} (1-B)^r y_{t-r} \quad (III.90)$$

The same exactly form alternatively derives from (III.25) by substitution of c_{t-r} for all r 's on the basis of (III.23). If in addition to the past stream of income there are other factors which affect consumption, they may be identified into two kinds, i.e. those which fix the subsistence consumption and those which are related to change in tastes about the distribution of resources between consumption and saving. The first source of influence is assumed to be constant for all time periods say (a_0) and the second can exert a systematic influence through time, which is supposed to be included in the residual term u_t . Therefore, the relationship (III.90) can take the following form:

$$c_t = a_0 + a_1 B \sum_{r=0}^{\infty} (1-B)^r y_{t-r} + u_t \quad (III.91)$$

where u_t is assumed to incorporate taste effects, in so far as they are not of a trend-like fashion and are not absorbed by income and any irregular influences.

Provided that the notion of subsistence does not change except in very long periods of time and that we can identify sufficiently the influence of the taste factor, the only condition regarding the value of a_0 will be

$$a_0 > 0 \quad (III.92)$$

(60) See Hicks J.R. (1954), p.172, Keynes J.M. (1935), p.97.

The value of the product $a_1 B \sum (1-B)^r$ in (III.91) consists of the sum of the partial marginal propensities to consume from income. The term $(1-B)$ consists of the common ratio of a geometric progression the sum of which is given by

$$\frac{a_1 B [1 - (1-B)^r]}{1 - (1-B)} = \frac{a_1 B [1 - (1-B)^r]}{B} = a_1 - a_1 (1-B)^r \quad (\text{III.93})$$

It is obvious given (III.89) that as $r \rightarrow \infty$ the value of the sum of the above geometric progression has a limit = a_1 . Also the sum of the parameters of income and lagged consumption in (III.25) equals to

$$a_1 B + (1-B) = 1 + B (a_1 - 1) \leq 1 \quad (\text{III.94})$$

depending on whether $a_1 \leq 1$ (III.95)

In addition, the relationship (III.25) can take the form of a difference equation

$$c_t - (1-B) c_{t-1} = a_0 B + a_1 B y_t \quad (\text{III.96})$$

If the value of y_t is held constant, this difference equation has the solution

$$\begin{aligned} c_t &= \frac{a_0 B + a_1 B y_t}{1 - (1-B)} + c_0 (1-B)^t = \frac{a_0 B + a_1 B y_t}{B} + c_0 (1-B)^t = \\ &= a_0 + a_1 y_t + c_0 (1-B)^t \end{aligned} \quad (\text{III.97})$$

The sum $a_0 + a_1 y_t$ is the equilibrium value attained by c_t for given value of y_t and the marginal propensity to consume in this equilibrium is a_1 . The exponential term $(1-B)^t$ indicates that ceteris paribus, the deviation of c_t from its equilibrium level approaches zero at a rapid exponential rate.

It appears therefore that with B taking values between zero and unity, the sum of the marginal propensities to consume from income (III.93), (III.94) will be less than unity. It means that in equilibrium saving will be positive rather than zero. Positive saving implies increase in wealth, as a result of which consumption is going to be increasing if it is positively associated with wealth. On the basis of this supposed wealth-consumption relationship, it has been maintained that the sum of the parameters of current and past incomes and of current and lagged consumption will be equal to unity rather than less than unity⁽⁶¹⁾. This critical question depends on the form and the stability of the

(61) See Spiro A. (1962), Ball R.J. and Drake P. (1964). The latter have proved the condition of the equality to unity of the sum of the parameters of income and lagged consumption through the identity $y_t = c_t + s_t = c_t + w_t - w_{t-1}$ and by assuming a behavioural relationship between c_t and w_t as $w_t = k c_t$. Substitution for w_t and w_{t-1} in the above identity gives $c_t = \frac{1}{1+k} y_t + \frac{k}{1+k} c_{t-1}$.

relationship of consumption and wealth in a given place. Suppose so that wealth has a proportional relationship with last year's consumption, i.e.:

$$w_t = k c_{t-1} \quad (\text{III.98})$$

If the sum of the parameter estimates of current income equals to unit, we can get an estimate of k through the relationship (5) of Ball and Drake (p.67). If that sum is less than unit we can substitute for c_{t-1} in (III.25) and get the following relationship:

$$c_t = a_0 B + a_1 B y_t + \frac{1-B}{k} w_t \quad (\text{III.99})$$

$$\text{or } s_t = -a_0 B + (1-a_1 B) y_t - \frac{1-B}{k} w_t \quad (\text{III.100})$$

The last relationship⁽⁶²⁾ can be presented in a more simplified form as follows:

$$s_t = A_0 + A_1 y_t + A_2 w_t \quad (\text{III.101})$$

Differentiation of this relationship in time and defining $\dot{w}_t = s_t$, it gets the following formula:

$$s_t = \frac{A_1}{1-A_2} \dot{y}_t + \frac{1}{1-A_2} s_{t-1} \quad (\text{III.102})$$

Testing this relationship⁽⁶³⁾ is possible by available statistical data in Greece and is going to be helpful in considering the question of a constant relationship between the flow of consumption and the stock of wealth in that country⁽⁶⁴⁾. In addition, it will show the sign of the relationship between the flow of saving and wealth which is going to be useful in the interpretation of the results of our statistical testing on the basis of the discussion in chapter II. Estimation of the exact size of dependence of the flow of personal saving on the stock of

(62) It is recalled here that the incorporation of 'wealth' as an independent variable of consumption and saving has been maintained that provides an alternative interpretation to the possible constancy of the aggregate propensity to save over time, See Tobin James (1951) and to the cyclical variation of saving See Ackley Gardner (1951). The above treatment is consistent with the net worth concept which is most relevant to saving decisions. See e.g. Tobin James (1952)

(63) The similar form of relationship was recently elaborated by Houthakker H.S. and Taylor L.D. (1966) and applied by them in group and total personal consumption expenditure in the United States and Canada. As Houthakker and Taylor notice (p. 183), direct testing of the saving function implies a zero depreciation rate of wealth and indeterminacy of the value of the intercept a_0 in (III.100).

(64) Thus, since $A_2 = \frac{1-B}{k}$ we may apply the estimate of form (III.25) to get an estimate of k . In fact we have to incorporate from the results of the testing of the relationship (III.25) the value of either a_1 or B in order to find the estimate of the other and of k since the relationship (III.100) is underidentified.

wealth from the relationship (III.102) is of course difficult, in view of the possibility of downward bias of the regression coefficient of lagged saving. Investigation of this possibility will take place through application of the three-pass least squares method.

It is now useful to point out that the assumption adopted in the derivation of the long-run marginal consumption income ratio in (III.21) or (III.25) that $c_t = c_{t-1}$ is better substituted by the assumption of steady linear growth, defined as the development in which the derivatives of c_t , y_t and c_{t-1} remain constant over time. Differentiation so of (III.25) in time gives:

$$\dot{c}_t = a_1 B \dot{y}_t + (1-B) \dot{c}_{t-1} \quad (\text{III.103})$$

Since \dot{c}_t is assumed to be equal to \dot{c}_{t-1} , simple transformation of (III.103) gets:

$$\dot{c}_t = a_1 \dot{y}_t \quad (\text{III.104})$$

Thus, we have $\dot{c}_t/\dot{y}_t = a_1$ which implies that the marginal propensity to consume in case of steady (linear) growth of income is the same as for long-run equilibrium of consumption and income. If we now differentiate alternatively (III.101) we have to assume that the growth rate of personal saving is zero (i.e. $\dot{s}_t = 0$) since the growth rate of wealth is taken constant. Therefore we have the following relationship:

$$A_1 \dot{y}_t + A_2 \dot{w}_t = 0 \quad (\text{III.105})$$

Given by definition that $\dot{w}_t = s_t$, the last relationship can take the form:

$$s_t = -\frac{A_1}{A_2} \dot{y}_t \quad (\text{III.106})$$

This relationship implies that in case of steady linear growth of income, personal saving is proportional to the absolute rate of growth of income. Dividing further both sides of (III.106) by \dot{y}_t gives the saving-income ratio to be proportionately related to the percentage rate of growth of income:

$$\frac{s_t}{\dot{y}_t} = -\frac{A_1}{A_2} \frac{\dot{y}_t}{\dot{y}_t} \quad (\text{III.107})$$

Since by assumption $A_1 > 0$ and $A_2 < 0$, it follows that the constant of proportionality is positive. If it is further assumed that

$$\dot{y}_t = g y_t \quad (\text{III.108})$$

then it is easy to show that s and w will ultimately grow at the same rate g .

It also follows that:

$$s_t = \frac{A_1 g y_t}{g - A_2} \quad (\text{III.109})$$

Division of both sides of (III.109) by y_t gets:

$$\frac{s_t}{y_t} = \frac{A_1 g}{g - A_2} \quad (\text{III.110})$$

This relationship of the saving-income ratio with the rate of income growth has derived on the assumption of exponential growth in per capita income provided that the structural equation (III.101) is made homogeneous by putting $A_0 = 0$ ⁽⁶⁵⁾. Comparison of (III.110) with (III.107) shows that although the steady growth saving-income ratio is proportional to the rate of growth of income in both cases, the proportionality factor is not the same. In (III.107) this factor is independent of the growth rate, but in (III.110) it is not.

Alternative use of aggregate rather than per capita data in testing (III.102) by adoption of the same definition of wealth, namely to exclude real capital gains or losses and comparison of the results by use of aggregate and per capita data is going to show whether population growth exerts a significant influence on the long-run saving-income ratio in Greece⁽⁶⁶⁾. It has to be pointed out that most of the modern hypotheses of saving result in the same outcome of a relationship of the aggregate saving-income ratio with the rate of growth of income⁽⁶⁷⁾. This has important implications in a number of directions. More particularly it suggests that the saving-income ratio is related in a cause and effect fashion with the rate of income growth which may be indicative of the role of saving in the

(65) See Houthakker H.S. and Taylor L.D. (1966), p.184.

(66) Further comparison of these results is also possible with a corresponding formula of the long-run saving-income ratio which was derived from a similar to (III.101) function by adoption of the assumptions of the life-cycle hypothesis of saving, namely $\frac{s_t}{y_t} = \frac{A_1 p}{A_2 + p}$ where, p = the sum of the rates of growth of population (n) and of per capita income (g). See Ando A. and Modigliani F. (1963).

(67) See Stone J.R.N., and Rowe D.A. (1962), Ball R.J. and Drake P. S. (1964), Modigliani F., and Brumberg R. (1954), Duesenberry J.S. (1949), Friedman M. (1957).

persistence of the vicious circle of poverty and in getting into a stage of self-sustaining growth in less developed countries (68).

The possible comparatively high cross-section variation of the saving-income ratio can also accommodate with the time series relationship of this ratio and the rate of income growth. Thus households with high rates of income growth predominate in the upper income groups. This provides an alternative to the absolute income hypothesis interpretation of the tendency of the saving-income ratio in cross-section to rise as a result of differential rates of income growth. In part, this tendency may be also explained in terms of differential wealth-consumption ratios which may be correlated with income in cross-section. This correlation may be due to age, inheritance and to the variability of income in some combination. The variability of income may be also such that the measured income of people in upper income groups lies above their normal or permanent income and so their saving ratio is comparatively high, in accordance with the permanent income hypothesis of saving.

We might get further into the question of applicability of alternative hypotheses if we had breakdown of saving and income data by wealth holdings, age, current and past variation of income, etc. With lack of data of this kind, the only possibility is to carry out an investigation of other factors of social, cultural and demographic nature largely in qualitative terms. In addition, we refer to the concept of the income elasticity of personal consumption and saving in the interpretation of the statistical results. It is that the income elasticity of saving depends on the form of the saving-income relationship and the value of the coefficient of income. The latter depends on the period of observation and the presence of other independent variables besides income. By definition, as equal to the ratio of the marginal over the average propensity to save, the income elasticity of saving is equal to unity or exceeds unity depending on whether the saving-income relationship is proportional or not. This may be presented on the basis of the relationship (III.81) in formal terms as follows:

$$e_{s,y} \gg 1 \text{ depending on whether } s_0 \ll 0 \quad (\text{III.111})$$

If $e_{s,y} \gg 1$ and $s_0 \ll 0$, namely the saving-income relationship is linear, then it follows that $e_{s,y}$ will tend to unit as income rises to infinity, namely it will be

(68) See especially in Ball and Drake op.cit.

a decreasing function of income. It has also been discussed that the income elasticity of saving is negatively affected and the income elasticity of consumption expenditure is positively affected by the length of the period of observation. Thus, the income elasticity of saving from budget studies is higher than the corresponding one derived from time series data of saving and income of the same year. If the saving function from time series includes lagged variables and has linear form, we can use both the short-run and the derived long-run marginal saving-income ratios to get corresponding income elasticities of saving. From the relationship (III.25) we obtain short-run and long-run marginal propensities to save $(1-a_1B)$ and $(1-a_1)$ respectively. The corresponding income elasticities are

$$e_{ys,t} = \frac{(1-a_1B)y_t}{s_t} \quad \text{and} \quad \bar{e}_{ys,t} = \frac{(1-a_1B)\bar{y}}{\bar{s}} \quad (\text{III.112})$$

$$e_{yl,t} = \frac{(1-a_1)y_t}{s_t} \quad \text{and} \quad \bar{e}_{yl,t} = \frac{(1-a_1)\bar{y}}{\bar{s}} \quad (\text{III.113})$$

where $e_{ys,t}$ and $e_{yl,t}$ are the short-run and long-run income elasticities of saving and the bar indicates here average magnitudes.

It is clear that given the condition (III.89) there must be

$$e_{ys,t} > e_{yl,t} \quad \text{and} \quad \bar{e}_{ys,t} > \bar{e}_{yl,t} \quad (\text{III.114})$$

Higher income elasticity of saving and lower income elasticity of consumption expenditure in the short-run than in the long-run can be attributed to higher variability of income⁽⁶⁹⁾; higher contribution of transitory income in the short-run than in the long-run⁽⁷⁰⁾, or to social and cultural conditions' change in the long-run.

As has been shown by Professor Friedman (1957), there is a clearcut relationship between the contribution of the transitory component of income and the divergence of the parameter of the observed and of the permanent income. This relationship is given as follows:

$$c_1 = a_1 P_y \quad (0 \leq P_y \leq 1) \quad (\text{III.115})$$

where, c_1 and a_1 are the parameters of the observed and of permanent income respectively and P_y is the ratio of the variance of permanent income to the variance of measured income.

(69) See Ball R.J. and Drake P.S. (1964), pp. 71-2.

(70) See Friedman M. (1957), pp. 125-129.

There is now a relationship between P_y and the income elasticity of consumption which is given as follows:

$$e_{c,y,t} = \frac{dc_t}{dy_t} \frac{y_t}{c_t} = c_1 \frac{y_t}{c_t} = a_1 P_y \frac{y_t}{c_t} \quad (\text{III.116})$$

If the mean transitory components of both income and consumption are equal to zero, so that $\bar{y}_t = \bar{y}_t^e$ and $\bar{c}_t = \bar{c}_t^e$, then the income elasticity computed at the point corresponding to the sample mean will be equal to P_y :

$$\bar{e}_{c,y} = P_y \quad (\text{III.117})$$

This is based on the relationship (III.26) which gets $\bar{c}_t = a_1 \bar{y}_t^e = a_1 \bar{y}_t$ or $\bar{y}_t/\bar{c}_t = 1/a_1$ and the form of $\bar{e}_{c,y} = a_1 P_y \bar{y}_t/\bar{c}_t$, if \bar{y}_t/\bar{c}_t is substituted for $1/a_1$.

If we get the estimate of c_1 from cross-section data and of a_1 from time series data we can derive an estimate of the P_y . (Alternatively if we put $c_1 = a_1 B$ from the relationship (III.32) then according to the relationship (III.115) we get $P_y = B$). Comparison can also be made with an estimate of P_y through the formula of the permanent income and an assumption about the auto-correlation structure of the income series. Thus, the relationship (III.28) by transformation to variance form gives:

$$\text{var}(y_t^e) = B^2 \text{var}(y_t) + (1-B)^2 \text{var}(y_{t-1}^e) + 2B(1-B) \text{cov}(y_t, y_{t-1}^e) \quad (\text{III.118})$$

Putting now $\text{var}(y_{t-1}^e) = \text{var}(y_t^e)$ and dividing both sides of (III.118) by $\text{var}(y_t)$ it gets:

$$\frac{\text{var}(y_t^e)}{\text{var}(y_t)} = B^2 + (1-B)^2 \frac{\text{var}(y_t^e)}{\text{var}(y_t)} + 2B(1-B) \frac{\text{cov}(y_t, y_{t-1}^e)}{\text{var}(y_t)}$$

$$\text{or } P_y = B^2 + (1-B)^2 P_y + 2B(1-B) \frac{\text{cov}(y_t, y_{t-1}^e)}{\text{var}(y_t)} \quad (\text{III.119})$$

given the definition of P_y . The $\text{cov}(y_t, y_{t-1}^e)$ can be further transformed given that from (III.28) $y_{t-1}^e = B y_{t-1} + (1-B) y_{t-2}^e$ into:

$$\begin{aligned} \text{cov}(y_t, y_{t-1}^e) &= \text{cov}\left[y_t (B y_{t-1} + (1-B) y_{t-2}^e)\right] \\ &= \text{cov}\left[y_t y_{t-1} B + B(1-B) y_t y_{t-2} + (1-B)^2 y_t y_{t-3} + \dots\right] \\ &= B \left[\text{cov}(y_t y_{t-1}) + (1-B) \text{cov}(y_t y_{t-2}) + (1-B)^2 \text{cov}(y_t y_{t-3}) + \dots \right] \end{aligned}$$

If we now assume that $h y_t = y_{t-1}$ so that $h = \frac{\text{cov}(y_t, y_{t-1})}{\text{var}(y_t)}$ we have

$$\text{cov}(y_t, y_{t-1}^e) = B \left[h \text{var}(y_t) + (1-B) h^2 \text{var}(y_t) + (1-B)^2 h^3 \text{var}(y_t) + \dots \right]$$

Dividing both sides by $\text{var}(y_t)$ the last relationship gives

$$\frac{\text{cov}(y_t, y_{t-1}^e)}{\text{var}(y_t)} = B \cdot h + (1-B)h^2 + (1-B)^2 h^3 + \dots = \frac{Bh}{1-(1-B)h}$$

provided that $(1-B)h < 1$.

After this transformation the relationship (III.119) can get the following form:

$$P_y \cdot 1 - (1-B)^2 = B^2 + \frac{2B^2(1-B)h}{1-(1-B)h} = B^2 \cdot 1 + \frac{2(1-B)h}{1-(1-B)h} = B^2 \frac{1+(1-B)h}{1-(1-B)h}$$

or
$$P_y = \frac{B^2}{1-(1-B)^2} \frac{1+(1-B)h}{1-(1-B)h} = \frac{B}{1+(1-B)} \frac{1+(1-B)h}{1-(1-B)h} \quad (\text{III.120})$$

with $P_y \rightarrow 1$ when $B \rightarrow 1$.

It is obvious from the last relationship that P_y can derive on the basis of the values of B and h . Thus, the relationship (III.120) enables estimation of P_y solely with time series data and with the two definitions of consumption and saving. The alternative estimation of P_y by the relationships (III.115) and (III.120) is going to give the opportunity of further improvement of our knowledge on the question of the contribution of the short-run oscillations of income and its transient component to the observed increase in the saving-income ratio in Greece.

CHAPTER IV
GROWTH OF SAVING IN POSTWAR GREECE

IV. 1. Growth of Domestic and Foreign Saving 1948-1968.

Greece has been no exception to the rule of an acute problem of supply of saving in the early stages of its development. This problem was particularly serious in the period between the two World Wars, when there were present certain special favourable factors to fixed investment expenditure. Economic policy was not effective at the time to expand personal and business saving. Thus, in view of the scarcity of saving and to avoid waste of resources, there was administrative blocking of entry in most industries. This was, in effect, a disincentive of saving and directed in addition its available supply largely toward gold hoarding, luxury real estate and forms other than investing to improve efficiency and to expand⁽¹⁾. The pulling up of the interest rates was under these conditions a poor incentive to save, especially given the inflation of that period which eroded rapidly the 'value of money' and left hardly a positive real rate of return from personal savings. Taxation was far behind the heavy government expenditure, which during that period was financed to a great extent by issue of new money and by foreign borrowing. Foreign business investment was virtually non-existent and capital inflow was very low due, among other things, to the often devaluations of the drachma in that period.

The end of the World War II was followed in Greece by a period of domestic turbulence which was settled down by the end of the year 1948. Delayed from the war consumption reduced the limits of domestic saving, so that the capital requirements to reconstruct fixed equipment from the damages of the war were satisfied by over six-tenths in the period 1949-1952 by capital inflow (table IV.1.1 A, column/4/). Most of this capital inflow⁽²⁾ consisted of grants to the Greek government in the form of aid mainly of U.S.A. through the Marshall and Truman Plans. This capital inflow exceeded the 10 per cent of Gross National Product during the period 1949-1952 compared with gross domestic

(1) See Coutsoumaris G. (1963), Ellis H. et.al. (1964).

(2) Capital inflow is here defined to include foreign saving, namely the deficit in the balance of goods and services, of the balance of payments excluding those transfers from the rest of the World which are characterized as current.

Table IV. 1.1.

Aggregate Domestic and Foreign SavingA: Ratios to total and to income (%)

	<u>Investment -</u>		<u>Gross Domestic</u>		<u>Gross National Product = 100</u>		
	<u>Income Ratio(a)</u>		<u>Investment = 100</u>				
	<u>Domestic</u>	<u>Fixed</u>	<u>Domestic</u>	<u>Foreign</u>	<u>Domestic</u>	<u>Foreign</u>	<u>Current</u>
	<u>Investm.</u>	<u>Investm.</u>	<u>Saving</u>	<u>Saving</u>	<u>Saving</u>	<u>Saving</u>	<u>Balance(b)</u>
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>
1949-1952	17.3	13.8	39.2	60.8	6.8	10.5	11.1
1953-1956	14.8	13.3	83.8	16.2	12.4	2.4	4.7
1957-1960	17.6	16.7	86.6	13.4	15.2	2.4	5.2
1961-1964	22.2	19.5	88.6	11.4	19.7	2.5	5.3
1965-1968	23.2	21.9	85.6	14.4	19.9	3.3	6.5
1949-1968	19.0	17.0	76.7	23.3	14.8	4.2	6.6

B: Absolute amounts and rates of change (%)

	<u>Gross Domestic Saving</u>		<u>Capital Inflow</u>		<u>Price</u>
	<u>(th.mil.drs)</u>	<u>Change(c)</u>	<u>(th.mil.drs)</u>	<u>Change(c)</u>	<u>Level(d)</u>
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
1949-1952	2.31	-	3.62	-	58.9
1953-1956	8.64	68.5	1.55	-14.3	86.5
1957-1960	15.00	18.4	2.29	11.9	101.0
1961-1964	26.84	19.7	3.61	14.4	107.7
1965-1968	40.73	12.9	6.41	19.4	118.2

(a) Gross domestic investment and gross fixed domestic investment over Gross National Product at market prices.

(b) Deficit on current account.

(c) Average annual rate of growth between successive four-year periods.

(d) Four-year average of the implicit price index of the private domestic consumption expenditure (1958=100).

Sources: National Accounts of Greece, No 16, 1948-1965, No 19, 1960-1968, tables 1, 2, 16 and 20.

saving of 6.8 per cent of GNP in the same period (columns /5/ and /6/). In the period 1953 onwards these proportions were reversed, i.e. there was a cutting down of the capital inflow to between 2.4 and 3.3 per cent of GNP, while the ratio of gross domestic saving to GNP was steadily increasing from the one four-year period to the other to reach the 20 per cent in the period 1965-1968.

These movements of domestic saving and capital inflow in opposite direction have put Greece in line with the international experience of the less developed countries, in that domestic saving is not determined by quite related factors with capital inflow⁽³⁾. Greece, in particular, is not rich in natural resources and is not a supplier of any commodity of rapidly expanding world demand. If this happened, this country might attract large amounts of foreign investment and increase fast its export earnings and saving out of exports⁽⁴⁾. Thus, about a half of Greek exports consists of tobacco, currant, and cotton, which are produced in fragmented small size holdings and do not seem to have elastic foreign demand.

The cutting down of the share of foreign saving in Greece since 1952 is due to the low rate of growth of private business long-term capital after the forementioned stop of the American aid⁽⁵⁾. However during the period 1953-1968 the deficit on current account, which represents the total external finance of the Greek economy, is about twice as much the amount of foreign saving (compare columns /6/ and /7/ of table IV.1.1.A.) This difference is attributed to the fact that apart from the capital inflow which is treated as foreign saving in the national accounts statistics, another bulk of capital inflow is not

(3) See United Nations (1960).

(4) Thus, throughout the period exports accounted for less than 10 per cent of the gross domestic product. In the period 1957-1964 export income has been relatively stagnant while domestic saving rose at a rapid rate. Furthermore variations in the level of exports incomes have little effect on the rise in disposable income in Greece. See Westebbe R.M. (1964).

(5) Most of the private business long-term capital inflow to Greece is made under the privileged treatment of the PL.2687/1953 which provides for differential taxation of profits and a re-export right of 10 per cent of the capital and of profits up to 12 per cent per annum of the outstanding amount of imported capital. See more on the PL.2687 in Ellis H.et.al. (1964).

included in foreign saving⁽⁶⁾. The latter inflow is associated with historical links of Greece with abroad and consists mostly of transfers from Greeks who have settled elsewhere, mainly in Europe, America and Australia and of seamen and shipowners of Greek subject.

This inflow is treated more specifically as income from abroad and as current transfers to households, though this results in an outstanding performance of Greece among developing countries as a net recipient of private capital per head of population⁽⁷⁾.

As it is known, the correct criterion of classification between capital and current transfers from abroad is the use of the imported capital⁽⁸⁾. To the extent therefore that the forementioned capital inflow is used as fixed investment in Greece, there is an upward measurement bias in the figures of personal income and personal saving and an equal downward bias in the foreign saving of the Greek national accounts. This makes difficult the discussion on the actual contribution of the domestic and foreign saving to the lifting up of the ratio of gross domestic investment expenditure to GNP from 17.3 per cent in the period 1949-1952 to 23.2 per cent in the period 1965-1968⁽⁹⁾, and reduces the validity of a relevant comparison of Greece with other countries.

(6) Foreign saving includes, however, changes in foreign exchange reserves which are counted as changes of inventories. Official foreign reserves were increased from about one thousand million drachmas at the end of 1948 to 10.5 thousand million drachmas (U.S.\$ 350) by the end of 1968. This amount corresponds to about 25 per cent of the imports c.i.f. in the year 1968 (U.S.\$ 1,395 million) and to about 21 per cent of the foreign liabilities of Greece at the end of 1968 (U.S.\$ 1,662 million). Foreign liabilities correspond to 22 per cent of GNP at market prices (1968) and 42 per cent of their total consists of public foreign debt. Data taken from N.S.S.G. Statistical Yearbook, 1969, B.G., The Greek Economy in 1969, and Monthly Bulletin of Statistics, December 1959.

(7) Thus, during the period 1960-1965, Greece was second after Israel in terms of net receipts of private capital and remittances per head of population (U.S.\$ 32.2), followed by Spain (\$ 14.1), Chile (\$ 9.7), Argentina (\$ 8.1), Peru (\$ 7.4) and Mexico (\$ 6.9). See Maddison A. (1970), table VII-3, p.219. This record was achieved for Greece while the share of developing countries to the total international flow of private capital was decreased in the post-war period as the circumstances of these countries were changed (de-colonization and fall in creditworthiness, risks of foreign exchange policies and of expropriation with inadequate compensation).

(8) See O.E.C.D. (1959).

(9) The corresponding ratio of gross fixed domestic investment expenditure to GNP was 13.8 per cent in the period 1949-1952 and 21.9 per cent in the period 1965-1968. The increase in the fixed investment-income ratio is higher than the corresponding one of the domestic investment-income ratio because of fall in the ratio of changes in inventories to GNP from 3.5 per cent in the period 1949-1952 to 1.3 per cent in the period 1965-1968 (difference between column (1) and column (2) of table IV.1.1.).

Assessment of the forementioned bias is possible through testing the extreme assumption that the total "current transfers to households from the rest of the World" are of the kind of capital transfers⁽¹⁰⁾. If this assumption reflects sufficiently the reality, we have to subtract the amount of these transfers from the personal disposable income and from the saving of the Greek household sector. After this subtraction, we observe that the ratio of personal saving to personal disposable income is still increasing in terms of four-year averages after 1956 (column 2/, table IV.1.2). The average annual rate of growth of this ratio between the first and the last four-year periods is 4.2 per cent compared with a corresponding rate of growth of 5.7 per cent estimated from the published data. This comparison reveals that the inflow of capital of this kind has a leading record in the upward movement, though the domestic personal saving-income ratio is also rising.

Table IV. 1. 2.

Alternative Estimates of the Ratio of Personal Saving to Personal Disposable Income.

(In percentages)

	A	B	(A-B)	(3) : (1)	Change in A*	Change in B*
	(1)	(2)	(3)	(4)	(5)	(6)
1949-52	6.0	5.4	0.6	10	-	-
1953-56	7.8	5.5	2.3	29	7.5	5
1957-60	8.9	6.2	2.7	30	3.5	3.2
1961-64	11.7	8.2	3.5	30	7.9	8.1
1965-68	<u>13.6</u>	<u>9.8</u>	<u>3.8</u>	<u>28</u>	<u>4.1</u>	<u>4.9</u>
1949-68	9.6	7.0	2.6	27	5.7	4.2

Estimate A: based on national accounts data of personal saving and of personal disposable income.

Estimate B: based on data of personal saving and of personal disposable income deduced by the amount of "current transfers to households from the rest of the world".

* Average annual percentage change between periods.

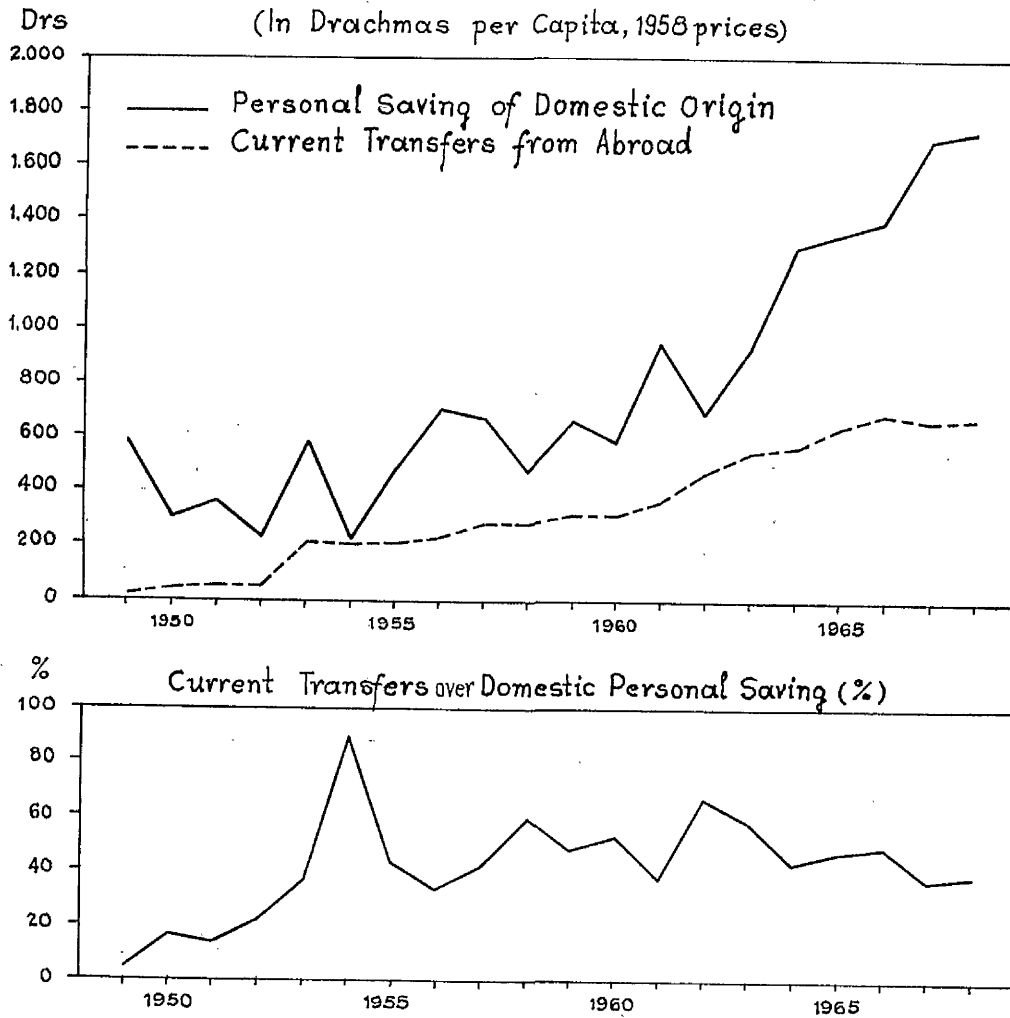
Sources: National Accounts of Greece 1948-1965, No 16, Athens 1967, National Accounts of Greece 1960-1968, No 19, Athens 1970, tables 16, 17 and 18.

(10) In absolute magnitudes the "current" transfers to individuals from the rest of the World reached in the period 1960-1968 the equivalent of U.S. \$ 190 million per annum.

The above conditions necessitate investigation of the possible causal relationship between domestic voluntary saving and capital inflow to Greece which is postponed for the next chapter. This investigation will be relevant to the question to what extent the rise of the domestic fixed investment-income ratio in over 20 per cent in sixties is attributed to the ratio of domestically generated saving to income. It is only stressed here that the real contribution of the foreign saving and of domestic saving cannot be adequately shown in terms of their proportions over total investment expenditure.

CHART IV. 1.

CURRENT TRANSFERS FROM ABROAD
AND PERSONAL SAVING OF DOMESTIC ORIGIN
(In Drachmas per Capita, 1958 prices)



IV. 2. Composition of Domestic Saving by Saver Group

We have so far observed that the increase in the saving-income ratio in Greece in the last two decades is associated with the particular conditions of the country from the point of view of international relations. The question now is whether the increase in the saving-income ratio is attributed to a special composition of domestic saving by saver group. An international comparison is possible here, with the main limitation to include only countries with available data on saving of the government sector, defined as in Greece to exclude public corporations⁽¹¹⁾.

As can be seen in the table IV.2.1, among the 20 countries with available data the position of Greece is ninth in terms of ratio of net domestic saving to net national product during the period 1955-1965 (see column /3/). At the same time the position of Greece in terms of share of government saving to the total net domestic saving is fourteenth (column /4/)⁽¹²⁾. The latter position is relatively low, especially in view of the fact that the correlation between those two ratios is positive (coefficient of rank correlation 65 per cent). This seems to indicate that the increase of the ratio of domestic saving to income in Greece is to some extent a consequence of an outstanding performance of the private sector of this economy.

(11) The public enterprises in Greece which deal with railways, matches, post-office, ports etc. are included in the public sector and the income from them (income from property and entrepreneurship) corresponds to 1.6 per cent of government revenue and .3 percent of GNP (1968).
Source, National Accounts of Greece 1960-1968.

(12) The ratio of government saving to net domestic saving rises from 14.6 per cent to 17.5 per cent if the total corporate saving is added to government saving. Thus, even under the extreme assumption that all the saving of the corporate sector is made by public corporations, government saving in Greece is still nothing like an international record. This indirectly shows the small importance of the corporate sector in this country.

Table IV. 2. 1.

Ratios of Net Domestic Saving (NDS) to Net National Product (NNP) and
of Government Saving (GS) to NDS*.

(Averages for 1955-1965; per cent)

	<u>NDS</u>	<u>GS</u>	<u>Order of Magnitude of:</u>	
	<u>NNP</u>	<u>NDS</u>	<u>Column (1)</u>	<u>Column (2)</u>
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>
Finland	20.3	47.1	1	3
Germany Fed. Rep.	19.6	39.7	2	4
Netherlands	19.4	23.6	3	12
Switzerland	18.0	30.8	4	8
Austria	17.8	39.4	5	5
South Africa	16.2	25.7	6	11
Peru ^a	15.4	10.6	7	17
Spain ^b	14.2	31.9	8	7
Greece	12.6	14.6	9	14
France	12.3	29.4	10	9
Canada	11.8	21.6	11	13
Belgium	11.4	2.7	12	20
Jamaica	11.1	26.3	13	10
United Kingdom	10.1	13.2	14	15
Ireland	9.5	4.6	15	19
Colombia	9.1	48.0	16	2
Uruguay ^b	8.6	11.9	11	16
Costa Rica ^a	7.8	38.5	18	6
Honduras	7.3	6.1	19	18
Korea, Rep. of	6.5	71.4	20	1

* Including only countries with government saving excluding saving of public corporations.

a. 1955-1963

b. 1955-1964

Source: United Nations, Yearbook of National Accounts Statistics, 1966.

The fact is that the government saving has also been increased in Greece during the last two decades. Thus, government saving grew up from negative (-3.2 per cent of GNP) in the period 1949-1952 to 3.3 per cent in the period 1961-1964, and fell again to 2.4 per cent of GNP in the last four year period 1965-1968. The public sector achieved positive saving for first time since the war in 1953, the year of devaluation of the drachma. During sixties the tendency for long postponed current civil mainly outlays to rise caused the rate of increase in the current budget surplus to decline and in some years absolute declines to occur. This made public saving inadequate to finance public investment expenditure with result an increasing recourse to foreign and domestic borrowing. On the other hand, despite the low rates of increase of the current surplus, the tax burden (which consists of a major component of government disposable income) as a percentage of national income has increased, as will be shown in chapter VI.

Table IV. 2. 2.

Size and Composition of Government Saving in Greece

(In Percentages)

Ratios :	<u>G.I</u>	<u>G.S.</u>	<u>G.S.</u>	<u>Government Saving = 100</u>		
	<u>G.D.I.</u>	<u>G.I.</u>	<u>G.N.P.</u>	<u>Budget</u>	<u>Local Auth.</u>	<u>Social Ins.</u>
	(1)	(2)	(3)	(4)	(5)	(6)
1949-1952	36.6	-	-3.2	-151.2	29.4	21.8
1953-1956	27.9	25.4	1.0	-5.2	74.4	30.8
1957-1960	29.5	44.1	2.3	53.7	26.7	19.6
1961-1964	33.7	45.1	3.3	42.1	31.5	26.4
1965-1968	30.2	33.8	2.4	32.7	44.5	22.8

where, G.I., G.D.I., G.S. and G.N.P. are abbreviations for Government Investment, Gross Domestic Investment, Government Saving and Gross National Product correspondingly.

Sources: National Accounts of Greece 1948-1965, No 16, 1960-1968, No 19.

The low rates of increase in the public sector's saving is attributed mainly to the budget surplus, as can be seen from the falling proportion of the latter to the former in the sixties (table IV.2.2, column /4/). There was at the same time a partially offsetting upward movement of the saving of local authorities excluding public corporations (column /5/). The proportion of social insurance reserves, on the other hand, goes up and down between four year periods, as a result of a regular rise of pensions.

Table IV. 2. 3.

Gross Private Saving: Level and Rate of Growth.

	Average Annual amount (th.mil.dr) (1)	Period Changes (th.mil.dr) (2)	Annual % Annual % (3)	G.P.S. at constant Values (th.mil.dr) (4)	G.P.S. per Capita (dr) (a) (5)	G.P.S. over GNP% (6)
1949-1952	3.37	-	-	5.72	752	10.0
1953-1956	7.89	4.52	33.5	9.12	1,150	11.4
1957-1960	12.76	4.87	15.4	12.63	1,537	12.9
1961-1964	22.33	9.57	18.7	20.73	2,450	16.4
1965-1968	35.88	12.38	13.2	30.36	3,501	17.5

(a) at constant 1958 values.

Sources: National Accounts of Greece, Statistical Yearbook 1969.

The leading role of the private saving is shown by the steady rise of its ratio to GNP which from 10 per cent in the period 1949-1952 has reached 17.5 per cent in the period 1965-1968 (table IV.2.3, column /6/). Similarly the increase in private saving has been steadily over two and a half times the corresponding increase of government saving. In absolute amounts the average annual Gross Private Saving in the period 1965-1968 (35,880 million dr) was over ten times the corresponding one in the period 1949-1952 (3,370 million dr). Allowing for about doubling of the price level (implicit price index of personal consumption expenditure) between these two periods, there is still an increase of over 600 per cent in the real value of private saving within a period of two decades (column /4/). This figure does not change appreciably if we speak in per capita terms (column /5/) in view of the low rate of population growth in Greece (a total of 18 per cent between 1949 and 1968).

The question further is to what extent the personal and the corporate sectors have contributed to the already observed increase in domestic private saving. Table IV.2.4 shows a very limited role of the corporate sector in total private saving in Greece. This is in part the result of the small size corporate sector in this country, as it is the rule in less developed countries⁽¹³⁾. In addition, it reflects the accounting practice, adopted in Greece, which excludes limited liability partnerships from the corporate sector and includes only anonymous societies, whether of private or public ownership and management. Anonymous societies in Greece, consist of an institution very close to the French sociétés anonymes, while the limited partnerships are included in the personal sector, in view of the fact that the profit income out of this type of companies is treated by tax law as personal income. Nevertheless, they are separate legal entities with own assets and liabilities though sufficient estimates of the amount and the use of profits from these companies cannot be easily obtained. The low proportion of corporate saving in Greece seems, on the other hand, to be due in part to the proportion of the distributed dividends⁽¹⁴⁾.

Table IV. 2. 4.

Composition of Gross Domestic Private Saving in Greece

In thousand million drachmas

	Personal Saving <u>(1)</u>	Corporate Saving <u>(2)</u>	Depreciation Charges <u>(3)</u>	G.P.S. = 100		
				Col.(1)	Col.(2)	Col.(3)
				<u>(4)</u>	<u>(5)</u>	<u>(6)</u>
1949-1952	1.77	-	1.60	52.5	-	47.5
1953-1956	4.64	-	3.25	58.8	-	41.2
1957-1960	7.42	.50	4.84	58.2	3.9	37.9
1961-1964	13.29	1.22	7.82	59.5	5.5	35.0
1965-1968	22.55	1.88	11.45	62.8	5.2	32.0

Source: National Accounts of Greece 1948-1965, 1960-1968.

(13) Exceptions to this rule are mainly found in countries endowed with natural resources exploited and exported by foreign companies.

(14) Thus, compared with other less developed countries the proportion of dividends in Greece is 42 per cent of corporate income before taxes (1960-67) against corresponding proportions of 23 per cent in Brazil, 20 per cent in Jamaica, 16 per cent in Puerto Rico, 10 per cent in Trinidad and Tobago and 44 per cent in Rhodesia and Nyasaland (for countries other than Greece data refer to the period 1950-59 and have been taken from the World Economic Survey of the United Nations of the year 1960, p.71). The proportion of dividends in Greece is associated, ^{more} with a low proportion of direct taxes than with a low proportion of retained profits.

With reservations of this kind in mind we observe that personal saving represents in Greece between 52 and 63 per cent of the total gross private domestic saving (column/4/, table IV.2.4). This proportion is in addition as a rule increasing from one four-year period to the next. Therefore, the question is whether this importance of the saving of the personal sector in Greece represents an outstanding performance of this sector internationally. A comparison of Greece with advanced countries having available data puts her midway these countries, i.e. in the fifth place among eleven countries.

Table IV. 2. 5.

Personal Saving over Gross Private Domestic Saving
(Average 1955-1965)

		in percentages	
United Kingdom	31.6	Netherlands	64.9
United States	51.9	South Africa	70.0
Switzerland	59.4	New Zealand	70.3
Australia	61.1	Japan	73.0
Greece	62.2(a)	Belgium	80.6
Canada	64.9		

(a) 1955-1968

Sources: United Nations, Yearbook of National Accounts Statistics 1966,
National Accounts of Greece 1948-1965, 1960-1968.

In view of a rather wide variation of the proportion of personal saving over gross private domestic saving among countries, we have to investigate further the relative position of Greece. Special conditions in the latter country with regard to the composition of investment, namely high proportion of housing, seem to result in a downward bias of the proportion of personal saving in comparison with other countries. This bias is assigned to the amount of current saving which is used for the construction of a rapidly increasing number of demolished single dwellings in the Greek cities and replaced by multi-storey buildings. This augmented depreciation of housing might be otherwise counted as personal saving if the composition of fixed investment were different⁽¹⁵⁾.

(15) Calculation of the depreciation in housing has been based on unpublished estimates of capital stock of the Center of Planning and Economic Research, which have been given to us by Dr. Elias Balopoulos, Director of this Center.

Adding the estimated depreciation of housing to personal saving increases the proportion of the latter to the gross private domestic saving to 64-67 per cent (column /2/, table IV.2.6). It means that, since the dwelling stock is of personal ownership in Greece, the personal sector contributes in effect about two thirds of the domestic private saving in the country.

Table IV. 2. 6.

Relative Size of the Personal Saving in Greece.

	<u>Ratio of Personal Saving over:</u>					<u>Personal Saving</u>	
	<u>Gross Domestic Private Saving</u>		<u>Personal Disposable Income</u>			<u>Per-capita (at 1958 prices)</u>	
	<u>A</u>	<u>B</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>A</u>	<u>C</u>
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>	<u>(7)</u>
1949-1952	52.1	65.1	6.0	7.1	9.0	415	573
1953-1956	56.7	66.1	7.8	8.7	11.9	669	970
1957-1960	57.2	64.2	8.9	9.9	14.8	894	1,410
1961-1964	59.4	64.6	11.7	12.8	18.8	1,454	2,232
1965-1968	62.6	67.1	13.6	14.6	23.4	2,194	3,620
1949-1968	57.6	65.4	9.6	10.6	15.5	1,125	1,761

Estimate A: national accounts data on personal saving.

Estimate B: includes column (1) plus depreciation of housing

Estimate C: includes column (1) plus consumer durables outlays.

Sources: National Accounts of Greece, Center of Planning and Economic Research of Athens.

In terms of ratio to personal disposable income, personal saving over-doubled between the periods 1949-1952 and 1965-1968, whether or not it includes depreciation of housing (columns /3/ and /4/, table IV.2.6). The increase of this ratio would be somewhat more rapid, if the national accounts concept of personal saving were expanded to include expenditure for purchase of consumer durable commodities (column /5/). Deflation by population and prices show that the per-capita saving of the period 1965-1968 is 5.3 and 6.3 times the one of the period 1949-1952 for saving defined to exclude and to include durables outlays correspondingly.

The relatively rapid rate of growth of the personal saving is alternatively shown by fitting a trend line through the least-squares method. Use of an exponential form of trend (linear in logs) has the advantage of giving a constant rate of growth⁽¹⁶⁾ and consists of a first approximation when the trend departs from linearity. By this way the trend line 'explains' the lowest proportion of the variance with personal saving which has in addition one of the highest rates of growth compared with total private domestic saving and total gross domestic saving. This implies that personal saving is more rapidly grown and at the same time more strongly fluctuating from the one year to the next than saving from other sources. It is therefore useful to try to isolate the factors which determine the growth rate of personal saving and those which make irregular the movement of personal saving through time in Greece.

Further breakdown of personal saving into saving of unincorporated enterprises and of private households is not possible with the available data in Greece, as in most less developed countries. It is often maintained that the saving of unincorporated enterprises may account for a large part of household saving because they have low access to financial markets and have to rely mainly on their own saving for financing expansion⁽¹⁷⁾. The Greek experience does not seem however to conform easily to this guess in all its respects. More specifically, on the basis of scattered evidence discussed in Appendix IV.A, it seems probable that the unincorporated enterprises save more than the corporate sector but their share to personal saving may be not higher than the household sector. This evidence seems to suggest that the business firms of small size save more than the big ones. In addition, there are some indications which derive from the composition of fixed investment and financial saving, about a relatively high share of saving of the household sector with respect to what is usually thought to be the case for the less developed countries. These indications are based on a very low share of investment in the manufacturing sector and a very high proportion of investment in

(16) More specifically, assuming an exponential trend of the form $S_t = AB^t$, we have $B = 1+g$, where g is the estimated average annual rate of growth of S_t . The computation of the coefficients A and B is easy through the regression of the $\log S_t$ with $t=1,2,3,\dots,20$, since the assumed form of the trend is alternatively written as follows: $\log S_t = \log A + t \log B$. Therefore the antilogarithm of $\log B$ is equal to $1+g$.

(17) This kind of situation is also to some extent present even in advanced countries. See O.E.C.D. (1967).

housing in comparison with other countries⁽¹⁸⁾, as well as on some outstanding characteristics of the composition of financial saving by form which are discussed in the next section.

The available data on saving and investment of the personal sector can be further shown in terms of surplus of this sector compared with the deficits of the other main sectors of the Greek economy. Table IV.2.7 so presents a consolidated saving and investment account by sector on the basis of national accounts data given that a flow-of-funds analysis is not yet available in Greece⁽¹⁹⁾. This account has a main advantage to present clearly the sources and uses of saving by the non-financial sectors of the Greek economy. Therefore the figures of this table have to be taken in accordance with the definitions of the national accounting.

Table IV. 2. 7.

Surplus and Deficit of the Non-Financial Sectors.

	Average 1960-1968		In million drachmas	
	Households (1)	Enterprises (2)	Public Sector (3)	Total (4)
1. Gross Saving	16,793	10,846 ^(b)	4,450	32,089
2. Gross Investment	2,751 ^(a)	24,281 ^(c)	10,625	37,657
3. Surplus(+), Deficit(-)	+14,042	-13,435	-6,175	-5,568 ^(d)
4. Capital Transfers	-9,615 ^(e)	+9,615 ^(e)	+1,180 ^(f)	+1,180
(3)-(4) :	+4,427	-3,820	-4,995	-4,388

(a) Includes private investment in agriculture.

(b) Includes corporate saving and depreciation allowances.

(c) Excludes transfers of ships under the Greek flag.

(d) The difference between gross domestic investment and saving equals to the foreign saving.

(e) Includes investment in housing construction.

(f) Includes capital transfers to the government from abroad.

Source: National Accounts of Greece 1960-1968.

(18) For an international comparison including Greece in these terms see e.g. Maddison A. (1970). It is here maintained that the small Greek business firms are unlikely to save for investing in housing, while they do not face so favourable terms of credit from the banking system.

(19) It has been maintained that although less developed countries have not detailed flow-of-funds analysis data available, it is possible to make many useful classifications of the existing in these countries statistical information. See e.g. Levy E. (1968).

Defining the difference between saving and investment as the surplus (+) and deficit (-) of each sector we observe that the surplus of the household sector has contributed to finance on average 72 per cent of the deficits of the other two sectors of the economy during the period 1960-1968. Further treatment of the expenditure on housing construction as a capital transfer from the household to the enterprise sector and allowing for the capital transfers to the government from abroad can give an estimate of the financial balance by sector. It shows an average financial surplus of the household sector of 4,427 million drachmas which covers a part of the deficits of 3,820 million drachmas of the business sector and of 4,995 million drachmas of the public sector and the rest is covered by capital inflow of 4,388 million drachmas (equivalent of 147 million of U.S. dollars). These figures are indicative of the role of the household sector in financing real capital formation in Greece and of the size of the resources transferred to enable this financing through the capital market. This transfer takes place by means of acquisition of certain forms of claims by the savers which correspond to a particular composition of personal saving by form shown in the next section.

IV. 3. Composition of Personal Saving by Form.

The available data in Greece concern the classification of saving in financial or intangible form and non-financial or tangible form. Financial saving is available either in gross terms or in net terms, i.e. before and after deduction of the personal debt incurred during a given period of time. Our data refer to the changes in claims of the personal sector per annum during the period 1956-1968, so that these are close to the concept of gross financial saving. Therefore the pace of the changes in claims is only roughly comparable with the national accounts data on personal saving, because among other things the former data do not allow for the debt of the personal sector which is not available in Greece⁽²⁰⁾. This does not imply that data on net financial saving of the personal sector would be fully comparable with the national accounts data on personal saving, since the latter includes also net investment expenditure of the personal sector, namely of individuals, self-employed and unincorporated business. The inclusion of unincorporated business enterprises in the national accounts definition of the personal sector adds one more difference to the comparison of personal saving with the data on changes in claims concerning only individuals.

The available data on changes in claims include cash and coins, total deposits with commercial banks and other financial institutions, bonds and stocks issued to the public and life insurance premiums. Parallel movement of the changes in claims and the personal saving is less often in agrarian economies, where most of saving is made in tangible forms, and in periods of severe inflation, when people get away from saving forms of fixed money values. During the period 1956-1968 Greece has experienced a relatively high average annual rate of output growth and relatively moderate price increases. Therefore the movement of personal saving and of change in claims of individuals is not quite different if it is expressed in real terms. The increase in claims corresponds on average to 7.3 per cent of the personal disposable income in the period 1965-1968 compared with a ratio of 11.4 per cent of personal saving over personal disposable income during the same period (columns /6/ and /7/, table IV.3.1).

(20) The lack of data on consumer debt is in part due to that it is largely non-institutionalized in Greece, since commercial banks were until recently prohibited to grant consumer credit of any kind. Thus most of the credit to consumers was granted through business firms. Consequently, the figures of the bank credit to the trade sector understate the outstanding consumer credit, though it has been so treated elsewhere. See Pailos D. (1968), Kalodaukas D. (1966).

Table IV, 3. 1.

Increase in Claims held by Individuals
(1956 - 1968)

	Increase in claims ^(a)	<u>Total Increase in Claims = 100</u>				<u>Ratios to Personal Disposable income^(e)</u>	
		Cash	Deposit Accounts ^(b)	Securities ^(c)	Contractual Saving ^(d)	Column(1)	Pers. Savin
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1956-1960	3,858	26.2	62.7	10.0	1.1	4.9	9.3
1961-1965	6,747	33.9	56.6	8.0	1.5	8.4	12.0
1966-1968	14,340	25.0	60.0	13.0	2.0	8.5	13.7
1956-1968	24,945	28.5	59.7	10.3	1.5	7.3	11.4

(a) Average annual increase in claims held by individuals (in mil.drds).

(b) Excluding demand deposits, which are in Greece virtually deposits of the business sector, and time deposits of Sociétés Anonymes and of Limited Liability Companies. About three-fourth of deposit accounts represent saving deposits.

(c) Estimated after deduction from the total of the purchases by public entities, since investigation of the balance sheets of a number of private business firms has shown very small amounts of securities to be held.

(d) Includes life insurance premiums.

(e) In percentages.

Sources: Bank of Greece, The Greek Economy in 1966, Kalodoukas D., The Development of the Greek Financial System 1956-1966, table 1, p.170, table 9, p.179, National Accounts of Greece 1948-1965, No 16, 1960-1968, No 19, table 18.

The year 1956 is characterized by a massive shift from gold sovereigns and inventories of business to financial forms of savings notably saving deposits, which are in Greece withdrawable on demand according to the present legislation and non transferable by cheque⁽²¹⁾. This shift came after the reduction of the increase in the price level well below ten per cent in 1955-i.e. two years after the official devaluation of the drachma by 50 per cent in 1953- and the sudden increase in the saving deposit rate from 7 per cent to 10 per cent in May 1956⁽²²⁾. This policy measure has become effective in view of the gradual cutting down of the inflation in previous years, which seems that has formed expectations of preservation of a relative price stability. A shift to the opposite direction, though smaller in size than the forementioned one, took place in the year 1965. This was attributed to the breakdown of the majority party in that year which by shaking public confidence resulted in massive deposit withdrawals and purchase of gold sovereigns which are not included in the data on changes in claims⁽²³⁾. No other major movements in the composition of saving by form have taken place during the period 1956-1968, so that great differences of annual data from period averages are not present. On the other hand, the period averages of this composition are close to the corresponding composition of stocks, in view of the low level of stocks in the inflationary period before 1956.

There are two at least worthnoting characteristics of the composition of the claims created in the period 1956-1968, namely that the share of deposit accounts reaches 60 per cent and the share of contractual saving is below 2 per cent of the total (columns /3/ and /5/, table IV.3.1). The share of deposit accounts to the total increase in claims of individuals is above the average in the period 1956-1960 and below the average in the period 1961-1965, mainly as a result of the forementioned special developments in the years 1956 and 1965. This indicates the term structure of claims of the Greek savers and the place of the banking sector in the Greek capital market. On the other hand, the small share of the contractual saving points out the voluntary nature of saving in Greece which

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- (21) Since the time of devaluation of the drachma in 1953 the Bank of Greece has succeeded to hold fairly steady at the parity of 300 drachmas the price of gold sovereigns by intervention in the market either as a buyer or as a seller, according to the circumstances.
- (22) The level of the interest rates on deposit accounts is fixed in Greece by the Currency Committee, the supreme body of monetary policy action in this country.
- (23) Most of these gold sovereigns flew back to the Bank of Greece after the measures taken in December 1965 which included abolition of the free market for gold sovereigns, maintenance of a controlled market, and establishment of a procedure of free conversion of gold hoardings into drachmas. See, Bank of Greece, Report For the Year 1965, Athens 1966, p.p. 24-5.

is usually not predetermined by external forces (such as the government) or by past obligations. This share is partly attributed to the fact that it does not include amortization and instalment and credit payments. Therefore, the available data include only the institutionalized contractual saving which does not seem to represent a fairly high proportion of the total⁽²⁴⁾. The share of institutionalized contractual saving to the total increase in claims is associated with a series of factors such as the memory of the prolonged war inflation till mid-fifties, the improvement of social security, the relative rates of return, and the control of major insurance companies by commercial banks⁽²⁵⁾.

Lastly, the share of total security holdings has averaged about 10 per cent annually since 1956. Less than a half of security holdings of individuals consists of securities of private corporations most of which are distributed directly to old shareholders according to the pre-emptive right. The fact that very few issues are made by corporations is largely attributed to the reluctance of them to raise capital on the open market, which is supported by bank finance on easy terms⁽²⁶⁾. Government borrowing in the open market takes place by large bond issues at irregular time intervals and corresponds to only a small proportion of the amount of Treasury Bills which the Greek Government sells to the commercial banks and which are not exchanged in the open market.

An international comparison of the composition of gross financial saving of the Greek personal sector is possible for the period 1960-1965 with another nine countries members of O.E.C.D. for which data are available (table IV.3.2).

(24) Contractual saving excludes also social security contributions which are by convention considered to be capital transfers and not a form of contractual saving.

(25) Over a hundred insurance companies many of which British operate in Greece, with a multiple line system and absence until recently of government control over their portfolio. About 60 per cent of the assets of these companies is controlled by the two largest banking groups. See Zonas E. (1963).

(26) See Psilos D. (1968). The need of 'securing an adequate supply of shares for the creation of a well-developed capital market' is also adopted officially. See Bank of Greece, Report for the Year 1969, Athens 1970, p. 18.

Table IV, 3. 2.

Main Forms of Financial Saving of Individuals in Selected Countries.

Percentage Distribution, 1960-1965

	Percentage of the Total						Fin. Saving over Income (g)
	Cash (1)	Deposit Accounts (2)	Contractual Saving (3)	Securities (4)	Others (5)		
United States	10 ^a	60	38	2	-10	8.7	
Belgium ^b	9 ^a	36	20	34	0	12.0	
France	15 ^c	58	4	19	3	9.0	
Germany	8 ^a	46	26	20	0	9.5	
Greece ^d	34	57	1	8	0	8.4	
Italy ^e	9	53	11	14	13	12.0	
Norway	9	43	26	12	10	8.0	
Sweden	5	43	36	9	7	11.0	
United Kingdom	3	55	57	-21	7	8.3	
Japan ^f	6	61	10	18	5	21.6	

(a) Includes demand deposits
 (b) 1959-1964
 (c) Estimate
 (d) 1961-1965
 (e) 1964-1965
 (f) 1958-1964
 (g) Personal Disposable Income
 Sources: O.E.C.D., Capital Markets Study, General Report, Paris March 1967, table 18 p.108. For Greece : Kalodoukas D. (1967) p.p. 9,179.

This comparison with advanced countries seems to show that Greece differs from them less in terms of ratio of financial saving over personal disposable income than in terms of composition of the increase in claims. Thus, the forementioned characteristic features of this composition in Greece seem to consist of an outstanding performance of this country compared with advanced western countries. More specifically, Greece has the lowest proportion of contractual saving, is third in terms of proportion of deposit accounts and in addition has the highest proportion of cash among the countries compared⁽²⁷⁾. The latter is attributed in part to further rise in the degree of 'monetization' of the Greek economy during the period under consideration⁽²⁸⁾ and the not yet close involvement of the Greek savers with the financial system.

The comparison of the proportion of securities held by individuals in Greece with other countries has to take account of the observed postwar shift towards intermediated forms of saving in advanced countries, notably the United Kingdom and the U.S.A. More specifically, the low share of securities in these countries is associated with high shares of the institutionalized forms of saving⁽²⁹⁾. This kind of development guarantees the competition in the collection of personal saving and borrowing by corporations from the banking and the non-bank sector of the capital market. In Greece, on the other hand, there is a disproportional expansion of deposit accounts only, namely the liabilities of the bank-sector, which does not seem to favour fully these market forces to operate.

(27) The ratio of contractual saving to deposit accounts in Greece (about 2 per cent) seems also to be lower than in Latin American countries, notably Brazil (13 per cent during the period 1946-49) and Cuba (over 50 per cent during the period 1945-48). See Barnstein E.M. (1953), table 4, p.271, table 5, p.273.

(28) The degree of monetization is commonly defined as the proportion of output that is traded. It seems relevant in this respect a comparison of the ratio of the currency outside the banking system at the end of 1968 to GNP at market prices of the year 1968 (about 14 per cent) with the corresponding ratio of the changes of these two magnitudes between 1960 and 1968 (about 20 per cent). Source: B.G., Monthly Statistical Bulletin, December 1970.

(29) The shift to these forms is attributed, among other things, to the 'simplicity' and 'liquidity' they offer to the small saver. See O.E.C.D. (1967) p.105.

Table IV. 3. 3.

Stock of Main Consumer Durables in Selected Countries in 1967.(Number per thousand inhabitants)

	<u>Telephones</u>	<u>Passenger Cars</u>	<u>T.V.Sets</u>	<u>Radios</u>	<u>Dwellings^(e)</u>
Austria	159	132	134	293	.9
Belgium ^(c)	184	160	185	333	.6
Canada	408	282	284 ^(a)	590	.7
France	141	240 ^(b)	185 ^(b)	306	1.0
Germany (F.R.)	172	194 ^(b)	248 ^(b)	482	.9
Greece	.76 ^(a)	21 ^(d)	9 ^(d)	114	1.5
Italy	132	136	144	222	1.1
Japan	107 ^(b)	48	206 ^(b)	248	1.2
Netherlands	203 ^(a)	157 ^(b)	200	250	.8
Spain	113 ^(b)	50 ^(b)	90 ^(b)	222	1.1
Sweden	489	246	28.9	372	.8
Switzerland	437 ^(b)	192 ^(b)	143	286	.7
Turkey	9	4 ^(b)	-	85	2.2
United Kingdom	218	196 ^(b)	280 ^(b)	318	.6
United States	540 ^(b)	414 ^(b)	392	1,413	.7

(a) 1966

(b) 1968

(c) Including Luxembourg

(d) 1969

(e) Persons per room at census dates

Sources: O.E.C.D., Observer, No 44, February 1970, and The O.E.C.D. Member Countries
 (5th Year), 1967. U.N. Statistical Yearbook 1968.

In view of the forementioned functions that saving performs (chapter II, 2) it seems now useful a comparison of Greece with other countries in terms of stocks of consumer durables per capita. This consists of a first approach to the view of considering consumer durables as a component of households' wealth, though their stock is not necessarily the most predominant factor of their flow demand. Greece so appears to be far behind the compared developed countries and even behind Spain which is also a less developed country of the Southern Mediterranean Europe. In so far as consumer durables are considered as objects of utility and financial saving also is a source of utility, it has to be noticed that Greece is considerably backward in the former compared with the latter. Whether and to what extent there is a relationship between these two characteristics, is a matter of substitution of financial saving with consumer durable outlays, to which we come back in the next chapter. What can be asserted from now is that the expansion of personal saving in financial form may be associated with the plans for acquisition of household durables in which Greeks are far behind other Europeans. In so far as an adjustment of the quality of food, clothing and personal services will follow the realization of these plans, it may have a negative effect on the saving-income ratio in the future.

APPENDIX IV.

Borrowing and Investing of Companies by Size

It has been long ago noticed in other countries that banking criteria discriminate against small size firms i.e. by the MacMillan Report and more recently by the Radcliffe Report (para 935) in the U.K. and by researchers in the U.S.A. (30) and was characterized by D.E.C.D. (1967) as a more general phenomenon.

The evidence discussed here for Greece is based on statistics from various sources. Thus while the 120 thousand small scale industrial establishments with less than 30 employees represent above 90 per cent of the total number of establishments and contribute above a half to the total manufacturing output, they get about 10 per cent of the total bank credit to manufacturing and mining, while 30 big industrial concerns get some 60 per cent of that total.

This phenomenon in Greece is especially related with the strong concentration in the banking system (95 per cent of assets and liabilities controlled by 2 banking concerns). This was recently recognized by the Currency Committee which by the decision 1421/1/28.2.66 has obliged banks to direct 6 per cent of future increases in bank deposits to firms of 'small size' or to keep them to a non-interest reserve account by the Central Bank. However, a part of this reserve was later on invested in interest bearing Treasury Bills (31), which have obviously retarded the initiative of the banks to extend credit to handicrafts, as was intended by the decision 1421. Small size firms have, therefore, to save for building up most of investment funds and working capital, for which firms of bigger size use retained profits as well as bank credit on easy terms.

On the other hand, the rate of expansion of smaller size firms does not seem to be behind that of bigger ones. Thus, as it is shown in table IV.A., the share of fixed assets to the total rose at a faster rate for the larger and increasing sample of manufacturing concerns recorded by the Federation of Greek Industry (F.G.I.) than for the smaller sample of two hundred biggest concerns. The latter which are attended by the Currency Committee (C.C.) are however the biggest debtors to commercial banks. These developments took place at the time of the

(30) See Klein L.R. (1957).

(31) See Bank of Greece, The Greek Economy 1968.

realized rise in the saving-ratio in Greece, i.e. during the last decade,

During the same period, the ratio of borrowed to total capital (the change of which is determined by the rate of rise in credit) rose for the big concerns and was held at fairly the same level of 70 per cent between 1958 and 1967 for the sample of the F.G.I. Since the stability of the debt-ratio of the F.G.I. sample was realized at a time of a rise in the size of this sample by inclusion of smaller size firms from 391 in 1958 to 862 in 1967 while the debt ratio of the sample of CC was likely rising, it is inferred that the stability of the former sample must be due to disproportionately lower rate of bank credit to smaller size industrial concerns. This has to be considered in combination with the fact that fixed assets rose at faster rate for smaller size industrial firms than for the two hundred of the biggest of them. These developments seem to imply relatively high ratios of internal finance, for the sample of F.G.I. which may come out of high rates of retained profits, since there are not reasons to expect the firms of smaller size to have relatively high net profits per unit of output.

Table IV. A.

Composition of Total Assets of Big Industrial Concerns.

	<u>Number of Firms</u>		<u>Fixed Assets (c)</u>		<u>Borrowed Capital (c)</u>	
	<u>C.C. (a)</u>	<u>F.G.I. (b)</u>	<u>C.C.</u>	<u>F.G.I.</u>	<u>C.C.</u>	<u>F.G.I.</u>
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>
1958	218	391	36	39	71	69
1964	218	711	35	48	74	67
1967	n.a	862	n.a	50	n.a	70

(a) Attended by the Currency Committee.

(b) Attended by the Federation of Greek Industry.

(c) Percentage of total assets and liabilities.

Sources: Federation of Greek Industry, Annual Reports, Currency Committee, Mimeographed Data of Limited Circulation.

In so far as the conclusion reached can be extended to even smaller size industrial and handicraft firms, then there is a possibility that unincorporated business and self-employed persons may have had relatively high saving-income ratio in Greece⁽³²⁾. Similar conclusions were drawn also so far for the United States of America⁽³³⁾ and Japan⁽³⁴⁾ from different sources of information.

(32) It is another question of course what is the share of the saving of unincorporated business to the total personal saving in this country.

(33) See Friend Irwin and Kravis I.B. (1957), Friend I. and Schor S. (1959).

(34) See Shinohara Miyohei (1959), Komiya R. (1966), Mizoguchi T.M. (1968).

CHAPTER V

SAVING INCOME RELATIONSHIPV. 1. An International Comparison of the Saving-Income Ratio and Income

Whether the saving-income ratio in Greece is too low or too high is faced here by reference to the main attributes of saving in comparison with other countries. As we have seen already, an international comparison of the saving-income ratio among countries in different stages of economic development may be subject to relatively minor bias, if it is carried out in terms of saving defined to include expenditure on consumer durables (chapter III). On the other hand, we are interested in the investigation of the substitutability between saving ordinarily defined and the expenditure on purchases of consumer durables. Consequently our sample is reduced to 15 countries which have available data for both concepts of personal saving. These data were taken from the same publication, namely the Yearbook of the National Accounts Statistics of the United Nations of the year 1968 for the period 1958-1967 and so there is no problem of different definitions for individual countries.

From the variety of the factors which may influence the saving-income ratio, we incorporate here the level of per capita incomes expressed in U.S. dollars, the average rates of growth of the per capita income, of population and of aggregate income during the period 1958-1967, a measure of the cyclical variation of income, and the ratio of personal saving to net private domestic saving.

As can be seen in the table V.1.1, Greece is third among the countries compared for saving ordinarily defined (column /1/), while its saving-income ratio drops to the tenth place when saving is defined to include expenditure on consumer durables (column /2/). On the other hand, the position of Greece is eleventh in terms of per capita income (column /4/) and first in terms of average annual rate of growth of per capita income during the period 1958-1967 (column /5/). Thus, the position of the saving-income ratio of this country is close to the corresponding one in terms of rate of growth of income when saving is ordinarily defined, and close to the position of this country in terms of per capita income when saving is defined to include expenditure on consumer durables. This value of the saving-income ratio of Greece is, as expected according to

Table V. 1. 1.

Rate of Personal Saving in Greece and other Countries 1958-1967.

	<u>Saving Income Ratio %</u>			<u>Per Capita</u>	<u>Average Rates of Growth of</u>		
	<u>Excluding^(a)</u>	<u>Including^(a)</u>	<u>(2)-(1)</u>	<u>Income</u>	<u>Income</u>	<u>Populat.</u>	
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>In U.S.\$^(b)</u>	<u>Y/N</u>	<u>N</u>	<u>Y</u>
Australia	7.7	18.0	10.3	1,808	2.6	2.1	4.7
Austria	7.7	15.9	8.2	1,110	4.2	.5	4.7
Belgium	11.4	23.9	12.5	1,612	3.9	.7	4.6
Canada	7.8	18.3	8.5	2,087	2.7	2.0	4.7
Finland	9.6	16.2	6.6	1,211	4.1	.7	4.8
Ireland (Rep.)	9.2	14.0	4.8	736	3.6	.2	3.8
Italy ^(c)	14.1	18.6	4.5	1,021	3.8	.7	4.5
Jamaica	4.1	12.9	8.8	384	2.1	2.1	4.2
Greece	11.0	15.2	4.2	651	5.6	.7	6.3
Netherlands	11.0	19.8	8.8	1,475	3.7	1.3	5.0
South Africa	8.8	19.3	10.5	590	3.6	2.3	5.9
Spain	8.5	15.3	6.8	620	5.3	.8	6.1
Sweden	7.9	18.3	10.4	2,674	3.7	.7	4.4
United Kingdom	4.3	11.6	7.3	1,366	2.2	.7	2.9
United States	5.0	13.9	8.9	3,302	3.1	1.2	4.3

(a) Expenditure on consumer durables.

(b) Net National Income at factor cost in the year 1967. On the basis of the data available the concept of net national income was considered the nearest to the personal disposable income, and the ratio of the former to the latter is assumed fairly steady during the period 1958-1967.

(c) 1961-1967.

Where: Y and N are total net national income and total population respectively.

Sources: United Nations, Yearbook of National Accounts Statistics, 1968, Monthly Bulletin of Statistics December 1969.

economic theory, though we cannot say whether the overall international pattern of this ratio depends on the same sort of factors without some statistical testing.

The statistical testing which follows does not aim to provide a thorough investigation of an international personal saving function, but rather to show whether the observed position of Greece in terms of saving-income ratio is associated by a corresponding relationship of this ratio with certain main attributes in international level. This testing of the saving-income ratio with the fore-mentioned attributes by country through a cross-section regression stems on the assumption that the observations are generated by the same function, i.e. the countries included have identical saving functions. Although this assumption may not be true, it has been recognized that the single international regression of personal saving on income has certain advantages⁽¹⁾. It is so, simple compared with the estimation of separate regressions by country, and it may improve the estimates of the parameters because it removes problems inherent in correlation of time series and increases the range of the explanatory variable income. On the other hand, the saving function estimated with country period-averages seems to be of a rather long-term nature⁽²⁾.

The results of this experimentation are reported as follows. The independent variables per capita income and the rate of its growth⁽³⁾ have given non-significant results, either in terms of explained proportion of the variance of the saving-income ratio or in terms of the standard errors of the parameters. More specifically, the per capita income has given negative regression coefficient, namely with the wrong sign, when it was regressed alone with the saving-income ratio and saving was ordinarily defined. The regression coefficient of both per capita income and rate of its growth had the right sign (positive) but were insignificant with the saving-income ratio and saving broadly defined⁽⁴⁾. In brief,

(1) See Johnson D.W. and Chu J.S.Y. (1968), Houthakker H.S. (1961).

(2) See Houthakker H.S. (1965).

(3) It is true that the divergent rates of growth in real income among countries are related to similar divergences in levels of investment, and, since high or low levels of investment necessarily imply high or low levels of saving, the level of saving and the rate of growth in real income are interrelated variables. But there appear to be some grounds for maintaining that high rates of investment, through fostering high rates of growth in per capita income may have facilitated the realization of higher levels of saving in the household sector. This is assumed to provide justification of the one way of causation used here.

(4) The opposite sign of the regression coefficient of income with saving narrowly and broadly defined may be due in part to the forementioned bias of the international comparison of these two concepts of saving.

this testing has shown that the level of per capita income and its growth rate do not 'explain' sufficiently the variation of the saving-income ratios on an international level⁽⁵⁾. Exceptionally, the growth rate of the per capita income has explained 31 per cent of the variance of the saving-income ratio with saving ordinarily defined. This proportion is significant at the 5 per cent level and the residuals do not seem to be serially correlated on the basis of the estimated value of the Durbin-Watson ratio⁽⁶⁾.

$$\left(\frac{S}{Y}\right)_i = .0256 + \underset{(2.70)}{1.659} g_i + u_i \quad \begin{array}{l} \bar{R}^2 = .311 \\ DW = 2.10 \end{array} \quad (V.1)$$

where $\left(\frac{S}{Y}\right)_i$ is the saving-income ratio of the country i , with saving ordinarily defined.

g_i is the percentage average annual rate of growth of per capita income of the country i during the period 1958-1967.

u_i is the residual term of the country i and the number in parenthesis is the t value of the estimate.

This relationship resembles with the results of certain other studies⁽⁷⁾. However, we do not maintain that this kind of results can lead to acceptance of any version of the normal income hypothesis internationally for two mainly reasons; first, there remains over two-thirds of the total variance of the saving-income ratio to be interpreted by factors other than the rate of growth of the per capita income⁽⁸⁾. Second, the constant intercept of the relationship (V.1) is statistically

(5) This finding is consistent with the observed stability of the saving-income ratio in the long-run in a number of advanced countries, notably the United States and the United Kingdom. See e.g. Kuznets S. (1966), pp 263-4. As it is known, this stability has accepted a number of alternative interpretations.

(6) Thus, the t value, estimated by the formula $R \sqrt{n-2} / \sqrt{1-R^2}$, was found equal 2.63 which exceeds the value of $t_{13, .05} = 2.16$. This implies rejection of the null hypothesis. On the other hand the estimate of the DW ratio (2.10) conforms to the following condition: $4-DW > d_u$ (where d_u is the upper limit value with 15 observations at the 5 per cent level of significance). This condition implies absence of serial correlation of the residuals, which is associated with the small size of the sample.

(7) See Houthakker H.S. (1965), Johnson D.W. and Chu J.S.Y. (1968) and Swamy S. (1968).

(8) On the contrary, without presenting the value of R^2 , Houthakker (1965) has interpreted similar results as implying application of the life-cycle hypothesis of saving. These results were furthermore used by Modigliani (1970) to reach conclusions about a general validity of this hypothesis.

significant at the 5 per cent level (ratio of its value to its standard error $> t_{ka}$).

Another factor of the variance of the saving-income ratio among countries may be the cyclical variability of income. It is often maintained that the saving-income ratio may be stable in the long-run if the rate of growth of income is constant despite the growth in the level of income, since the disproportional rise in saving when the growth of income has been rapid tends to be neutralized when the rate of income growth is moderate, by the steady advance in consumption levels. It implies that the short-run variations of the rate of growth of income may have little influence on the period averages of the saving-income ratios used here. This may not be true since the period used may not correspond to one or more complete cycles in all the countries selected. It is therefore assumed that a high coefficient of variation of the growth rate-defined as the standard deviation divided by the average rate of growth during the period 1958-1967 - may have some positive influence on the saving-income ratio. However, there is a strong collinearity between the average growth rate and the coefficient of its variation. Under these conditions it becomes a difficult task the distinction of the effects of the trend and of the short-run variations of the per capita income on the saving-income ratio by country.

Using now the rate of growth of aggregate rather than of per capita income, which was used in the regression (V.1), we get the following results:

$$\left(\frac{S}{Y}\right)_i = .0210 + 1.362 g_i^1 \quad \bar{R}^2 = .124 \quad (V.2)$$

(1.73) DW = 2.08

where $g_i^1 = \Delta Y_i / Y_i = g_i + n_i$
and $n_i = \Delta N_i / N_i$ with N_i , the total population of the country i .

Both the coefficient of correlation and the regression coefficient of the variable g_i^1 are insignificant at the 5 per cent level; nevertheless we present these results just for the sake of comparison with those of the regression (V.1), and in view of the importance of this difference in the interpretation of the results. Further testing with g_i and n_i as separate independent variables has given worse results than (V.1), in which we have taken g_i as the only independent variable:

$$\left(\frac{S}{Y}\right)_i = .0277 + 1.620 g_i - 0.0723 n_i \quad \bar{R}^2 = .230 \quad (V.3)$$

(2.18) (.66) DW = 1.93

In the regression (V.3) the coefficient of the variable n_i in particular has negative sign and is insignificant. This result seems to cast doubts on the view about a positive relation of the saving-income ratio with the rate of growth of population which was maintained in support of the life-cycle hypothesis of saving internationally⁽⁹⁾. Different growth rates of population by country are not necessarily reflected in corresponding differences in employment, which is a main income generating source if productivity is given, because of time required for the new born to come on age or other obstacles, which the transformation of the active population to employment faces especially in less developed countries. Under these conditions the positive influence of the growth of population on the consumption expenditure and the negative one on saving may become predominant.

Finally a positive relationship was found in testing of the saving-income ratio with the ratio of the personal saving over net private domestic saving, with the latter 'interpreting' almost 70 per cent of the variance of the former⁽¹⁰⁾. This result may imply that the personal sector has a leading role in the change of private domestic saving, though not without reservations, concerning the relative size of the unincorporated business in the personal sector by country.

In conclusion, the poor results of this statistical testing seem to indicate that apart from factors referring to income and to population, there may be other important influences which differentiate the size of the saving-income ratio among countries, including Greece. The range of these influences is likely quite wide and may include factors such as initial level of saving, changes in the price level and the distribution of income, taxation and factors of social, cultural and demographic nature. Investigation of the relevance of the main of these factors to the observed increase of the saving-income ratio in Greece is carried out in the next two chapters.

(9) See Modigliani F. (1970).

(10) More specifically, we have got the following relationship:

$$\left(\frac{S}{Y}\right)_i = -.103 + .146 \left(\frac{S}{PDS}\right)_i + u_i \quad \bar{R}^2 = .695$$

(5.74)

DW = 1.80

where, PDS stands for net private domestic saving.

V. 2. Personal Saving and Income in Greece.

Chart V.1 and table V.2.1 show the year-to-year movement of the ratio of personal saving over personal disposable income and of the personal per capita disposable income and personal saving at constant 1958 values during the period 1949-1968 in arithmetic scale and in logarithmic scale. As can be seen in the diagram, between the years 1949 and 1968 there was an increase in the ratio of personal saving to personal disposable income from 8.74 per cent to 14.12 per cent. During the same period the personal per capita disposable income at constant values has increased from 6.3 thousand drachmas to 17.0 thousand drachmas. These developments represent a 4.2 per cent average annual rate of growth of the saving-income ratio and a 5.7 per cent average annual rate of growth of the real personal disposable income per capita, between the two-year averages 1949-1950 and 1967-1968⁽¹¹⁾.

The personal disposable income per capita is almost steadily increasing, while there is an irregularity in the movement of the ratio of saving to income which is apparently stronger in fifties than in sixties. This kind of change seems to be the result of a gradual reduction of the amplitude of the cyclical variation of income in Greece. In addition, the variation of the per capita income since 1960 has been limited to different rates of growth, all above the rate of 3.5 per cent. We do not mean, of course, that the rate of growth was the only factor of the observed upward movement of the proportion of income which is saved. Thus, it seems that the trend of this proportion has not changed in sixties though the rate of growth of real per capita disposable income has increased in the last decade. More specifically, the average annual rate of growth of the real per capita income was 6.76 per cent in the period 1961-1968 compared with a corresponding rate of 4.88 per cent during the period 1949-1960 (table V.2.2).

In the attempt of assessing further the effect of the cyclical variation and of the rate of growth of income we observe the following. Changes in the rate of growth of the per capita income are connected with disproportional changes in the per capita saving towards the same direction, which caused the observed irregularity in the proportion of income saved. In terms of four-year averages both the real per capita income and the saving-income ratio are uninterruptedly

(11) These rates do not coincide with the corresponding rates estimated as averages of the rate of growth in each one year, which are affected by the year-to-year variation of the growth rate.

Table V. 2. 1.

Per Capita Personal Disposable Income and Saving

(Annual Data: 1949-1968)

	Thousand Drachmas		Percentages	
	Per Capita Income ^(a)	Per Capita Saving ^(a)	Saving-Income Ratio	Rate of Income Growth ^(b)
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>
1949	6.34	.60	8.74	16.1
1950	6.76	.35	5.21	6.5
1951	7.03	.42	5.93	4.1
1952	6.91	.29	4.19	-1.6
1953	7.96	.79	9.93	15.1
1954	7.98	.24	3.07	.3
1955	8.60	.70	8.19	7.8
1956	9.26	.94	10.11	7.7
1957	9.69	.96	9.88	4.6
1958	9.70	.75	7.74	.2
1959	9.72	.97	9.99	.2
1960	10.10	.90	8.87	3.9
1961	11.16	1.32	11.83	10.5
1962	11.62	1.15	9.92	4.1
1963	12.66	1.47	11.64	8.9
1964	13.86	1.87	13.49	9.5
1965	15.09	1.99	13.19	8.8
1966	15.75	2.02	12.82	4.4
1967	16.46	2.36	14.35	4.5
1968	17.03	2.40	14.12	3.5
1949-1968 ^(c)	10.71	1.12	9.66	5.7
S.D. ^(d)	3.37	.68	3.26	2.9
C.V. ^(e)	.31	.61	.34	.51

(a) Personal disposable income and saving respectively deflated by the population and the implicit price index of the personal consumption expenditure.

(b) Rate of growth of real per capita disposable income (column /1/).

(c) Average annual rates (arithmetic unweighted average).

(d) Standard Deviation.

(e) Coefficient of Variation.

Sources: National Accounts of Greece 1948-1965, 1960-1968, N.S.S.G., Statistical Yearbook 1969.

increasing.

Table V. 2. 2.

Saving-Income Ratio, Per Capita Income and Rate of Income Growth.

(Four-Year Averages, Ratios in Percentages)

<u>Time Period</u>	<u>Saving-Income</u> <u>Ratio^(a)</u>	<u>Per Capita</u> <u>Income^(b)</u>	<u>Rate of Growth of:</u>	
	<u>(1)</u>	<u>(2)</u>	<u>Column 2/^(c)</u>	<u>Column 1/^(d)</u>
1949-1952	6.01	6.90	4.70	-
1953-1956	7.82	8.45	7.72	7.50
1957-1960	9.12	9.81	2.22	4.10
1961-1964	11.72	12.32	8.25	7.10
1965-1968	13.62	16.08	5.27	4.00
-----	-----	-----	-----	-----
1949-1968	9.61	10.71	5.63	5.67

(a) Ratio of Personal Saving over Personal Disposable Income.

(b) Disposable per capita income at 1958 prices in thousand drachmas.

(c) Average annual rate of growth.

(d) Average annual rate of growth between four-year periods.

Source: National Accounts of Greece.

This is not, however, sufficient to support that Greece enjoys an outstanding performance compared with the constancy of this ratio for long periods of time in advanced countries, like the United States and the United Kingdom, despite the huge increases of the level of per capita income in these countries. Thus, the two decades period in Greece is not considered long enough to enable full assessment of the long-term trend of the saving-income ratio which is likely subject to a number of influences.

The same variations in the rate of growth of real per capita income do not seem to exert the same influence on the saving-income ratio. So, it is not surprising that in years of increase in the rate of income growth there is a disproportional increase in the part of income which is saved, while the fall of the rate of income growth is associated with fall in the saving-income ratio. This indicates the presence of an asymmetry of the consumption-income relationship, which is not an exceptional characteristic of Greece⁽¹²⁾. We will attempt to give

(12) See e.g. for U.S.A. Suits D.B. (1962), Ferber R. (1967).

a full interpretation of such an asymmetry in this country later on. For the time being we have to remark here that the rate of income growth does not exert an identical effect on the saving-income ratio through time. This seems to imply that the proportion of income which is saved is not solely affected by the rate of growth of income of the same period.

Chart V.1 clearly shows that the increase in the rate of income growth results in an increase in the saving-income ratio while a rate of income growth below 4 per cent or so is associated as a rule with fall of this ratio. Thus, the same or even higher current per capita income than its past level may have lower than before proportion of income saved. It is questionable how much lower the saving-income ratio is when the rate of income growth drops down, and how much higher this ratio is when the rate of income growth rises. It is the result of the institutional and behavioural frame rather than anything like a natural law. More specifically, it is a matter of adjustment of the annual consumption expenditure to the change in attributes. If the Greek consumers were as a rule near the 'subsistence level', any additional income would be used for buying necessities rather than for saving. In this case, as well as in the case where there were forces to make consumption expenditure very rigid, saving would be entirely residually determined. The forementioned relation of the saving-income ratio with the rate of income growth does not seem to be so close to suggest that saving is treated by the savers ^{as/} a mere residual. The question therefore is what are the main attributes of the planning of the economic units, in which their consumption and saving consist of integral parts.

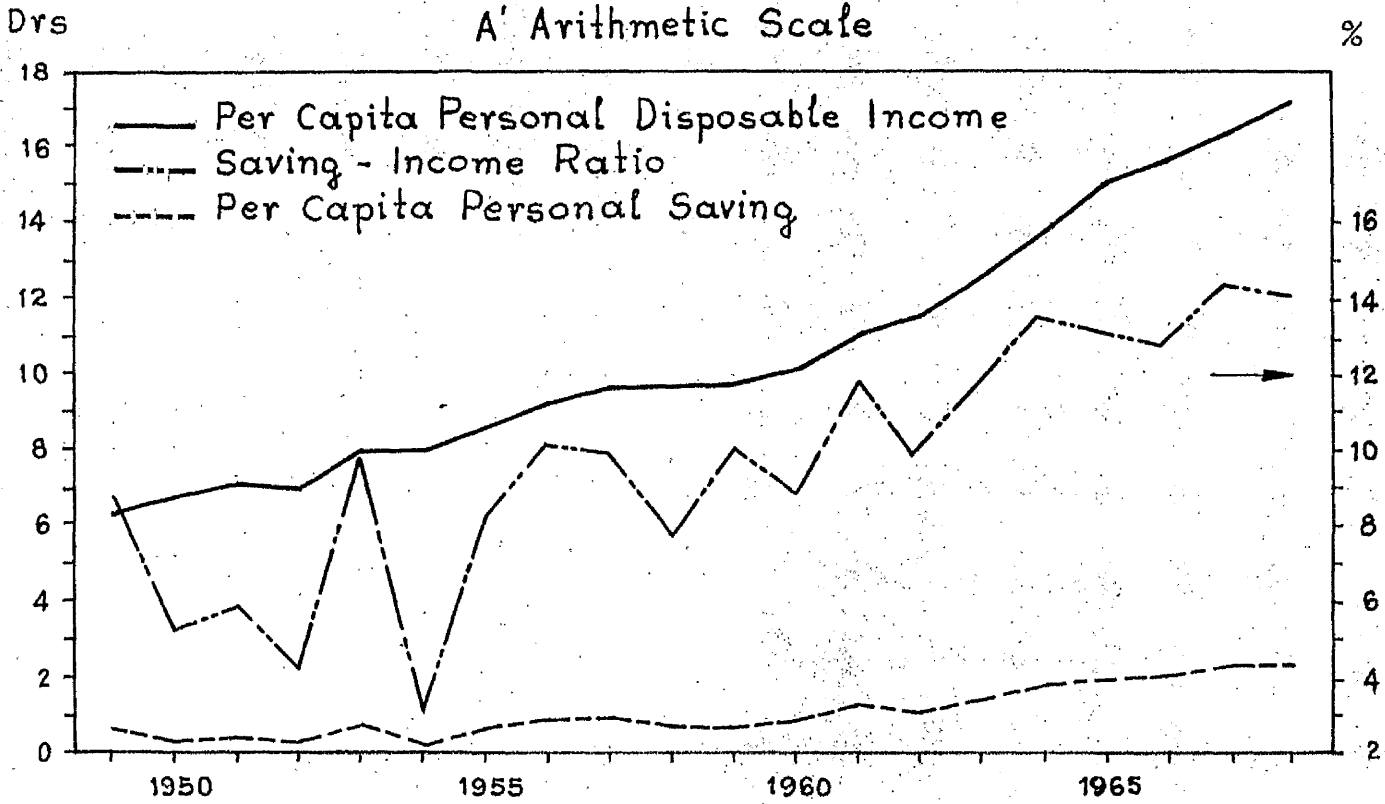
The available aggregate data on personal disposable income and personal saving provide insufficient indications about the merits and demerits of alternative hypotheses in the case of Greece. Thus, the forementioned increase in the saving-income ratio in sixties along with acceleration of the rate of growth of per capita income during the same period, may be assigned to an augmentation of the difference between measured and permanent income ⁽¹³⁾. This view faces, however, the objection that the high rates of income growth in sixties lasted for a period long enough to affect also the permanent income of the Greeks. Positive influence on the permanent component of income may have also been exerted by the forementioned

(13) If the transitory component of income was the predominant factor of the saving-income ratio, it seems extremely difficult to explain why this ratio has fallen down e.g. in the years 1950 and 1965 when the rates of growth of the real per capita income were 6.5 per cent and 8.8 per cent respectively. Similar questions arise for the years 1951 and 1967 in which the saving-income ratio was increased and the rates of growth of the per capita income were 4.1 per cent and 4.5 per cent respectively (see table V.2.1) columns /3/ and /4/).

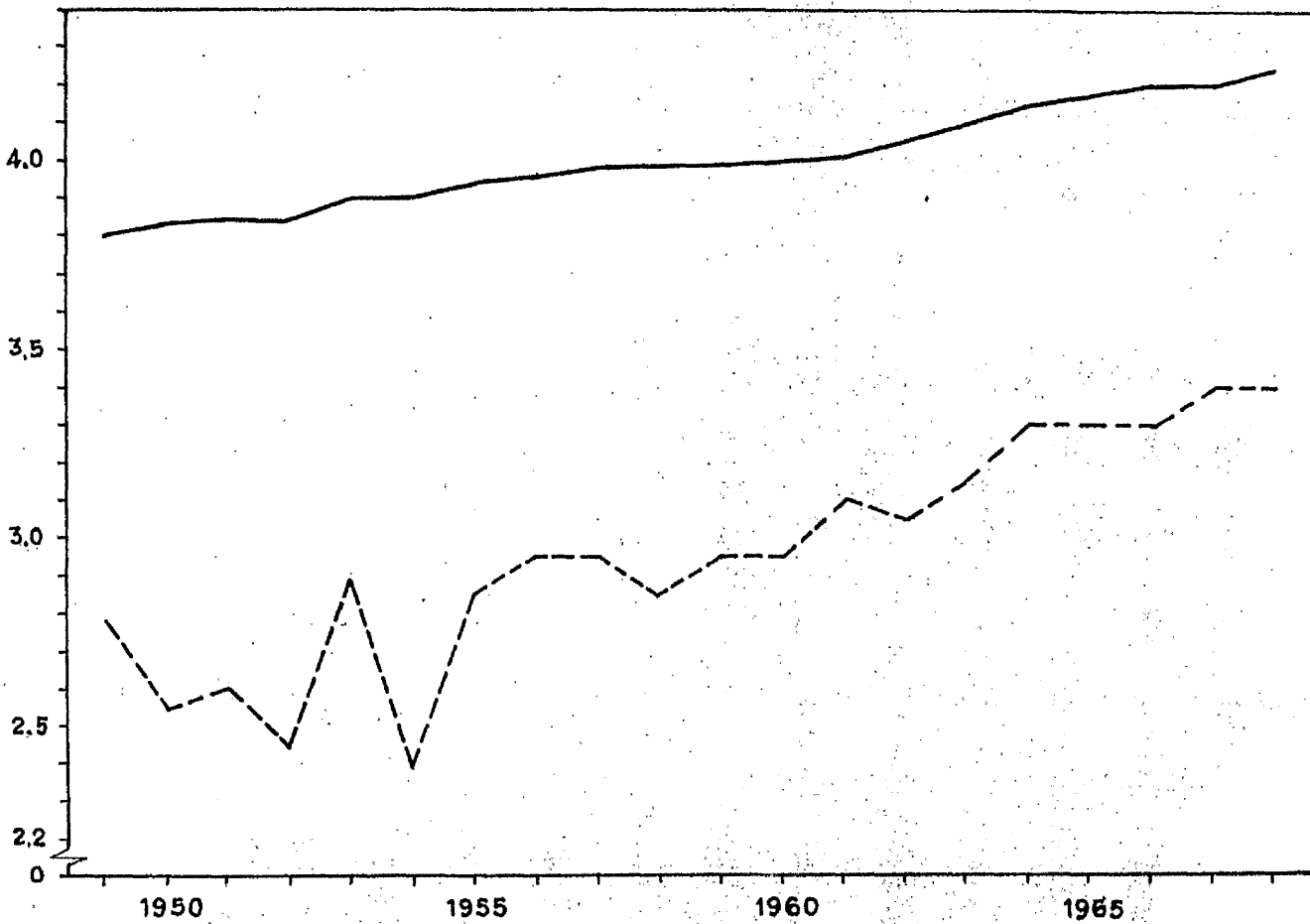
CHART V.1.

REAL PER CAPITA INCOME AND SAVING 1949-1968
(At 1958 Prices)

A' Arithmetic Scale



B' Logarithmic Scale



reduction of the cyclical variations of income in sixties. Further investigation is therefore required for a full judgment of the applicability of the permanent income hypothesis in Greece since late fourties.

On the basis of the available aggregate data, which indicate a persistent increase in the real personal disposable income per capita, the extent of application of the relative-income hypothesis is also difficult to find out. Thus, the ratio of the current to the last peak income coincides under these circumstances with the ratio of the current over last year's income, which equals to the rate of growth of income plus one i.e. $y_t/y_{t-1} = 1 + \Delta y_t/y_{t-1}$. In view of the persistent trend-like movement of the per capita income during the period 1949-1968, we shall make use of additional information from other sources in the attempt to clear out the importance of the relative-income hypothesis and of the demonstration effect so far in Greece. The already shown in table IV.3.4 low stock of main consumer durables per capita in Greece may not be considered as being in favour of this hypothesis. There is, however, some ambiguity on the question at hand since Greeks seem to put as a rule first priority on housing, which requires long time for purchase and full payment by the average income receiver.

Moreover, special difficulties emerge in the attempt of assessing the merits of the life-cycle hypothesis of saving on the basis of the data presented so far. It is recalled, in particular, that the rate of growth of the population during the period 1949-1968 was low (an annual average of .8 per cent) compared with the rate of growth of the personal per capita income during the same period⁽¹⁴⁾. Therefore the pace through time of the rate of growth of real personal disposable income does not differ from the corresponding pace of the rate of growth of the real per capita disposable income, shown in table V.2.1. We cannot therefore find out whether the saving-income ratio is associated more strongly with the growth rate of total real income, as the life-cycle hypothesis maintains, than with the corresponding rate of the real per capita income. Further investigation of the rate of growth of population is going to be carried out later on, alongwith the main changes in the composition of population by age, sex, place of residence and education during the period under consideration.

(14) In addition, the variation of the rate of growth of population is lower than the corresponding one of income (coefficients of variation .37 and .51 respectively).

It seems to derive from the discussion up to now that Greek savers react differently to increases and to falls in their income. Much less clarification is on the other hand possible on the question regarding the reasons of this difference. It is so yet doubtful why the saving-income ratio drops down when the rate of income growth falls. If a full assessment of the applicability of alternative hypotheses were possible, it would enable us to say whether this different reaction is attributed to an effort to protect previously attained by each one living standards or because the consumers assume that the drop of income is of temporary nature, or even because they are on the way of attaining in the future higher living standards than in the past under the pressure of changes of social and cultural nature.

In further consideration of the question at hand, it seems illuminating a comparison of the evolution of the personal saving ordinarily defined with the expenditure on consumer durables. The latter corresponds to about 60 per cent of the former on average during the period 1949-1968 (columns /1/ and /2/, table V.2.3). This proportion is consistent with the forementioned international position of Greece, namely with the leading role which this country holds in terms of saving ordinarily defined. However, the corresponding ratio of the changes between first and last four-year periods of the expenditure on consumer durables and of personal per capita saving is about 70 per cent. This indicates a more rapid rate of increase of the expenditure on consumer durables than the corresponding one of saving ordinarily defined.

The rate of expansion of the outlays for consumer durables is due in part to their low level in the period 1949-1952. The outlays for consumer durables in per capita terms, have been increased at an average annual rate of 317 drachmas in 1958 values compared with a corresponding rate of change of 447 drachmas of the personal saving ordinarily defined (columns /4/ and /5/). Nevertheless, the rate of growth of consumer durables outlays was steadily higher than the corresponding one of ordinarily defined saving, except in the period 1961-1964 (columns /7/ and /8/). During this period the rate of growth of the per capita income was particularly high (column /3/, table V.2.2). On the other hand, during the period 1957-1960 when the rate of growth of income was very low, the rate of growth of the outlays for consumer durables was higher than the corresponding rate of growth of personal saving ordinarily defined per capita. We may therefore expect that consumer

Personal Saving and Outlays of Consumer Durables
(1949-1968)

	In drachmas of 1958 values				P e r c e n t a g e s										
	Per capita Saving		Period Changes of :		Rates of Growth of :				Saving-Income Ratio						
	S_1/NP	D/NP	S_1/NP	U/NP	S_1/NP	U/NP	S_2/NP	U/NP	S_1/Y	U/Y	S_2/Y	U/Y			
1949-1952	415	(2)	158	(3)	573	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
1953-1956	669	301	970	254	143	397	15.3	22.5	17.3	7.82	4.05	11.87	6.01	3.07	9.08
1957-1960	894	516	1,410	225	215	440	8.4	17.9	11.4	9.12	5.64	14.76	9.12	5.64	14.76
1961-1964	1,454	778	2,232	560	262	822	15.6	12.7	14.6	11.72	7.07	18.79	11.72	7.07	18.79
1965-1968	2,194	1,426	3,620	740	648	1,388	12.7	20.8	15.5	13.62	9.75	23.37	13.62	9.75	23.37
1949-1968(a)	1,125	636	1,761	447	317	764	13.0	18.5	14.7	9.65	5.92	15.58	9.65	5.92	15.58

where, S_1 , U , S_2 , N , P and Y stand for the national accounts concept personal saving, expenditure for consumer durables, the total of them, population, price level and personal disposable income at current prices, respectively.

(a) Average annual.

Sources: National Accounts of Greece, 1948-1965, 1960-1968, Statistical Yearbook, 1969.

durables outlays are less strongly related with the rate of growth of income than the narrowly defined personal saving.

We turn now to the question whether the outlined developments of the ordinarily defined personal saving versus outlays for consumer durables can offer anything to the interpretation of the expansion of personal saving during the period 1949-1968, according to alternative hypotheses. If according to Friedman's view we consider consumer durables outlays as saving, and the permanent income hypothesis applies, then these outlays will be related to the rate of growth of income as strongly as the ordinarily defined personal saving. Although this does not seem to reflect the forementioned developments, the fact remains that consumer durables outlays have had a rate of growth somewhat higher than the corresponding one of the national accounts concept of personal saving. Thus, given the observed increase in the ratio of the personal saving over personal disposable income, it implies that the long-term movement of consumer durables outlays is closer to the national accounts personal saving than to other types of consumer expenditure.

These developments seem to imply that the degree of substitution of consumer durables outlays for personal saving may be higher in the longer-run than in a year-to-year basis. This possibility is based on the observation that the trend of the outlays for consumer durables is closer to the trend of personal saving than to the one of other consumption expenditure. This is associated with the indivisibility of consumer durables, the frictions in the market of borrowing and the priority of Greeks to accumulate wealth for improving the level of living⁽¹⁵⁾. For a given rate of income growth, the factors related to the indivisibility and the market frictions are overcome as time passes and the rate of acquisition of durables rises. Otherwise, if the obstacles to this acquisition were less intensive than they actually were, the rate of purchase of consumer durables and the expenditure on consumer durables would be higher than it was in the period 1949-1968.

(15) We see that in years of high rate of growth of income, personal saving increases disproportionately to the consumer durables outlays and vice-versa in years of low rates of income growth. These developments may not apply, however, for rates of income growth above certain amount. Thus, exceptionally high rates of growth of real incomes would enable fast accumulation of the downpayments and purchase of the planned appliances without resort to borrowing.

The possibility that the outlays for consumer durables could be higher than they were and increasing as time passes, provided the rate of growth of income does not fall drastically, encourages a further guess. This is based on the assumption that the forementioned obstacles to the buying of consumer durables have been stronger for the mass of the consumers than for the high income classes. If so, the rate of acquisition of consumer durables was very divergent among different income groups. It is so often asserted by Greek economists that the luxury consumption and housing have a disproportionately high share in the allocation of resources compared with other countries⁽¹⁶⁾. In so far as the increase in this kind of expenditure was attributed not solely to the increase in incomes⁽¹⁷⁾, it may have been in part affected by an extension of the demonstration effect⁽¹⁸⁾. This effect is not in contrast with the observed increase in the saving-income ratio. Thus, the positive influence of the demonstration factor on the consumption of the rich may have been outweighed by relatively low rate of expansion of the consumption of the masses among other things because of the forementioned obstacles to the fast augmentation of the rate of purchase of consumer durables.

(16) See, e.g. Psilos D. (1968, Ellis et.al. (1964).

(17) As we shall see later on, there seems to be only a minor change in the distribution of income by size which means that the rate of increase of the income of the rich was not divergent from the corresponding one of the lower income classes.

(18) For factors in favour and against the demonstration effect in Greece see especially chapter VII.

V. 3. Attempts of Estimating the Size of the Marginal Saving Ratio.

The relationship of personal saving with income in terms of tabular and graphical analysis is extended here by statistical testing carried out in accordance with the previous discussion of chapter III. Taking the real per capita personal saving and the saving-income ratio as dependent variables with saving excluding and including outlays of consumer durables and the real per capita disposable income as independent variable and using the ordinary least-squares method, we obtain the following results:

Table V. 3. 1.

Saving-Income Relationship 1949-1968*

A. Linear Regression of the Per Capita Personal Saving and Income.

(1)	$\left(\frac{S_1}{NP}\right)_t = -966 + .196 \left(\frac{Y}{NP}\right)_t + u_t$	$\bar{R}^2 = .954$
	(8.49) (19.2)	DW = 2.38
		F = 370.5
(2)	$\left(\frac{S_2}{NP}\right)_t = -1,803 + .334 \left(\frac{Y}{NP}\right)_t + v_t$	$\bar{R}^2 = .976$
	(13.2) (27.3)	DW = 1.46
		F = 748.5

B. Linear Regression of the Saving-Income Ratio and Per Capita Income.

(3)	$\left(\frac{S_1}{Y}\right)_t = -.667 + .00084 \left(\frac{Y}{NP}\right)_t + u_t$	$\bar{R}^2 = .736$
	(6.98) (7.34)	DW = 2.67
		F = 50.8
(4)	$\left(\frac{S_2}{Y}\right)_t = -1.260 + .00157 \left(\frac{Y}{NP}\right)_t + v_t$	$\bar{R}^2 = .922$
	(2.65) (15.10)	DW = 2.37
		F = 67.8

* With personal saving and income per capita at 1958 drachmas and the proportion of income which is saved in percentages.

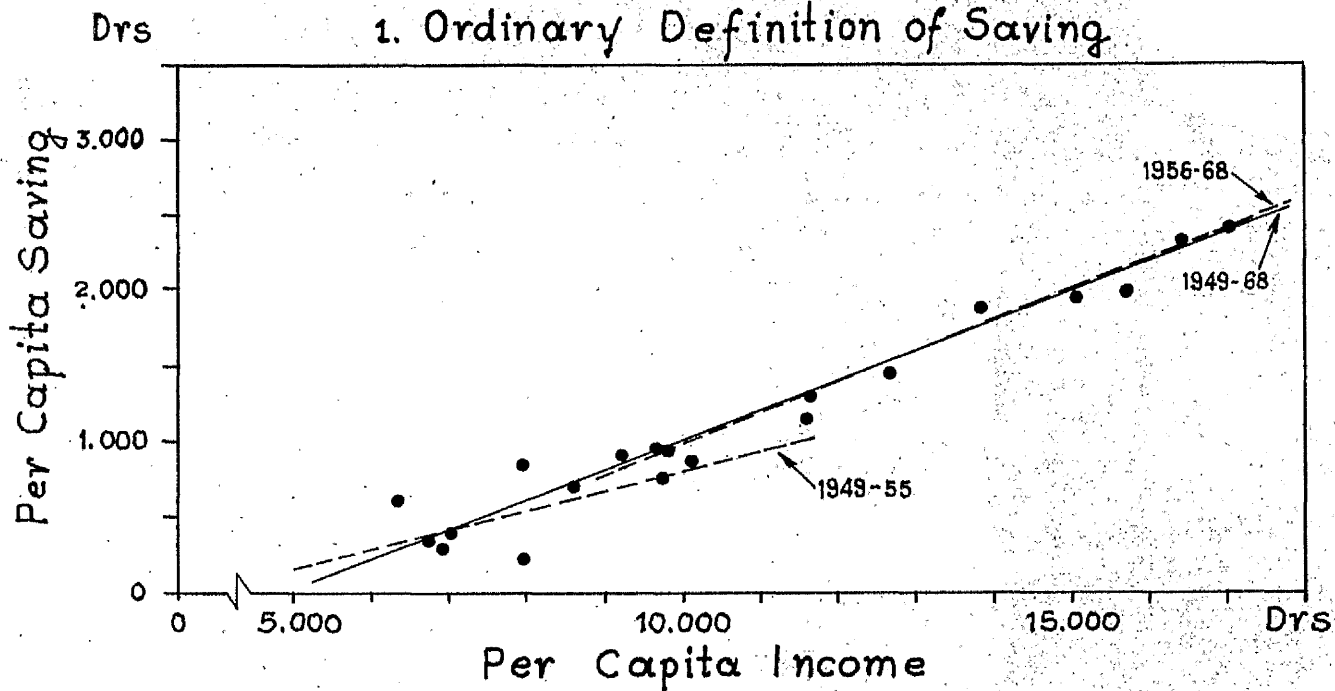
Where, S_1 , S_2 , N , P , Y , t , u and v are the national accounts concept of personal saving, personal saving plus outlays of consumer durables, population, price level, personal disposable income, time and residual terms respectively.

It has to be noticed that in the above relationships, both the regression coefficients of income and the constant intercepts are statistically significant at the 5 per cent level of significance. Thus, the ratio of these estimates to their standard errors, given in parentheses below each of them, exceeds in all cases the $t_{k,a}$ ($t_{17, 0.05} = 2.11$) of the Student's distribution, which implies rejection of the null hypothesis regarding the influence of the per capita income and the non-proportional nature of the relationship. In addition, the variable of the real

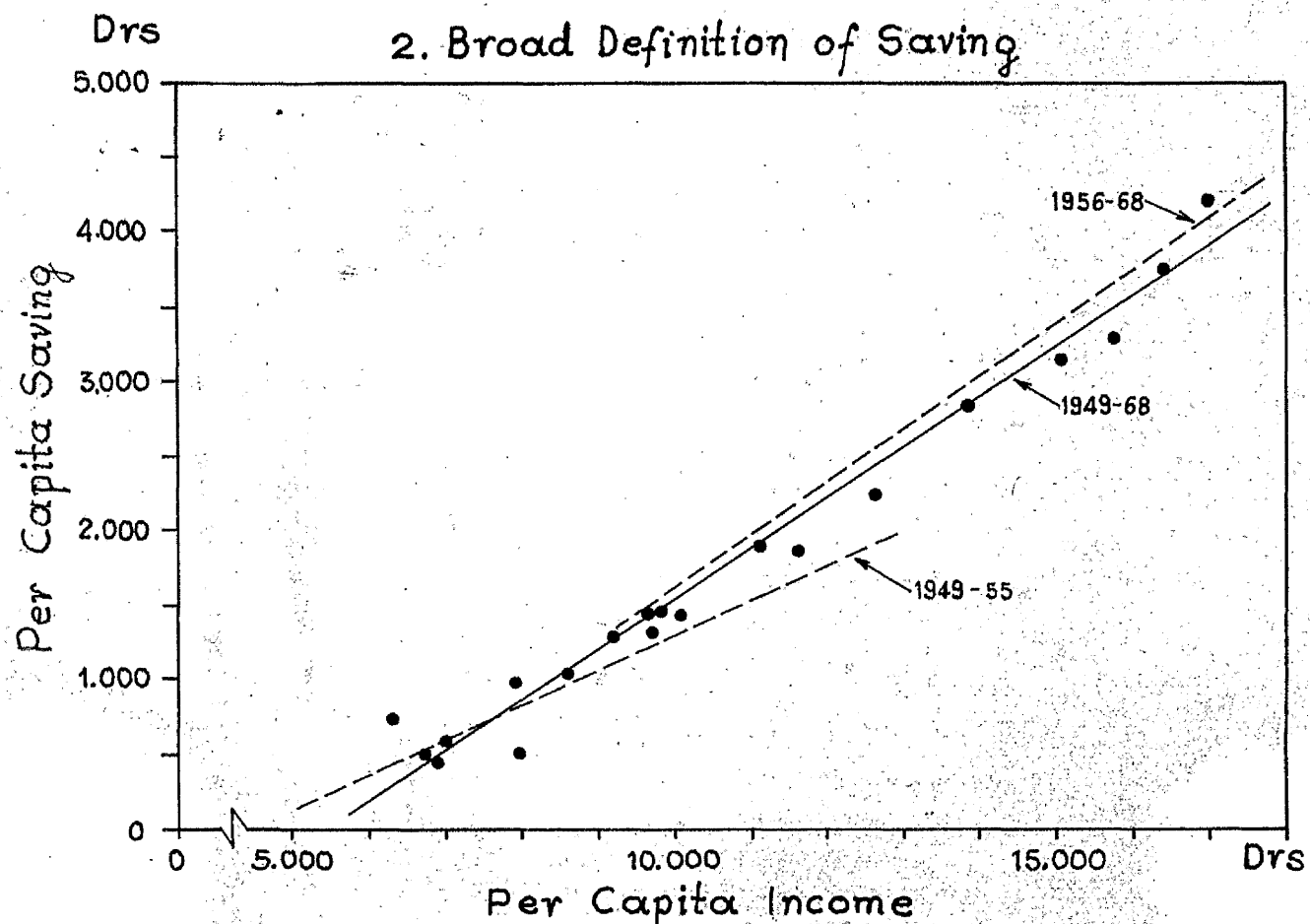
CHART V. 2.

REAL PERSONAL SAVING AND INCOME 1949 - 1968

1. Ordinary Definition of Saving



2. Broad Definition of Saving



per capita income 'explains' statistically significant proportion of the variance of personal per capita saving and of the saving-income ratio. Comparing so the estimated F ratio of the relationships (1)-(4) with the value of this ratio in the table of Snedecor and for the pair of degrees of freedom (18,1) we see that the latter (8.28) is lower than all the estimated F ratios. It is further observed that the estimate of the Durbin-Watson ratio of residuals in the regressions (1), (2) and (4) conforms to the following relation $4-DW > d_U$ at the 5 per cent level, which means no presence of serial correlation. Exceptionally, the difference of the Durbin-Watson ratio from 4 in the regression (3) is between the upper and the lower limits of the theoretical values at the 5 per cent level of significance ($d_L < 4-DW < d_U$)⁽¹⁹⁾. This indicates inconclusiveness about the presence of serial correlation of the residuals in this relationship.

From the economic point of view, the inconclusiveness about the presence of serial correlation of the residual term in the relationship (3) means that the variance of the saving-income ratio with personal saving ordinarily defined may be systematically affected by factors other (e.g. the rate of growth of income) than the level of the per capita income, though the latter explains almost three-fourths of this variance. This finding taken in combination with the other regressions implies that although the saving-income relationship in Greece during the period 1949-1968 seems to follow the Keynesian approach to saving⁽²⁰⁾, this approach weakens to interpret sufficiently the year-to-year variation of the saving-income ratio with saving ordinarily defined.

In view of these reservations we may also raise some doubts about whether the non-proportional form of the estimated regressions is, at least in part and mainly in the regression numbering (3), due to other not yet incorporated variables. Before engaging ourselves with the problem of the omitted variables we have to investigate the estimated value of the regression coefficient of the personal per capita income variable. The marginal saving-income ratio was found at the 5 per cent level to be .196 ($\pm .021$) and .334 ($\pm .025$) for personal saving defined to exclude and to include expenditure of consumer durables. Similarly the obtained regression coefficients by the application of the Wald

(19) For one independent variable and 20 observations the values of d_L and d_U at the 5 per cent level are 1.20 and 1.41 respectively.

(20) It is recalled that this approach is testable by a linear non-proportional form of the saving-income relationship.

method (.195 and .326 respectively) are very close to the former, as can be seen in the table V.3.2. This reduces the danger that the results of our statistical testing are significantly affected by the presence of errors of measurement of the variables of the personal saving and income.

Table V. 3. 2.

Alternative Estimates of the Marginal Saving-Income Ratio

<u>Method used:</u>	<u>O. L. S.</u>		<u>Wald's Method</u>		<u>T. S. L. S.</u>	
	<u>Narrow(a)</u>	<u>Broad(b)</u>	<u>Narrow(a)</u>	<u>Broad(b)</u>	<u>Narrow(a)</u>	<u>Broad(b)</u>
<u>Definition of saving:</u>						
Marginal Saving Ratio	.196	.334	.195	.326	.201	.359
Marginal Consumption Ratio ^(c)	.804	.666	.805	.674	.799	.641

(a) National accounts concept of personal saving.

(b) Personal saving including outlays of consumer durables.

(c) Difference of the marginal saving ratio from unit.

where, O.L.S, stands for the ordinary least squares method.

T.S.L.S, stands for the two stage least squares method.

Moreover, the estimated regression coefficient of the personal disposable income per capita by application of the two stages least squares method (.201 and .359 for the narrow and the broad definition of saving respectively) is within the confidence intervals of the ordinary least squares estimate of this coefficient at the 5 per cent level. It has to be pointed out that the results from application of the T.S.L.S. method are significant in terms of standard errors of estimates and the explained proportion of the variance. Also the Durbin-Watson ratio in the T.S.L.S. method is 2.48 and 2.32 for the narrow and the broad definition of saving respectively, which indicates absence of serial correlation of the residuals at the 5 per cent level of significance ($4 - DW > d_U$). In effect, the closeness of the results of the two statistical methods is associated with the non-presence of serial correlation of the residuals in both cases.

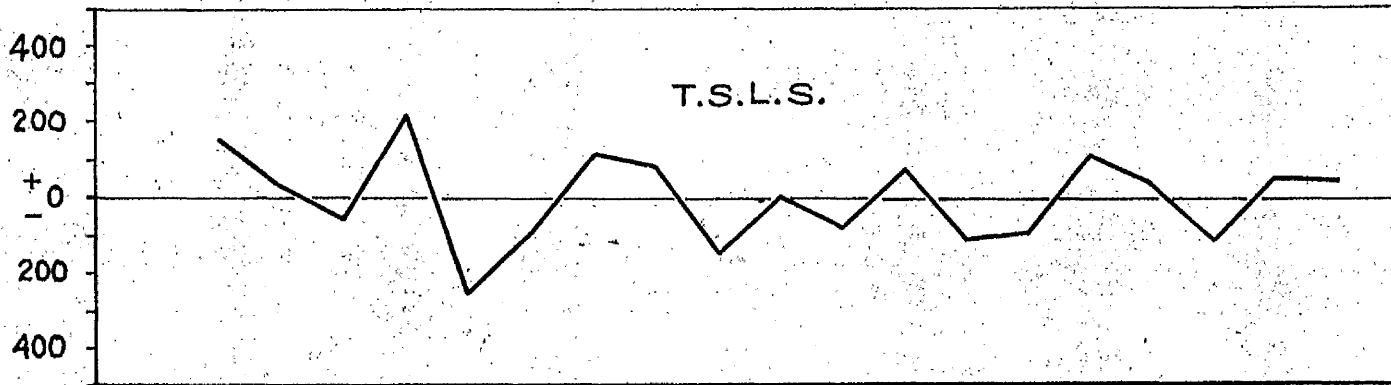
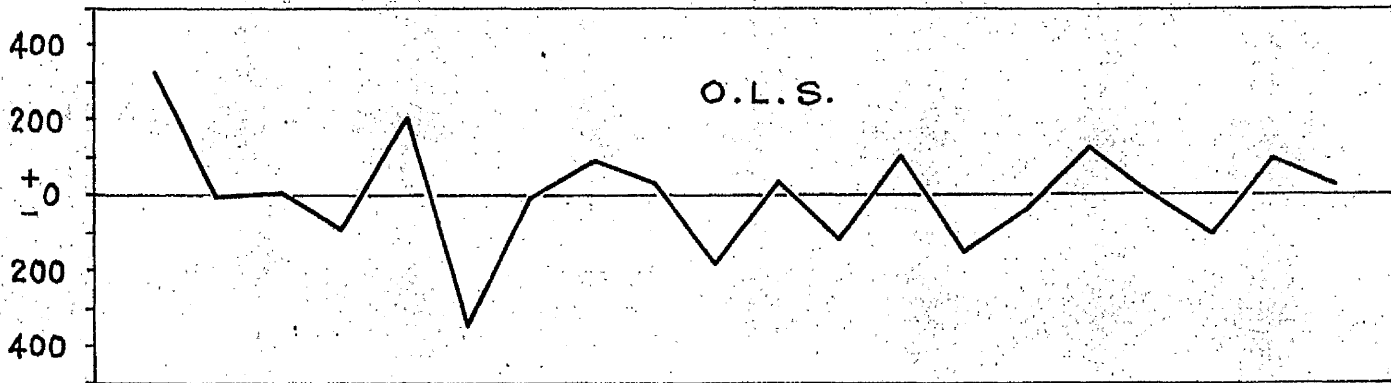
The estimated marginal saving-income ratio for Greece is comparable with the corresponding results of studies in other countries derived by the application of the ordinary least squares method. Thus, Goldsmith (1956) in the U.S.A. has found regression coefficients of income .256 and .317 for the narrow and the broad

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CHART V.3.

RESIDUALS OF THE RELATIONSHIP $\left(\frac{S}{NP}\right)_t = s_0 + s_1 \left(\frac{Y}{NP}\right)_t + u_t$

Ordinary Definition of Saving

Drs



1950

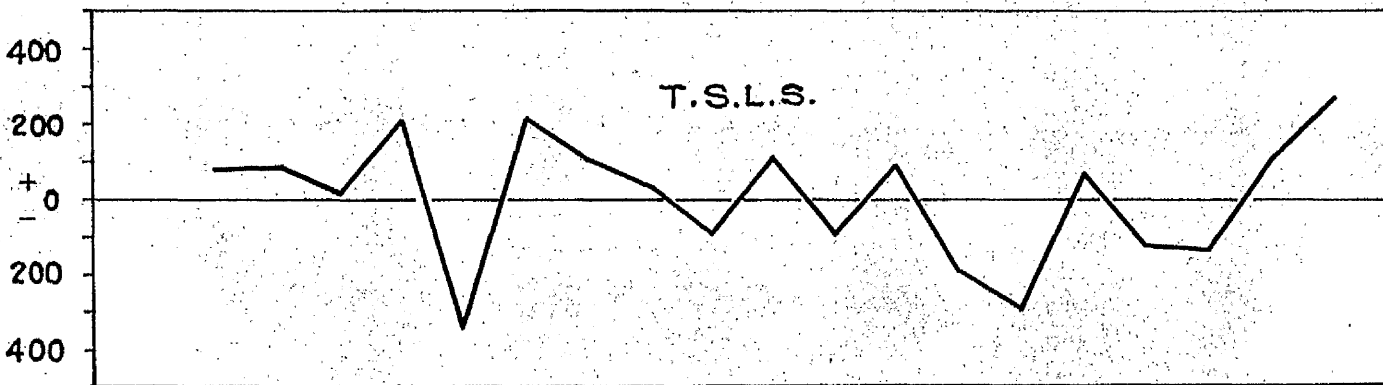
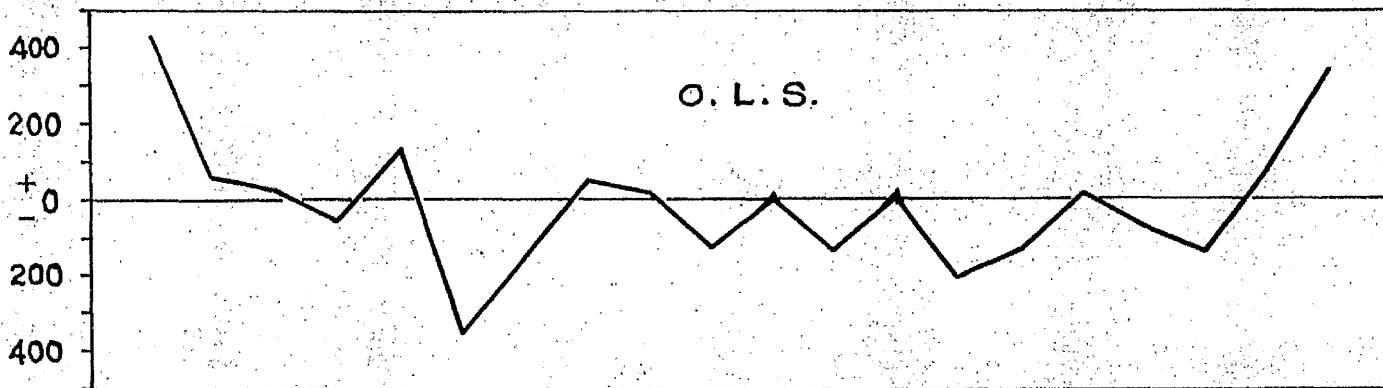
1955

1960

1965

Broad Definition of Saving

Drs



1950

1955

1960

1965

definition of saving respectively during the period 1897-1949. Also Williamson (1968) has found an average marginal saving ratio of Asian countries during the period 1950-1964 of .203 with saving ordinarily defined, which is very close to the results presented in table V.3.2. On the other hand, the estimated marginal saving-income ratio in Greece is lower than the corresponding ones in the majority of the advanced countries of Europe which derived from the country consumption functions estimated by Yang (1964) for the period 1950-1959⁽²¹⁾. The average income elasticity of personal saving in Greece during the period 1949-1968 is about 2⁽²²⁾, which is not particularly high compared with the corresponding ones derived from the forementioned studies in other countries. It may therefore be inferred that the observed increase in the average saving-income ratio in Greece is not attributed to a particularly high marginal saving-income ratio as to the increase in the real per capita disposable income during the period 1949-1968.

A question now is whether the marginal saving-income ratio out of domestically generated income is significantly lower than the estimated already ratio of about .2 for this country. This eventuality can be examined by statistical testing of the forementioned in chapter IV extreme assumption that the transfers from abroad to Greek households are of the nature of capital transfers. This suggests regressing the domestically generated personal saving and personal disposable income at constant per capita values, which has given the following results:

$$\left(\frac{S_h}{NP}\right)_t = -.698 + .143 \left(\frac{Y_h}{NP}\right)_t + u_t$$

(5.62) (9.90)

$$\begin{aligned} \bar{R}^2 &= .896 \\ DW &= 2.23 \\ F &= 155.1 \end{aligned}$$

where, S_h and Y_h are personal saving and personal disposable income minus transfers to households from abroad.

- (21) The marginal saving-income ratios which derive from the estimates of Yang C.Y. (1964) are .306 for the United Kingdom, .356 for Austria, .313 for Belgium, .292 for Netherlands, .278 for West Germany, .196 for Sweden, .119 for France, .238 for Japan, .325 for Burma and .129 for Honduras.
- (22) By definition, the income elasticity of saving for a given period of time equals to the ratio of the marginal saving-income ratio over the average saving-income ratio of the same period. With a non-proportional form of saving-income relationship the income elasticity of saving falls as income rises and tends to unit in the very long-run.

This relationship is also linear and non-proportional similar to the corresponding one of total personal per capita saving and per capita disposable income (/1/, table V.3.1). The confidence intervals of the estimated above regression coefficient of income (.143 ± .029) are outside the corresponding ones of the regression coefficient of income in equation (1) of the table V.3.1 (.196 ± .021) at the 5 per cent level of significance. However, the confidence intervals of the regression coefficient of domestic income at the 1 per cent level of significance (.143 ± .041) coincide to some extent with the corresponding ones of the regression coefficient of the total income (.196 ± .029), as it is more easily shown in the table V.3.3. Therefore, we are not entitled to support that the regression coefficient of the domestically generated income is significantly lower from the one of the total personal disposable income.

Table V.3.3.

Confidence Intervals of the Regression Coefficient of Income*

$$\underline{(\hat{b} - t_{ka} s_b) \leq \hat{b} \leq (\hat{b} + t_{ka} s_b)}$$

<u>Level of Significance</u>	<u>Total Saving and Income^(a)</u>	<u>Domestic Saving and Income^(b)</u>
5 per cent	.175 to .217	.114 to .172
1 per cent	.167 to .225	.102 to .184

(a) based on the regression (1) of the table V.3.1

(b) based on the last regression above.

* The t value of the difference between the regression coefficients of the total and of domestic income is 2.8 > 1.96, i.e. significant at the 5 per cent level.

In addition, we have to face the problem of the possible presence of heteroscedasticity of the disturbance term of the tested relationship of personal saving and personal disposable income. As it has been referred to already, this can take place through testing of the saving-income ratio with the reciprocal of the income in accordance with the relationship (III.82), subject to the forementioned there assumptions. Table V.3.4 presents the results of this testing, which are comparable with the results of the relationships (1) and (2) of the table V.3.1. More specifically, the constant intercept of the relationship (1) of the table V.3.4 (.189 ± .029) is very close and within the confidence intervals of the regression coefficient of per capita income of the

relationship (1) of the table V.3.1 (.196 \pm .021) at the 5 per cent level. Also the regression coefficient of the relationship (1) of the table V.3.4 (-901 \pm 279) is very close and within the confidence intervals of the constant intercept of the relationship V.3.1 (-966 \pm 239). Similar results also derive from a corresponding comparison of the relationships (2) of the table V.3.4 and (2) of the table V.3.1. It seems therefore that the results of the statistical testing of the saving-income relationship during the period 1949-1968 are not significantly affected by presence of heteroscedasticity in the disturbance term.

Table V. 3. 4.

Testing of the Saving-Income Ratio with the Reciprocal of Income*

$$(1). \left(\frac{S_1}{Y}\right)_t = .189 - 900.6 \left(\frac{1}{Y/NP}\right)_t + u_t$$

(13.30) (6.70)

$$\bar{R}^2 = .715$$

$$DW = 2.37$$

$$F = 45.6$$

$$(2). \left(\frac{S_2}{Y}\right)_t = .328 - 1678.1 \left(\frac{1}{Y/NP}\right)_t + v_t$$

(20.90) (11.40)

$$\bar{R}^2 = .870$$

$$DW = 1.49$$

$$F = 129.9$$

* where, income is personal disposable per capita income at constant 1958 values.

We proceed now in testing of the reduced form equations in accordance with the relationships (III.76) and (III.77) to allow for simultaneous equation bias in our results. For this purpose we use personal saving and personal disposable income as dependent variables, and the difference between personal saving and gross domestic investment expenditure as the common independent variable, taken all of them in real per capita terms. This testing, as presented in table V.3.5, has given marginal saving-income ratios .194 and .365 with saving narrowly and broadly defined respectively⁽²³⁾. These values are close to the corresponding regression coefficients of the personal per capita disposable income of the equations (1) and (2) of the table V.3.1. Therefore, we may not expect that our results are subject to significant simultaneous equation bias due to the two-ways causation of personal saving and of personal disposable income.

(23) The marginal saving-income ratio with saving broadly defined (.365) is within the confidence intervals of the marginal saving-income ratio of the relationship (2) of table V.3.1 (.334 \pm .034).

Table V.3.5.

Results of Testing of Reduced Form Equations

(1).	$\left(\frac{S_1}{NP}\right)_t = -223.1 + .938 \left(\frac{O_1}{NP}\right)_t + u_t$	$\bar{R}^2 = .805$
	(2.41) (9.01)	DW = 1.86
		F = 81.4
(2).	$\left(\frac{S_2}{NP}\right)_t = 1,472.3 + 1.328 \left(\frac{O_2}{NP}\right)_t + v_t$	$\bar{R}^2 = .348$
	(4.91) (2.27)	DW = 2.45
		F = 4.12
(3).	$\left(\frac{Y}{NP}\right)_t = 3,753 + 4.823 \left(\frac{O_1}{NP}\right)_t + z_t$	$\bar{R}^2 = .856$
	(5.43) (10.98)	DW = 1.91
		F = 120.6
(4).	$\left(\frac{Y}{NP}\right)_t = 10,058.2 + 3.635 \left(\frac{O_2}{NP}\right)_t + e_t$	$\bar{R}^2 = .782$
	(11.54) (2.16)	DW = 2.13
		F = 3.55

where, O_{1t} and O_{2t} are given as $I_t - S_{1t}$ and $I_t - S_{2t}$ respectively
(with I_t , the gross domestic investment expenditure).

As it has been noticed in chapter III, the goodness of fit of the estimated saving-income relationship can be supplementary tested by the accuracy of the predictions. Thus, from the published lately data for the year 1969 we get per capita personal saving at 1958 values of 2,982 drachmas and 4,932 drachmas for saving narrowly and broadly defined respectively and the per capita personal disposable income at constant values of 18,453 drachmas. This value of per capita personal income gives from the regressions (1) and (2) of the table V.3.1 predicted values of personal per capita saving of 2,650 drachmas and 4,365 drachmas for saving narrowly and broadly defined respectively. Estimating further the standard errors of these predicted values we find the confidence intervals of them at the 5 per cent level of significance to be $2,650 \pm 903$ and $4,365 \pm 525$ respectively or 1,747 to 3,553 and 3,835 to 4,885 drachmas⁽²⁴⁾,

(24) The standard error of the predicted values of the personal per capita saving of the year 1969 (430 drs and 525 drs for the two definitions of saving) were found through the squared standard error of estimate of the regressions (1) and (2) of the table V.3.1 (22,748 drs and 32,710 drs respectively) and of the variance of the personal per capita income by the relationship (1-49) p.36 of Johnston, J. (1963).

for narrowly and broadly defined saving respectively. Thus, the actual value of the personal per capita saving of the year 1969 lies within the confidence intervals of the forecasts, with both definitions of saving. On the other hand, the ratio of forecast to the actual saving of the year 1969 is about 89 per cent with either definition of saving, which corresponds to an error of forecast of about 11 per cent. The error of this magnitude is not particularly high, given that it corresponds to a value of the Theil's U statistic of about .06 for either definition of saving. Despite these records of forecasting performance, it is noticed that the absolute values of the errors of forecast in the year 1969 (drs 332 and 567 for saving narrowly and broadly defined respectively) are about 2.4 times and 3.5 times the corresponding standard errors of estimate. This is attributed to the high rate of income growth in 1969 and the low value of standard errors of estimate of the relationships /1/ and /2/ of table V.3.1 because of goodness of fit.

The above comparisons are relevant to the stability of saving-income relationship over time, but they are inconclusive regarding the concept of saving which provides a more stable relationship. As it appears in table V.3.6 (column /1/), the standard error of estimate is higher for the broadly defined saving (drs 161) than for narrowly defined saving (drs 139). However, the ratio of standard error of estimate over either the standard deviation or the average saving in the period 1949-1968 is lower for the broad than for the narrow definition of saving (columns /3/ and /5/). It means that after allowance for the scale factor, the choice turns in favour of the broad definition of personal saving including expenditure on consumer durables. This gives the first rough quantitative evidence that Greeks may consider consumer durables as a form of saving. However, reservations arise in establishing a fair conclusion on this question, in view of the higher absolute value of the standard error of estimate with broad than with narrow definition of saving. We are therefore going to come back on this question later on, where the dynamic properties of saving function in Greece are investigated.

Table V.3.6.

Standard Errors of Estimate of Two Concepts of Saving 1949-1968:(Drs at 1958 Prices)

<u>Saving</u>	<u>S.E. of</u>	<u>S.D. in</u>	<u>Ratio</u>	<u>Average</u>	<u>Ratio</u>	<u>C.V.</u>
<u>Concept</u>	<u>Estimate</u>	<u>1949-1968</u>	<u>(1):(2)</u>	<u>S/NP</u>	<u>(1):(4)</u>	<u>(2):(4)</u>
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>	<u>(6)</u>
S ₁ /NP	139	682	.20	1,125	.12	.61
S ₂ /NP	161	1,145	.14	1,765	.09	.65

where, S.E., S.D. and C.V. are the standard error of estimate, the standard deviation (both given in drs) and the coefficient of variation (ratio of the standard deviation over the average saving 1949-1968), respectively.

Besides the difficulties of choice between the two concepts of personal saving on the basis of these results, the forementioned rather high error of forecast for the year 1969 in comparison with the standard error of estimate leave still some doubts as far as the stability of the saving-income relationship in time is concerned. This problem is faced in this stage by separate statistical testing of the relationship of real personal per capita saving and income in the period of reconstruction and inflation 1949-1955 and in the more normal period with relative price stability, 1956-1968. The results of this testing are reported in table V.3.7. Testing the significance of the difference between the regression coefficients of income in these two sub-periods with the appropriate test (see section III.3) leads to the estimation of the F ratio of .79 and 2.55 for saving narrowly and broadly defined respectively. Both these are lower than the corresponding $F_{2, 16, 05} (=3.63)$. Therefore we have to accept the null hypothesis with regard to the difference between the regression coefficients of income in two sub-periods at the 5 per cent level of significance for both concepts of saving.

Table V. 3. 7.

Saving-Income Relationship in 1949-1955 and 1956-1968.

<u>No of</u>	<u>Period of</u>	<u>Concept of</u>	<u>Constant</u>	<u>Regression</u>		<u>D.W.</u>	<u>F</u>
<u>Relationship</u>	<u>Observation</u>	<u>Saving</u>	<u>Intercept^(a)</u>	<u>Coefficient</u>	<u>R²</u>	<u>Ratio</u>	<u>Ratio</u>
(1)	1949-1955	S ₁ /NP	-575	.142 ^(b)	.312	2.98	2.76
(2)	"	S ₂ /NP	-950	.221 ^(c)	.351	2.82	2.93
(3)	1956-1968	S ₁ /NP	-1,067	.203 ^(c)	.967	2.73	35.93
(4)	"	S ₂ /NP	-2,068	.353 ^(c)	.983	1.31	64.71

- (a) In drachmas at 1958 values.
- (b) Significant at the 1 per cent level.
- (c) Significant at the 5 per cent level.

In spite of the insignificant difference between the regression coefficients of income of two sub-periods, the constant intercept of the relationship in the period 1956-1968 is about twice the corresponding one of the relationship in the period 1949-1955 in absolute values for either concept of saving. This implies an increase in the zero saving point from drs 4,050 in the period 1949-1955 drs 5,240 in the period 1956-1968 for the ordinary definition of saving. It means that within a period of six years, namely between 1949 and 1956, the level of real consumption which must be reached before start saving has been increased by about 29 per cent. This corresponds to a rate of about 4.9 per cent per annum which is quite comparable with the average annual rate of growth of real per capita disposable income during the period 1949-1955 (6.9 per cent). Whatever is the appropriate interpretation of the shift of this size, it does not seem to be too low to warrant the stability of saving-income relationship in the long-run.

The above reservations are ^{further/} established if we make forecasts with the relationship of each one sub-period for the other sub-period, and compare through this the forecasting performance each of the two relationships outside the period of observation. It is first observed that the standard error of estimate with both concepts of saving is for the saving-income relationship 1956-1968 just about one half of its amount derived from the corresponding relationship 1949-1955 (column/4/,

table V.3.8). The opposite proportions are noticed if we estimate the standard errors of each sub-period on the basis of the residuals derived from application of the saving-income relationship of the other sub-period. More specifically, the average absolute standard error of the sub-period 1956-1968 derived from application of the saving-income relationship 1949-1955 is higher than that of the period 1949-1955 derived from application of the saving-income relationship of the period 1956-1968 (column /5/). These comparisons taken in combination suggest that the goodness of fit both inside and outside the period of observation is better for the saving-income relationship in the period 1956-1968 than in the period 1949-1955.

Somewhat contradictive are the results from the comparison of the Theil's statistic U estimated from the forecasts of each sub-period by use of the saving-income relationship of the other sub-period. Thus, the value of the U statistic in the period 1949-1955 derived from the saving-income relationship of the period 1956-1968 is higher than its corresponding value in the period 1956-1968 derived from the saving-income relationship of the period 1949-1955 (column /8/).

These comparisons seem to cast reservations about the stability of the saving-income relationship throughout the period 1949-1968. It is therefore advisable to carry out a careful further investigation of the dynamic properties of the saving-income relationship in Greece and of the possible destabilizing influence of non-income factors which act in a systematic fashion on this kind of relationship. If dynamic and non-income factors catch up the instability of saving in the period 1949-1968, this may further improve the goodness of fit within and outside the period of observation and so increase the value of the results of statistical testing for policy formation and for prediction. The results of the testing so far tend on balance to show that the saving-income relationship of the period 1956-1968 fits better than the corresponding relationships of the period 1949-1955 and the one of the whole period 1949-1968. This conclusion is further supported by the fact that the errors of forecast of personal per capita saving in the year 1969 derived from the saving-income relationship 1956-1968 are slightly lower than the corresponding errors derived by the saving-income relationship 1949-1968, for both saving concepts.

Table V. 3. 8.

Standard Errors of Estimate and Errors of Forecast of the Relations of the Two Sub-periods*

(In Drachmas, at 1958 prices)

Observation Period	Dependent Variable	Number of Relationship	S.E. of Estimate	S.E. Indirectly Derived	S.D. of Depend Variable (c)	S.E. of Estima- te over S.D. (d)	Statistic U _(e)	Column /5/ over Col./4/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1949-1955	S ₁ /NP	(1)	203	248	213	.96	.35	1.22
"	S ₂ /NP	(2)	219	316	244	.90	.20	1.44
1956-1968	S ₁ /NP	(3)	105	346	590	.18	.12	3.30
"	S ₂ /NP	(4)	137	384	1,017	.13	.08	2.08

* Based on the results presented in the last table.

(a) In the table V.3.7.

(b) From the differences between the actual per capita saving and the theoretical values obtained by application of the saving-income relationship of the other sub-period.

(c) As given in column /2/ and for the time period of the column /1/.

(d) Column /4/ over column /6/.

(e) Based on projections in the other sub-period.

The standard error of estimate obtained by the saving-income relationship of the period 1956-1968 (column /4/, table V.3.8) is higher for the broad (137 drs) than for the ordinary concept of personal saving (105 drs). Nevertheless, the ratio of the standard error of estimate to the standard deviation is (column /7/) lower for the broad definition of saving (.13) than for the corresponding ratio of the narrow definition of saving (.18). Similarly, the statistic U of the projection in the period 1949-1955 by use of the relationships of the period 1956-1968 (column /8/), is lower for the broad definition of saving (.20) than for the ordinary definition (.35). Therefore the breaking down of the whole period 1949-1968 into two sub-periods seems to turn further in favour of the choice of the broad definition of personal saving.

V. 4. Testing the Dynamic Properties of the Saving-Income Relation.

The forementioned budget survey data which became available lately for more than one years give us the opportunity of a first consideration of the short-run saving-income relationship in Greece. Table V.4.1 presents the results of statistical testing of six group averages of household consumption expenditure and income for the years 1957/58 and 1968/69⁽²⁵⁾. These results, subject to the already noted reservations about data, are comparable with the results of the testing with aggregate time series of table V.3.1. The marginal saving-income ratios derived from equations (1) and (2) of table V.4.1 are .324 and .314 respectively, which exceed by over 50 per cent the marginal saving-income ratio .196 of the equation (1) of table V.3.1⁽²⁶⁾. As a consequence, the confidence intervals at the 5 per cent level of significance of the marginal saving-income ratios derived from the budget survey data being, $.324 \pm .040$ and $.314 \pm .110$ are outside the previous referred confidence intervals of the marginal saving-income ratio from time series ($.196 \pm .021$).

(25) For reasons of using consumption expenditure including outlays of consumer durables as the dependent variable here see section III.4.

(26) The latter does not differ on the other hand significantly from the regression coefficient of income from time series during the period 1957-1968 ($.208 \pm .025$):

$$\left(\frac{S_1}{NP}\right)_t = -1,139 + .208 \left(\frac{Y}{NP}\right)_t + u_t$$

(7.9) (2.1)

$$\bar{R}^2 = .965$$

$$DW = 3.1$$

$$F = 35.4$$

Also, the confidence intervals of the constant intercept of this relationship at the 5 per cent level ($-1,139 \pm 374$) coincide partially to the confidence intervals of the same relationship during the period 1949-1968. Therefore, this comparison of the regression coefficient of income and of the constant intercept turns in favour of the stability of the saving-income relationship in Greece from aggregate time series.

Table V. 4. 1.

Consumption-Income Relationship from Budget Survey Data.

(1)(a)	$c_i = 2,860 + .676 y_i + u_i$ (10.8) (39.1)	$\bar{R}^2 = .980$ DW = 1.70 F = 101.6
(2)(b)	$c_i = 10,849 + .686 y_i + u_i$ (26.2) (21.4)	$\bar{R}^2 = .977$ DW = 2.03 F = 179.1

(a) Data of the budget survey 1957-1958

(b) Data of the budget survey 1968-1969.

It is reminded that presence of significantly different values of the marginal saving-income ratio from time series and from budget survey data is common in other countries, notably in the U.S.A. A main question arises which can be the interpretation of this difference in the case of Greece. Firstly, we remark that the estimate of the marginal saving ratio is very stable between the two surveys which have an interval over a decade. A further characteristic difference between the results of the two budget surveys is that the confidence intervals of the constant intercepts differ significantly at the 5 per cent level ($2,860 \pm 794$ for the budget survey 1957/58 and $10,849 \pm 1,137$ for the budget survey 1968/69)⁽²⁷⁾. Taking the values of 2,860 drachmas for the year 1957 and 10,849 drachmas for the year 1968 we obtain an average annual rate of increase of the constant intercept of about 14 per cent. This is over twice the average annual rate of growth of the real per capita income between 1957 and 1968 (5.25 per cent). This difference, on the other hand, is not greatly reduced if allowance is made for the increase in the consumer price index (about 25 per cent between 1957 and 1968) and for the change in the size of household during the same period (3.8 members in 1957/58, 3.3 members in 1968/69).

It may therefore be maintained that as time passes, Greek people start saving at higher and higher level of income. It has to be recalled here that the estimates of the constant intercept in the consumption-income relationship

(27) The constant intercepts are expressed in terms of annual amounts per household in drachmas.

from household budget survey data may be strongly affected by the under-reporting of the household income. However, application of the Wald method seems to show that the difference of the estimate of the constant intercept between the two budget surveys cannot be attributed mainly to errors in the variables of household consumption and income⁽²⁸⁾. On the other hand, statistically significant difference of the estimate of the constant intercept between the two budget surveys is not sufficient to provide an interpretation about a shift in the consumption-income relationship before further investigation of other possible alternative interpretations.

The approach which applies best to the case depends on which other independent variables of personal saving are appropriately incorporated besides the per capita income of the same year. We notice firstly that the ratio of current to last peak income has not achieved to explain a significant proportion of the variance of the saving-income ratio during the period 1949-1968. The results were not improved by testing the less inflexible adjustment assumption through the use of the ratio of the current to the last year's income (total and per capita) as independent variable. Incorporation of the rate of growth of the real per capita income besides its level as an independent variable has given statistically significant results in terms of explained proportion of variance and of standard errors of the parameters, as can be seen in table. V.4.2.

Table V.4.2.

Personal Saving Regressed with Income and the Rate of Income Growth

(1)	$\left(\frac{S_1}{NP}\right)_t = -1,086 + .197 \left(\frac{Y}{NP}\right)_t + .017 g_t + u_t$	$\bar{R}^2 = .976$
	(2.7) (26.1) (3.1)	DW = 2.02
		F = 17.3
(2)	$\left(\frac{S_2}{NP}\right)_t = -1,924 + .341 \left(\frac{Y}{NP}\right)_t + .005 g_t + v_t$	$\bar{R}^2 = .982$
	(2.3) (32.7) (2.6)	DW = 1.72
		F = 16.4
(3)	$\left(\frac{S_1}{Y}\right)_t = -.095 + .00084 \left(\frac{Y}{NP}\right)_t + .269 g_t + z_t$	$\bar{R}^2 = .882$
	(2.1) (9.8) (4.3)	DW = 1.64
		F = 67.9
(4)	$\left(\frac{S_2}{Y}\right)_t = .025 + .00154 \left(\frac{Y}{NP}\right)_t + .221 g_t + e_t$	$\bar{R}^2 = .952$
	(2.4) (17.9) (3.1)	DW = 1.43
		F = 184.1

where g_t = the annual rate of growth of real personal per capita income in percentages.

(28) Thus, application of the method of grouping averages in the cross-section data 1957/58 has given the following relationship: $c_i = 2,600 + .691 y_i$.

Comparison of the estimates of the marginal saving-income ratios of the regressions (1) (.197 ± .019) and (2) (.341 ± .022) of table V.4.2 with the corresponding ones of the regressions (1) and (2) of table V.3.1 shows that they coincide virtually one by one respectively⁽²⁹⁾. This is assigned to a relatively low influence of the rate of income growth on saving, as can be seen by breaking down the explained proportion of the variance by the level of the per capita income and the rate of income growth (table V.4.3)⁽³⁰⁾. The proportion of the variance due to the rate of income growth is higher for the narrow than for the broad definition of saving and higher for the saving-income ratio than for the real personal saving per capita. The partial correlation coefficients of the saving-income ratio and real personal disposable per capita income are .81 and .90 for saving narrowly and broadly defined respectively, while the corresponding partial correlation coefficients of the same ratio and the rate of growth of real per capita income are .11 and .04.

(29) The corresponding results from testing the relationship (III.84)

$$\text{are: } \left(\frac{S_1}{Y}\right)_t = .176 - 942 \left(\frac{1}{Y/NP}\right)_t + .296 g_t + u_t \quad \begin{array}{l} \bar{R}^2 = .890 \\ DW = 1.54 \\ F = 74.6 \end{array}$$

(19.1) (10.2) (5.5)

$$\left(\frac{S_2}{Y}\right)_t = .316 - 1,716 \left(\frac{1}{Y/NP}\right)_t + .270 g_t + v_t \quad \begin{array}{l} \bar{R}^2 = .925 \\ DW = .84 \\ F = 11.5 \end{array}$$

(25.1) (15.0) (3.7)

(where S/Y and g are taken in percentages).

The derived from these relationships marginal saving-income ratios have confidence intervals (.176 ± .020) and (.316 ± .025) for saving narrowly and broadly defined respectively. Also the confidence intervals of the constant intercepts are (-942 ± 176) and (-1716 ± 228). These estimates of the marginal saving ratios and of the constant intercepts do not differ significantly at the 5 per cent level from the corresponding estimates of the relationships (1) and (2) of table V.4.2. The residuals of the latter have therefore a fairly constant variance and are not subject to presence of heteroscedasticity.

(30) This breaking down is carried out through the so-called coefficients of separate determination, for which see e.g. Mills F.C. (1955).

Table V.4.3.

Coefficients of Separate Determination of Income and Rate of Income Growth

Dependent Variable	Proportion of Variance Explained by:		
	$(\frac{Y}{NP})_t$	g_t	Total*
	(1)	(2)	(3)
$(\frac{S_1}{NP})_t$	.939	.040	.979
$(\frac{S_2}{NP})_t$	.975	.009	.984
$(\frac{S_1}{Y})_t$	.699	.196	.895
$(\frac{S_2}{Y})_t$	.893	.064	.957

* Columns (1) plus (2).

The possibility of no particularly high net contribution of the rate of growth of income to the variation of the proportion of income which is saved in Greece may be associated with the observed reduction of the variation of the rate of growth of income at the time of increase in the saving-income ratio. It does not indicate therefore necessarily an extremely fast adjustment of the consumption expenditure to the changes in income, as it was pointed out in the last section. This problem can be investigated further now by incorporation of the last year's consumption expenditure besides current income as an independent variable of the personal saving.

Table V.4.4 presents the results of statistical testing with the ordinary least squares method and personal saving as a function of current per capita income and last year's per capita consumption at constant 1958 values. The first thing remarked here is that the exact values of the regression coefficients of income in equations (1) and (2) of table V.4.4 (.301 and .528 for narrowly and broadly defined personal saving respectively) exceed the corresponding regression coefficients of the equations (1) and (2) of table V.3.1 by over fifty per cent (54 per cent and 58 per cent for the two definitions of saving). In particular, the confidence intervals of the regression coefficient of the

income variable in table V.4.4 (.302 ± .195) are within the range of the estimates of the short-run marginal saving-income ratio from budget survey data in table V.4.1 (.324 for the year 1957/58 and .314 for the year 1968/69). On the other hand, simple transformation of the equations (1) and (2) of table V.4.4 in accordance with the discussion of the relationship (III.21) gives a measure of the long-run marginal saving-income ratio (.195 and .330 for the narrow and the broad definition of saving respectively). These estimates are almost identical to, and consequently do not differ significantly from, the corresponding regression coefficient of the personal per capita income in equations (1) and (2) of table V.3.1.

Table V.4.4.

Personal Saving and Income and Last Year's Consumption*

(1)	$\left(\frac{S_1}{NP}\right)_t = -879 + .302 \left(\frac{Y}{NP}\right)_t - .133 \left(\frac{C_1}{NP}\right)_{t-1} + u_t$	$\bar{R}^2 = .946$ DW = 2.18 F = 189.0
(2)	$\left(\frac{S_2}{NP}\right)_t = -1,239 + .528 \left(\frac{Y}{NP}\right)_t - .298 \left(\frac{C_2}{NP}\right)_{t-1} + v_t$	$\bar{R}^2 = .971$ DW = 1.59 F = 455.9
(3)	$\left(\frac{S_1}{Y}\right)_t = .79 + .00084 \left(\frac{Y}{NP}\right)_t - .00015 \left(\frac{C_1}{NP}\right)_{t-1} + z_t$	$\bar{R}^2 = .765$ DW = 2.64 F = 28.8
(4)	$\left(\frac{S_2}{Y}\right)_t = .41 + .00193 \left(\frac{Y}{NP}\right)_t - .00058 \left(\frac{C_2}{NP}\right)_{t-1} + z_t$	$\bar{R}^2 = .907$ DW = 2.28 F = 98.4

* where $C_1 = Y - S_1$ and $C_2 = Y - S_2$ i.e. C_2 does not include expenditure on purchase of consumer durables.

Despite the so indicated close values of alternative estimates of the regression coefficient of the income variable we have to face the forementioned problem of possible bias in the estimate of the regression coefficient of lagged consumption and of presence of serial correlation of the residuals in the testing of table V.4.4. This is going also to help the appropriate interpretation of the results of statistical testing.

Alternative testing of the short-run marginal propensity to save can be made by use of first differences of the original values of real per capita personal disposable income. Thus, by losing one degree of freedom we have tested the above relationship with first differences in linear and in linear-proportional form, fact which has turned in favour of the proportional relationship. This is consistent with the relationship of first differences of consumption (III.54), though the regression coefficient of the below relationship (.332) is very close to the one given by the results of table V.4.1 (cross-section) compared with the corresponding one from the results of time series (equation /1/, table V.3.1).

$$\Delta \left(\frac{S_1}{NP} \right)_t = .332 \Delta \left(\frac{Y}{NP} \right)_t + u_t \quad (3.9)$$

$$\begin{aligned} \bar{R}^2 &= .206 \\ D.W. &= 2.49 \\ F. &= 1.6 \end{aligned}$$

The results of this relationship are at least subject to presence of serial correlation of the residuals. They may not be of course quite sufficient for accepting the value of the above regression coefficient, because of non-significance of the coefficient of correlation at the 5 per cent level. Decrease of the value of the coefficient of correlation is usually expected from first differences, though the comparison of this coefficient with the corresponding one derived from testing with original data is not strictly permitted because the dependent variable is not the same in both cases. In addition, it is reminded that the correlation coefficient is not a sufficient measure of goodness of fit in the case of the above equation since it has not intercept. We have therefore to note that the standard error of estimate in the above relationship (91 drs) is about two-thirds of the corresponding one (139 drs) in the case of testing with original values (equation /1/, table V.3.1).

We have to investigate now more thoroughly the question about the true value of the long-run marginal propensity to save in Greece which is not provided by the last relationship. We resort for this purpose to the forementioned econometric techniques (section III.4). Table V.4.5 presents the results of the statistical testing of personal per capita saving with personal per capita disposable income and last year's personal per capita consumption expenditure from the use of three alternative statistical methods i.e. the O.L.S., the T.S.L.S. and the T.P.L.S. Comparison of the regression coefficients of income and of lagged consumption between equations /1/ and /2/ on the one hand and equations /4/ and /5/ on the other hand in terms of t ratio does not indicate significant differences

Table V. 4. 5.

Results of Alternative Testing of Personal Saving with Income and
Last Year Consumption*

(Aggregate Time Series: 1949-1968)

Method of Estimation**	Equat. No	Saving Definition	a_0	a_1	a_2	\bar{R}^2	F	D.W.
O.L.S.	(1)	Narrow	-879 (6.4)	+302 (3.2)	-.133 (2.1)	.946	189.0	2.18
T.S.L.S.	(2)	"	-624 (5.9)	+335 (3.7)	-.161 (2.4)	.953	131.4	2.01
T.P.L.S.	(3)	"	-873 (6.3)	+297 (3.1)	-.128 (6.4)	.959	124.9	1.80
O.L.S.	(4)	Broad	-1,329 (5.3)	+527 (5.9)	-.298 (2.2)	.981	155.9	1.39
T.S.L.S.	(5)	"	-1,526 (5.2)	+494 (6.3)	-.275 (1.9)	.968	246.5	1.66
T.P.L.S.	(6)	"	-1,455 (4.6)	+480 (6.1)	-.223 (3.0)	.988	106.8	2.19

where a_0 = the constant intercept in drachmas of 1958 values.

a_1 = the regression coefficient of income.

a_2 = the regression coefficient of last year consumption.

O.L.S. = ordinary least-squares method.

T.S.L.S. = two-stage least-squares method.

T.P.L.S. = three-pass least-squares method.

* The series of personal saving and of personal disposable income and last year's consumption are expressed in real per capita terms, i.e. after deflating by population and the implicit price index of personal consumption expenditure.

** For a discussion about the usefulness of these methods see chapter III.4.

between the O.L.S. and the T.S.L.S. for either definition of saving. This implies that the O.L.S. estimators may not be subject to significant bias because of presence of serial dependence in the disturbance term⁽³¹⁾. It can also be seen that the standard errors of the regression coefficients from the O.L.S. and the T.S.L.S. methods/for both definitions of saving. This means that O.L.S. does not involve any significant underestimation of the sampling variances of the regression coefficients which is supposed to be removed by the T.S.L.S.⁽³²⁾.

In addition, the differences of the regression coefficients of income between equations /1/ and /3/ and between equations /4/ and /6/ are insignificant at the 5 per cent level. Similar results have been drawn as far as the regression coefficient of lagged consumption is concerned. The results of this testing seem to imply that the estimators of the O.L.S. are not likely inconsistent with either definition of saving. In particular, the fact is that the regression coefficient of the lagged consumption expenditure with the T.P.L.S. is not significantly lower in absolute values than the corresponding coefficient obtained by the application of the O.L.S. method. This implies that the estimator of the parameter of the lagged consumption is not seriously downward biased by the O.L.S. and is unlikely to be zero in our case⁽³³⁾.

The regression coefficient of the lagged consumption expenditure may be interpreted in accordance with the relationship (III,25) as a measure of the difference of the coefficient of adjustment of the consumption expenditure from the unit⁽³⁴⁾. This implies that about 87 per cent of the divergence between the 'desired' consumption ordinarily defined and the consumption of the last year is fulfilled within a year in an asymptotic process, according to the results of the O.L.S. method. The corresponding proportion of the consumption defined to exclude expenditure on consumer durables is about 70 per cent. From the application of the T.P.L.S. method the estimates of the adjustment coefficient are 87 per cent and 78 per cent for consumption ordinarily and narrowly defined respectively.

(31) Closely similar results to the equation /1/ of table V.4.5 have been also obtained by testing in terms of ratios to income in accordance with the relationship (III.84), which allows for presence of heteroscedasticity in the disturbance term:

$$\left(\frac{S_1}{Y}\right)_t = .332 - \frac{894}{(4.5)} \left(\frac{1}{Y/NP}\right)_t - .175 \frac{C_{t-1}}{Y_t}$$

This gets $s_0 = -894$, $s_1 = .332$ and $s_2 = -.175$.

$\bar{R}^2 = .694$

D.W. = 2.21

F. = 28.6

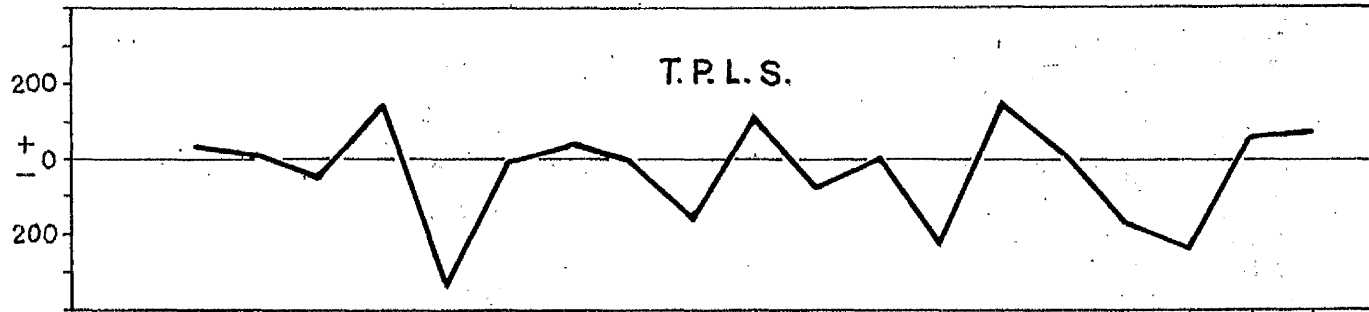
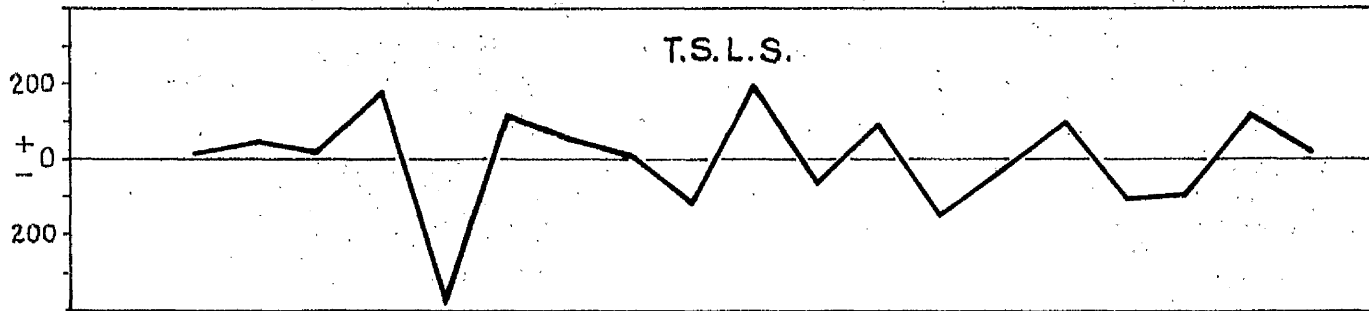
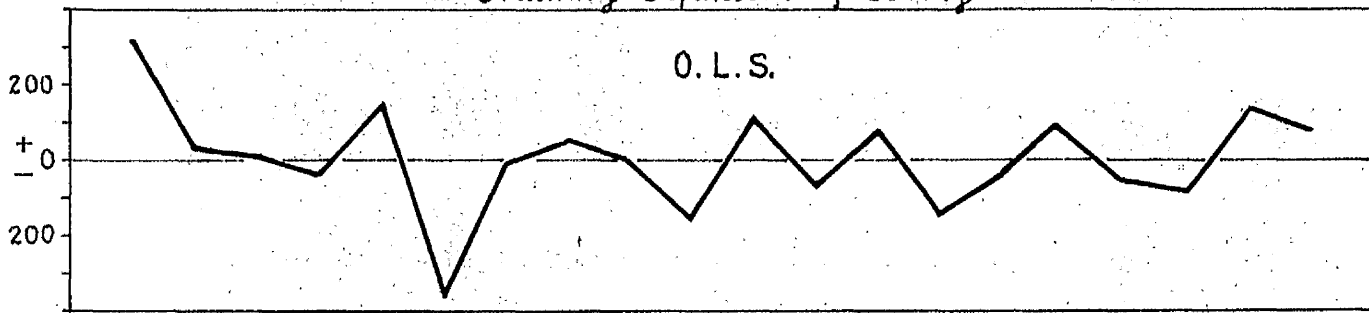
(32) As it has been shown by Professor Johnston J. (1963), p.186, the T.S.L.S. is equivalent to the generalized least-squares method.

(33) How great this danger usually is see especially Griliches Zvi (1961).

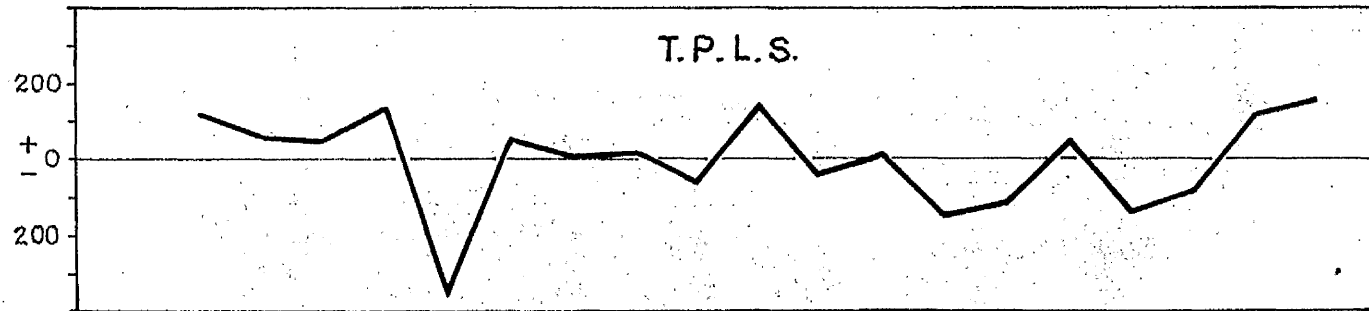
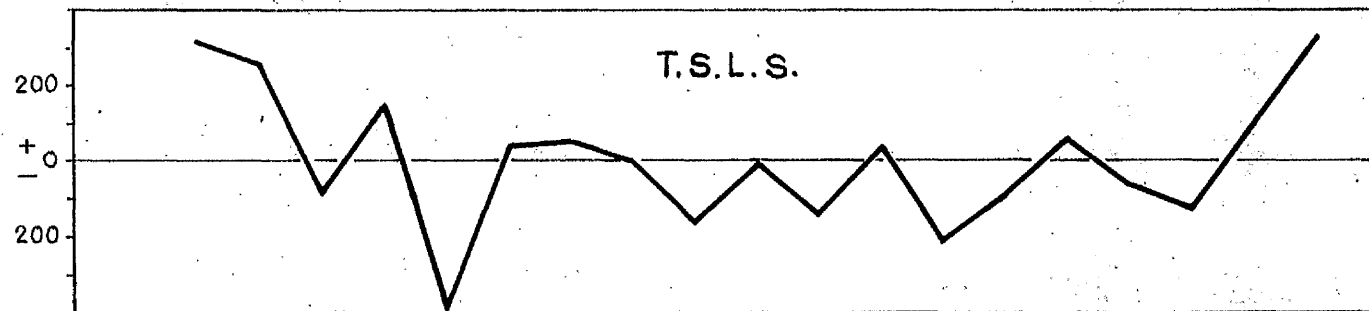
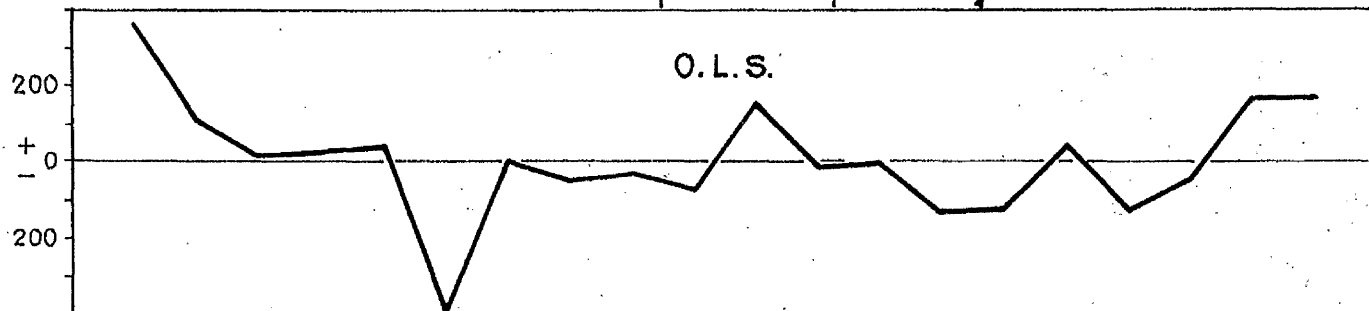
(34) Thus, taking the regression coefficient of lagged consumption as $(1-B)$ we have $-(1-B) = -.133$ and $B = .867$.

RESIDUALS OF THE RELATIONSHIP $(\frac{S}{NP})_t = s_0 + s_1 (\frac{Y}{NP})_t + s_2 (\frac{C}{NP})_{t-1} + u_t$
Ordinary Definition of Saving

Drs



Broad Definition of Saving



1950

1955

1960

1965

Alternatively, and according to the relationships (III.32) and (III.27), the regression coefficient of the lagged consumption may be interpreted as a measure of change of permanent income following the changes of measured income. It means that 87 per cent of the difference between observed income and last year's permanent income is transformed into permanent income of the current year. The corresponding proportion for the narrow definition of consumption expenditure is 70 per cent. Applying now the estimates of B to the regression coefficient of income in accordance with (III.32), we get values for the coefficient a_1 equal to .804 and .672 for the broad and narrow definition of consumption expenditure respectively. Therefore, the relationship (III.91) gets the following form for the two definitions of consumption expenditure:

$$\left(\frac{C_1}{NP}\right)_t = 879 + .804 \cdot 867 \sum .133^r \left(\frac{Y}{NP}\right)_{t-r} = 879 + .697 \sum .133^r \left(\frac{Y}{NP}\right)_{t-r}$$

$$\left(\frac{C_2}{NP}\right)_t = 1,329 + .672 \cdot 702 \sum .298^r \left(\frac{Y}{NP}\right)_{t-r} = 1,329 + .484 \sum .298^r \left(\frac{Y}{NP}\right)_{t-r}$$

These two equations present the results of the statistical testing in the form of distributed lag structure of the nature of a declining geometric progression. The first term of this progression is the regression coefficient of current income which is identified as the short-run marginal propensity to consume (a_1B), i.e. the product of the corresponding long-run propensity (a_1) and the coefficient of adjustment (B). It is recalled that the size of the derived here long-run marginal propensity to consume is almost identical with the corresponding estimate of the regression coefficient of income when it was used as the only independent variable in time series (regressions /1/ and /2/ of table V.3.1).

On the basis of the regression coefficient of income in the equations /1/ and /2/ of table V.4.4 and of the average income-saving ratio in the period 1949-1968 we find the income elasticity of saving at the point corresponding to the sample mean to be 2.88 and 3.20 for saving narrowly and broadly defined respectively. These values are higher than the corresponding elasticities 1.87 and 2.08 derived from the equations /1/ and /2/ of table V.3.1. This divergence is attributed to the fact that the former represent measures of the short-run elasticity of personal saving while the latter consist of long-run elasticities (see relationship III.114). It is reminded that the longer the period of time the lower the elasticity of saving, provided that income is rising and the saving-income relationship is linear and non-

proportional. The difference between the short-run and the long-run elasticity of personal saving is the result of a different saving-income relationship and can get interpretations as referred to in appendix III.

As far as the contribution to the above differences of the transitory component of income, it is recalled that this component in cross section may not be as small as in the case of time series. More specifically, the transitory component in time series may be zero for a too long sample period. Because this does not happen in our case we apply the relationship (III.115) which is based on this assumption as a first approximation. Inserting a_1 from the results of cross-section testing and the value of a_1 from testing of aggregate time series of ordinarily defined consumption expenditure^{it/} gets:

$$.676 = .804 P_y \quad : \text{ for the cross-section 1957/1958}$$

$$.686 = .804 P_y \quad : \text{ for the cross-section 1968/1969.}$$

Thus, we find the ratio of the variance of permanent income to the variance of measured income P_y to be between .840 and .853. This implies that about 15 per cent of the variance of income in Greece is considered to be attributed to the transitory component⁽³⁵⁾. The so estimated ratio of variance due to transitory income in Greece is lying between the corresponding estimates of this ratio in the United Kingdom (13 per cent) and in the United States (18 per cent)⁽³⁶⁾. The lower contribution of the variance of the transitory income in Greece than in the United States is in spite of the possibility that the variance of income in Greece, a country in intermediate stage of development, is greater than in the United States. Thus, the structure of industry in Greece, in which the farm sector had the higher share to G.D.P. than the manufacturing sector till 1963, may contribute positively to the variance of transitory income. This kind of influence, however, seems to be overoffset by a possible negative

(35) Putting alternatively values for $h=.94$ and for B values .867 and .700 for the broad and narrow definition of consumption, we get in accordance with the relationship (III.120) values of P_y of .98 and .96 for the two definitions of consumption respectively. These values of P_y are closer to unit than the corresponding ones above derived by combination of cross section and time series estimates (.840 and .853).

(36) See Walters A.A. (1968), pp.259-60.

influence exerted by the limitations on competition in Greece (no -freedom of entry in many sectors of the economy without government licence) and the prevalence of price maintenance arrangements since 1955 in the purpose to preserve a low rate of inflation. Anyhow, the estimated value of P_y in the case of Greece does not seem to be of a magnitude to suggest that the variance of saving is attributed largely to the variance of the transitory component of income.

The closeness of the results of alternative statistical testing of personal saving with current income and last year's consumption⁽³⁷⁾ reduces, as it was noticed already, the possibility of presence of serial correlation of the disturbance term. This may also be shown by direct consideration of the time pattern of the residuals of these estimates. Attention to the particular pattern of the disturbance term may in addition help to reveal some factors which have not been considered so far, but which can be observed and taken into account.

It is first observed from chart V.4 that there is a close similarity of the time pattern of the residuals derived by use of the three alternative computing techniques. Another particular characteristic of this pattern is that the residual term takes negative values systematically between four-year periods, namely in the years 1954, 1958, 1962 and 1966. As can be seen in table V.2.1 (column /4/), these are years of low rate of growth of the real per capita disposable income, as a result of recession of the Greek economy, which follows as fore-mentioned a pervasive four-year cyclical movement. The negative value of the residual term of personal saving in these years means that the realized saving

(37) To account for the possibility that not all measured income has the same effect on saving and for the failure of the relationship (III,40) to give acceptable results, we have proceeded toward testing of the (III,43). This has given regression coefficients of the income trend of .191 and .328 which are almost identical with the previous estimates of the long-run marginal saving-income ratio. In addition, this testing has given regression coefficients of the deviation of income from the trend of .347 and .458 for the narrow and the broad definition of saving respectively. These estimates of the regression coefficient of the transient component of income are below .5, compared with a unit suggested by the strict version of the permanent income hypothesis. This kind of comparison is of course subject to certain reservations, namely that the proxy of permanent income used here may be not entirely independent of the income deviation around trend and that the transitory component overlooks bonus payments which seem to be comparatively high in the case of Greece (see section VI,3).

was less than the amount which corresponds to the income and lagged consumption on the basis of the average relationship⁽³⁸⁾. This can be attributed to the fall in the transitory component of income in these years of recession. This kind of interpretation does not imply, however, acceptance of the permanent income hypothesis without a series of reservations. These reservations refer to the forementioned as likely low variance of the transitory component in Greece and the noticed already (section V.2) weakness of this interpretation in some years and between fifties and sixties. Also they refer to the small number of observations for a sufficient assessment of the long-run properties of the saving-income relationship in Greece. It is further noticed that testing of the relationship (III.40) in which both consumption and income are broken into a permanent and a transient component has not obtained statistically significant regression coefficients for all the variables, in spite of goodness of fit. In addition, it is observed that the intercept in all testings presented in table V.4.5 is statistically significant at the 5 per cent level; though it is reminded that the proportionality assumption is not an essentially integral part of the permanent income hypothesis⁽³⁹⁾.

The goodness of fit of the results of table V.4.5 is now examined for outside the period of observation 1949-1968, namely the year 1969, for which data have been published lately. Column /3/ of table V.4.6 shows that the error of forecasting personal per capita saving for the year 1969 with alternative methods is as a rule below 10 per cent. This error variates less with the statistical method applied than with the definition of saving, namely it is lower with the definition which includes expenditure as consumer durables⁽⁴⁰⁾. Similarly the Theil's statistic U has been found to approach zero rather than unit

(38) A roughly similar pattern of residuals of consumption with income and lagged consumption as independent variables in the period 1949-1959 has been attempted to be explained exclusively in terms of the permanent income hypothesis. See Pavlopoulos P. (1966), pp. 85-6.

(39) See Farrell M.J. (1959).

(40) It is reminded that the corresponding forecasts of the year 1969 on the basis of the results of the equations /1/ and /2/ of table V.3.1 have ratios to actual per capita personal saving of the year 1969 about 89 per cent in both definitions of saving. This implies less satisfactory performance of them than the corresponding relationships of table V.4.5 (since the forecasting error of the relationships of table V.3.1 exceeds 10 per cent).

(column 4, table V.4.6), which indicates a satisfactory forecasting performance of the results of table V.4.5.

Table V.4.6.

Forecasts of Saving for the Year 1969 and Standard Errors of Estimate

(Drachmas, 1958 prices)

Dependent Variable	Forecast ^(a)	Relation ^(b)	Forecast over actual	Theil's U	Standard Error ^(c)	Forecast Error over ⁽⁵⁾	Col. (5) over S.D. ^(d)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$(S_1/NP)_t$	2,766	(1)	.93	.04	149	.78	.22
"	3,223	(2)	1.08	.04	138	1.75	.20
"	2,751	(3)	.92	.04	146	.90	.21
$(S_2/NP)_t$	4,793	(4)	.97	.01	164	.84	.14
"	4,265	(5)	.86	.07	186	3.59	.16
"	4,706	(6)	.95	.02	131	1.72	.11

(a) The actual per capita personal saving for the year 1969 was found to be drs 2,982 and drs 4,932 for the ordinary and the broad definition of saving respectively. Also the real personal per capita disposable income in 1969 was drs 18,453.

(b) Number of relationship of table V.4.5 applied to obtain column /1/.

(c) Standard error of estimate of the relationships (column /2/).

(d) S.D. is the standard deviation of personal per capita saving.

With such a not particularly high error of forecasts there is no reason for strong questioning the stability of the estimated parameters outside the period of observation. It has to be noticed, however, that the forecasts of table V.4.6 are in the majority of cases lower than the actual per capita personal saving of the year 1969. This is associated with the fact that the rate of growth of the real per capita disposable income in this year (7.1 per cent) is well above the corresponding average annual rate of growth of 5.6 per cent during the period 1949-1968 (column /4/, table V.2.1). Nevertheless this may not be a sign of alert in view of the not particularly high value of the error of forecast. In addition, it seems worthnoting that the actual value of per capita personal

saving in 1969 is found to be without exception within the estimated confidence intervals of the forecasts at the 5 per cent level.

The fact that the error of forecast by use of the results of the ordinary least squares is very close to the corresponding ones derived from the results of other statistical techniques (column /3/, table V.4.6) has to be further pointed out. This provides additional evidence of consistency with the estimate of the coefficient of the lagged endogeneous variable of consumption by the ordinary least squares. It has, however, to be pointed out that the forecast based on the T.P.L.S. overlooks the influence of \hat{Q}_{t-1} which was used by this method, but is an unknown quantity in the projection period⁽⁴¹⁾. Therefore, the forecast made by the use of the least squares equation is partly complementary to the corresponding projection by use of the T.P.L.S. equation.

Table V.4.6 further shows that the forecasting error is slightly lower with saving defined to include expenditure on consumer durables than with saving ordinarily defined. The goodness of fit within the period of observation seems however to be somewhat better when saving is ordinarily defined than when it is defined to include expenditure on consumer durables. Thus, the standard error of estimate of saving ordinarily defined is 149 drs (equation /1/, table V.4.5) compared with a corresponding error of drs 164 for broadly defined saving (equation /4/, table V.4.5)⁽⁴²⁾. However the standard error of estimate of the T.P.L.S. is lower when saving is broadly defined (drs 131) than with saving excluding expenditure on consumer durables (drs 146). Moreover, after allowance for the scale bias of the standard error of estimate, the comparison turns in favour of the broad definition of saving even from the least squares method. More specifically, the ratio of the standard error of estimate to the average per capita saving in the period 1949-1968 is .093 for the broad definition of saving compared with a corresponding ratio of .132 for saving narrowly defined. Similarly, the ratio of the standard error of estimate to the standard deviation is .143 for saving including expenditure on consumer durables, while the same ratio for ordinarily defined saving is .218 (column /7/, table V.4.6.).

(41) Four at least alternatives have been suggested for the projection of this unknown quantity, though existing theory is a poor guide in assessing these alternatives. See Houthakker H.S. and Taylor L.D. (1966), pp.44-45.

(42) These estimates are based on the results of equations /1/ and /4/ of table V.4.5.

The conflicting results of these comparisons in terms of standard error of estimate, before and after allowance for the bias of scale implicit in the standard error of estimate, add difficulties to the choice between the two concepts of saving employed in the statistical testing. Combination of these comparisons in terms of standard error of estimate and in terms of forecasting performance of the saving function seems to turn, however, in favour of the definition of saving including expenditure on consumer durables in the case of Greece.

CHAPTER VI

PRICE LEVEL, INCOME DISTRIBUTION AND TAXATION.

VI. 1. Price Level and Stock of Wealth.

The so far used saving and income figures were deflated by the implicit price index of the personal consumption expenditure in accordance with the rational consumer behaviour (section III.2). The question now is whether the changes in the price level in Greece have exerted a significant independent influence on the observed increase in the proportion of income saved during the period 1949-1968. As can be seen in chart VI.1, much of the increase in the saving-income ratio has taken place in the period since mid-fifties during which the rate of increase in the implicit price index of the personal consumption expenditure has fallen down. This is not, however, sufficient to prove the kind and the size of the possible contribution of the restoration of the price stability to the increase in the saving-income ratio in Greece, before considering the saving-price level relationship besides other factors of saving.

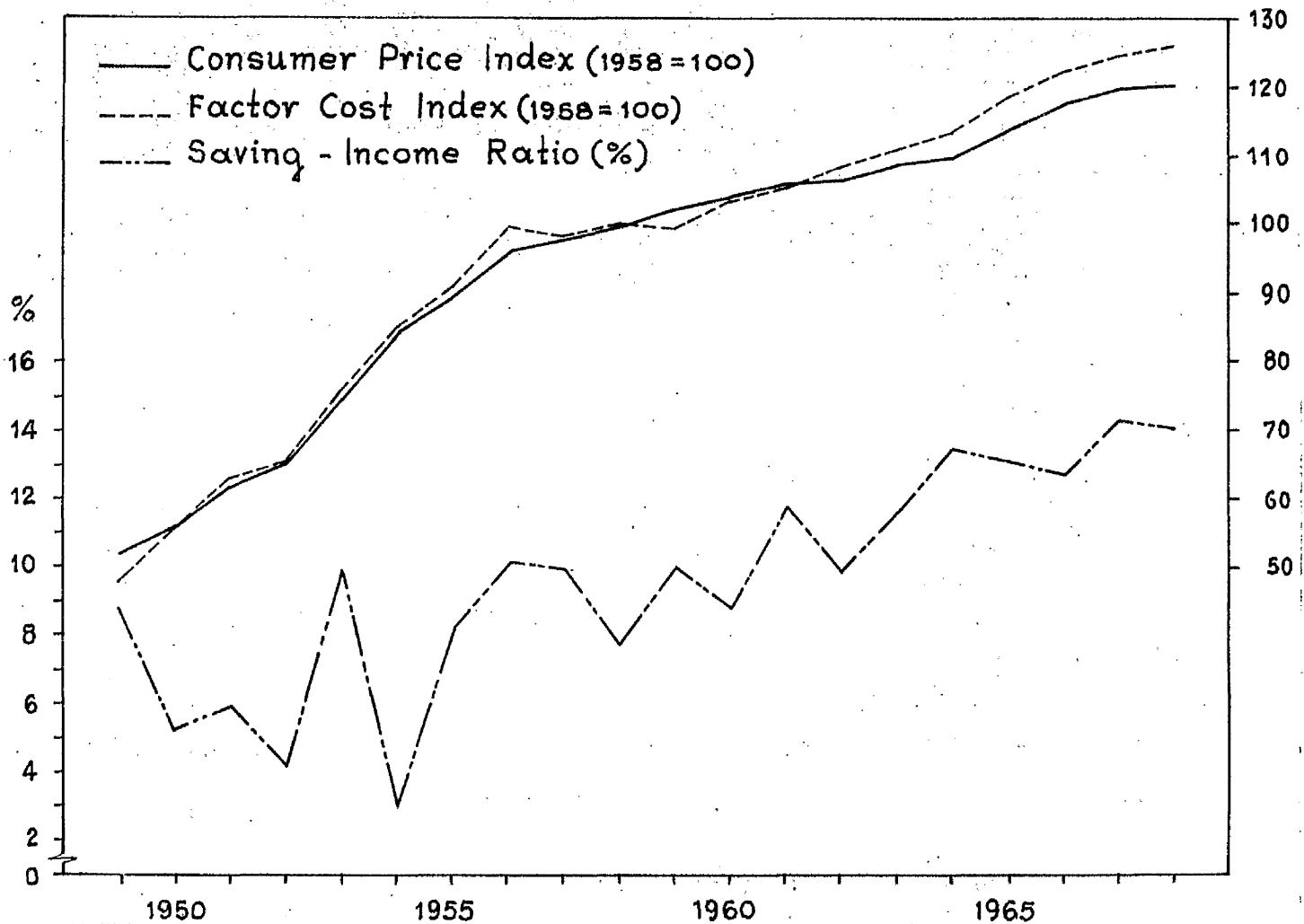
The relationship of consumer prices with personal saving is first examined here in terms of the influence of the former on the real personal disposable income. The influence of price increases is negative only in so far as factor prices are given. If, on the other hand, factor prices are strongly related with consumer prices, which seems to happen in the case of Greece (chart VI.1)⁽¹⁾, the rate of changes in the price level influences money income and leaves largely unaffected the real income and ceteris paribus the flow of saving. Under these circumstances, the cutting down of the rate of growth of consumer prices since 1955 have been accompanied by lower rate of growth of money incomes and have left virtually uninfluenced the real personal disposable income⁽²⁾. A possible parallel movement of wages and salaries and of consumer

(1) Wages and salaries constitute, of course, a relatively important component of the index of factor prices in developing countries with predominantly light industry, like Greece.

(2) Closely parallel movement of the reward of labour and of the prices of final consumer commodities provides indications about minor change in the functional distribution of income which is discussed in some detail in section VI.2.

prices consists of the result of certain bargaining power of employers and trade unions and of incomes policy applied in Greece. The trade unions movement has increased somewhat its power in this developing country, especially after the acceleration of emigration (see section VII. 2).

CHART VI.1.
SAVING - INCOME RATIO AND PRICE LEVEL



The reduction of the rate of growth of consumer prices since mid-fifties may have further exerted a positive influence on personal saving, due to a possible negative effect on expected consumer prices. In particular, if the elasticity of expectations of prices is unit, the fall in consumer prices results in a proportional cutting down of the expected prices. Under these circumstances it does not pay the quick realization of the consumer plans to the extent it has happened so in the past. This kind of influence can appear if the elasticity of expectations of consumer prices is not anyhow zero.

A further source of influence of consumer prices on personal saving may come from the possible presence of 'money illusion' of certain kind and degree during the period under review. Thus, the Greek consumers may consider themselves somewhat better off because they do not realize the relatively low rate of increase in prices since mid-fifties, as much as they do for the parallel increase in their money incomes. If so, the moderate rate of growth of prices affects positively saving more than higher rates of, say, over 4 or 5 per cent per annum and also more than if prices were held constant⁽³⁾.

The possible relationship of consumer prices with personal saving does not affect under certain conditions the estimate of the real personal per capita disposable income. This is easily shown by multiplying both sides of the linear relationship between personal per capita saving and personal disposable income by the measure of the price level P_t which gets

$$\left(\frac{S}{N}\right)_t = s_0 P_t + s_1 \left(\frac{Y}{N}\right)_t \quad (\text{VI. 1})$$

It is obvious that if $s_0 = 0$ and if the covariance $(P_t \frac{Y}{N}_t) = 0$, the estimate of s_1 from VI.1 will be identical to the corresponding estimate of the saving-income relationship in real per capita terms⁽⁴⁾. The results of table VI.1.1 show insignificant differences of the regression coefficients of money income and the corresponding ones of the saving-income relationship in real per capita terms (regressions /1/ and /2/ of table V.3.1), in accordance with the assumptions made for the relationship VI.1. Consequently, though the regression coefficients of the series of price level are statistically significant, a sizeable independent influence of this variable on the volume of saving is rather precluded. This is clear from the relative values of partial correlation coefficients of saving with money income (.969 and .989) and price level (-.223 and -.289) for narrowly and broadly defined saving respectively⁽⁵⁾.

(3) Money illusion of whatever kind may not apply well to all ranges of changes in consumer prices and in money incomes (because if the opposite happens, it would invalidate the assumption of rational behaviour) and may be relatively strong in short periods of time. See Ackley G. (1961), Ball R.J. (1964);

(4) See Ferber R. (1953).

(5) The estimated t ratios for the partial correlation coefficients -.223 and -.289 are 1.3 and 2.9 respectively, compared with the critical value of the Student's distribution 2.11 (for 17 degrees of freedom and 5 per cent level of significance). Therefore, only the partial correlation coefficient of the price level variable with saving broadly defined is statistically significant. It is noticed anyway that the series P_t is an index number and does not express directly the quantitative influence of the price level on personal saving.

Table VI, 1, 1.

Changes in the Price Level and Marginal Saving Ratio,(1949-1968)

Regression Number	Dependent Variable	Independent Variables		D.W. Ratio	F Ratio	\bar{R}^2
		Price Level (a)	Income (b)			
(1)	$(S_1/N)_t$	-1,052 (9.7)	,202 (2.5)	2,72	27,6	.951
(2)	$(S_2/N)_t$	-2,043 (17.7)	,360 (37.0)	1,59	62,2	.954

(a) Implicit Price Index of the Personal Consumption Expenditure (1958=100).

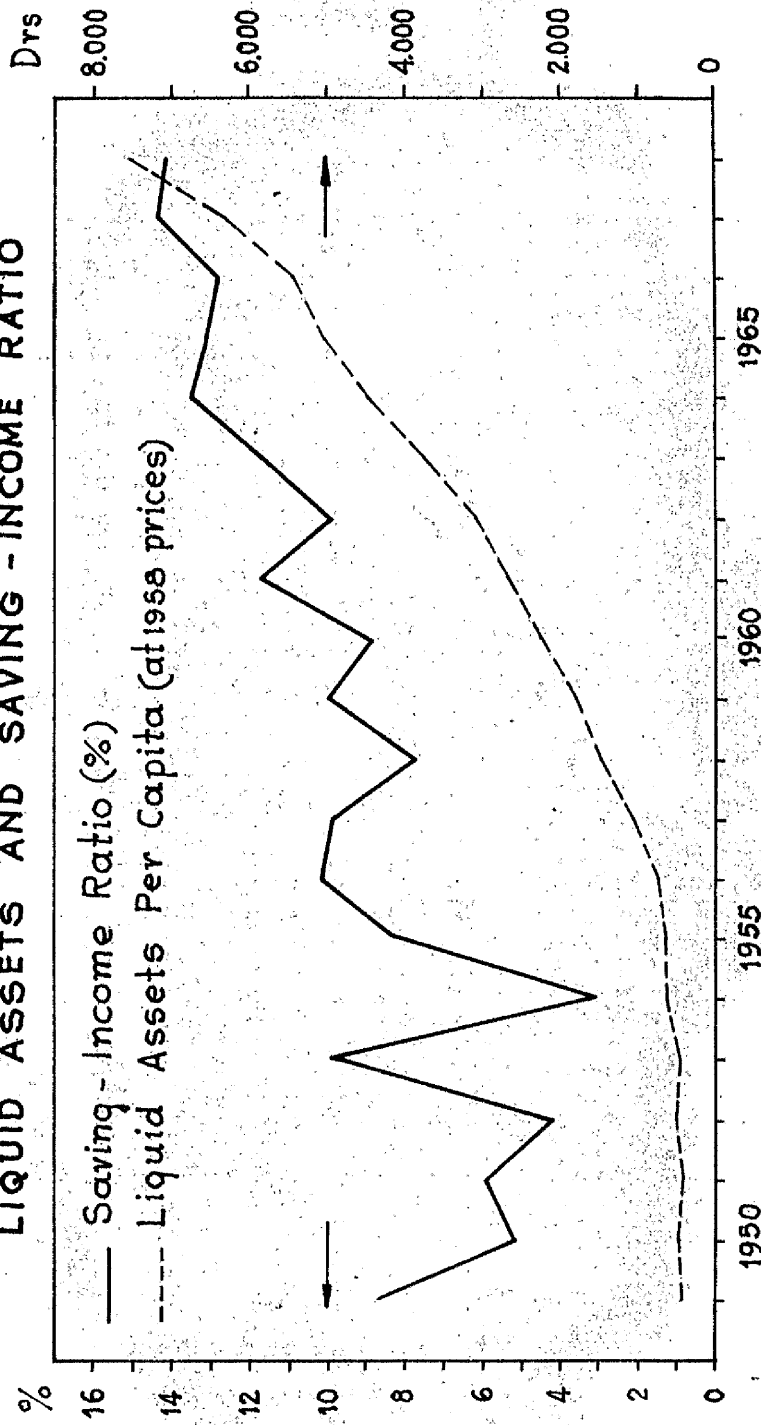
(b) Personal Disposable Income deflated by mid-year Population.

This kind of results seems to cast doubts on the maintained view that Greece can give lessons to other developing economies for an effective application of the monetarist school of economic thought⁽⁶⁾. Thus, the statistical evidence is not sufficient to show that inflation was one of the most important restraining factors to saving till 1955, and that the restored relative price stability has significantly contributed directly to the observed increase in saving onwards. Relative price stability seems of course essential especially in view of the forementioned (section IV.1) special connections of Greece with abroad. Thus, the transfers of capital by emigrants and the expansion of tourism seem to be particularly favoured under conditions of relative price stability. The largest share of the capital inflow to Greece is not business capital for exploitation of investment opportunities so that to affect negatively domestic saving as it possibly happens in other less developed countries (see e.g. Johnson H. (1967), Kafka A. (1967)).

The restoration of relative price stability in Greece seems to have further affected the growth of personal saving. Thus, the replenishment of the lost real value of liquid assets because of the erosion of the 'value of money' during inflation, may have contributed to the observed increase in the proportion of income saved since mid-fifties. 'Liquid assets' are defined here to include claims in fixed currency units, i.e. cash outside the banking system plus deposit accounts of individuals. The real per capita value of liquid assets follows an upward trend

(6) See Palmer D.K. (1962).

CHART VI.2.
LIQUID ASSETS AND SAVING - INCOME RATIO



like the saving-income ratio which becomes particularly strong especially since mid-fifties (chart VI.2). There seems to be in addition a correspondence between year-to-year variations in the rate of growth of liquid assets and in the magnitude of the saving-income ratio. These relative movements seem to add difficulties with regard to the question about the nature and the size of the net influence of liquid assets on the observed growth of personal saving in Greece.

For theoretical and empirical reasons liquid assets may be a poor surrogate of the wealth of the savers (7). Thus, the growth of liquid assets reflects both growth in the wealth and the holding of a part of it into liquid form not necessarily stable over time. In addition, liquid assets are strongly correlated with income. Under these circumstances and in view of the lack of data on wealth, we can only indirectly investigate the wealth effect on the growth of saving in Greece. This problem is simplified to a certain extent by the forementioned transformation of the supposed saving-income-wealth relationship and the use of the testable form of (III.102). Testing this relationship by the ordinary least-squares method has given the following results:

$$\left(\frac{S_1}{NP}\right)_t = .424 \dot{y}_t + .879 \left(\frac{S_1}{NP}\right)_{t-1} \quad \begin{array}{l} \bar{R}^2 = .955 \\ D.W. = 2.71 \\ F. = 47.3 \end{array} \quad (VI.2)$$

The regression coefficients of both independent variables are statistically significant at the 5 per cent level, though the D.W. coefficient is high enough to warrant application of the three-pass least squares method. This does not seem to affect significantly the regression coefficient of lagged saving (8). Thus, application of the T.P.L.S. method has given the following results:

$$\left(\frac{S_1}{NP}\right)_t = .440 \dot{y}_t + .839 \left(\frac{S_1}{NP}\right)_{t-1} \quad \begin{array}{l} \bar{R}^2 = .976 \\ D.W. = 1.81 \\ F. = 53.4 \end{array} \quad (VI.4)$$

The regression (VI.2) gives in accordance with (III.102) estimates of $A_1 = .482$ and $A_2 = -.137$. The relationship (III.101) can therefore get the form

$$s_t = A_0 + .482 y_t - .137 w_t \quad (VI.5)$$

(7) See e.g. Suits D. (1963), Ackley G. (1961).

(8) Testing in addition the relationship (III.102) in linear non-proportional form

$$\text{has given: } \left(\frac{S_1}{NP}\right)_t = 5.833 + .420 \dot{y}_t + .879 \left(\frac{S_1}{NP}\right)_{t-1} \quad \begin{array}{l} \bar{R}^2 = .851 \\ D.W. = 2.71 \\ F. = 51.5 \end{array} \quad (VI.3)$$

The constant intercept of (VI.3) is insignificant, while comparison of this relationship with (VI.2) indicates that the relationship (III.102) is actually proportional as derived from differentiation in time.

Similar transformation of (VI.4) in accordance with the relationship (III.102) gives:

$$s_t = A_0 + .524 y_t - .191 w_t \quad (\text{VI.6})$$

The relationships (VI.5) and (VI.6) remove much of the doubts about the question whether real per capita wealth exerts a negative influence on real personal per capita saving in Greece, although it is difficult to be revealed directly from the available data⁽⁹⁾. Putting now $A_2 = -\frac{1-B}{k}$ from (III.100) and with the estimate of $B = .867$ from equation (1) of table V.4.5., we find from (VI.5) a value of $k \approx .97$. This means, in accordance with (III.98), that Greek savers have plans to acquire on average wealth of real value almost as much as the consumption expenditure per annum. In accordance with the discussion in appendix III, by this way we can get an estimate of the consumption-wealth relationship in case the sum of the estimates of the parameters of income and lagged consumption is less than unit. The so derived estimate of k is somewhat comparable with the corresponding direct estimates obtained by the results of testing in the United Kingdom during the period 1950-1960 (.85) and in the United States during the period 1929-1960 excluding 1942-1945 (.70)⁽¹⁰⁾. The possibility of higher value of k in Greece than in the U.K. and in the U.S.A. may be interpreted in that Greeks plan on average to accumulate higher amount of wealth in relation to their consumption per annum compared with British and Americans, in view of the observed extremely low level of consumer durables per capita in Greece (see table IV.3.4).

Applying now the formula (III.107) to the results of the relationship (VI.3) we get

$$\frac{s_t}{y_t} = 3.52 \frac{y_t}{y_t} \quad (\text{VI.7})$$

It means that the proportion of income saved in the long-run in Greece corresponds to about 3.5 times the rate of growth of the real personal disposable income per capita. This proportionality factor in Greece is lower than the corresponding estimates in the United States and Canada⁽¹¹⁾, though still high to imply a

(9) Houthakker H.S. and Taylor L.D. (1966) have obtained very similar results in the testing with annual data in the U.S.A. and Canada. See especially equations (37) and (41), pp.185,187.

(10) These estimates derive from Ball R.J. and Drake P.S. (1964), table 1, p.76. The definition of consumption there includes expenditure on consumer durables, like here saving is taken to exclude consumer durable outlays (narrow definition of saving).

(11) See Houthakker and Taylor, pp.cit.

saving-income ratio of about 14 per cent for an average rate of growth of real per capita income of 4 per cent per annum. The corresponding estimate based on the assumption of steady exponential growth in per capita income (III.110) of 4 per cent, gives a saving-income ratio of 10.9 per cent.

Similar application of the relationship (III.107) to the results of (VI.6), which is based on the estimates derived from the T.P.L.S. method, gives:

$$\frac{s_t}{y_t} = 2.76 \frac{y_t}{y_t} \quad (VI.8)$$

This implies a saving-income ratio of 11 per cent to correspond to a rate of growth of real per capita income of 4 per cent per annum, while application of (III.110) to the same rate of income growth gets a proportion of income saved of 9.1 per cent.

Using further a rate of growth of per capita income of 9.3 per cent which was found⁽¹²⁾ to be necessary for Greece to fulfill the gap with E.E.C. by 1984 - i.e. the year in which Greece is going to become a full member of E.E.C. - it obtains a ratio of personal saving over personal disposable income of 25.6 per cent and 17.1 per cent by application of the formulas (III.107) and (III.110) respectively. These numbers correspond to 20.7 per cent and 13.9 per cent of G.N.P. respectively provided that the ratio of the personal disposable income to G.N.P. is going to remain stable (1960-1968: 81 per cent). The so found ratios of personal saving to G.N.P. are equivalent to 72 per cent and 49 per cent respectively of the average requirements of domestic saving during the period 1968-1984 (28.75 per cent of G.N.P.)⁽¹³⁾. It is recalled that the average ratio of personal saving to gross domestic saving was during the period 1961-1968 about 60 per cent, which is higher than 49 per cent estimated on the condition of a constant exponential rate of growth of income. This implies that, in so far as the adopted assumptions hold true, the achievement of the target of filling the gap of the per capita income of Greece with E.E.C. by the time of full association of Greece with the Community, will depend upon whether sectors other than the personal one increase their share to the gross domestic saving by 11 per cent, i.e. so that to offset the fall in the share of the personal saving from 60 per cent to 49 per cent. It means that if foreign saving continues financing about 10 per cent of the gross domestic investment expenditure during the period 1968-1984⁽¹⁴⁾, the realization of the above

(12) See footnote 4 section I.1.

(13) These requirements are taken here as the average of the ratios of gross domestic saving to GNP of 26 per cent and 31.5 per cent, which were derived on the assumption about a value of I.C.D.R. between 3 and 3.5.

(14) It is recalled that the contribution of foreign saving, as defined by the national accounts, was an average of 13 per cent during the period 1957-1968 (see table IV.1.1, column 4).

target presupposes an increase in the ratio of corporate and government saving from 40 per cent of the gross domestic saving in the period 1960-1968 to 51 per cent⁽¹⁵⁾.

The corresponding estimates from the use of the variables in aggregate rather than per capita terms are:

$$\begin{aligned} \left(\frac{S}{P}\right)_t &= .584 \Delta \left(\frac{Y}{P}\right)_t + .770 \left(\frac{S}{P}\right)_{t-1} & \bar{R}^2 &= .973 \\ & \quad (5.9) \quad (11.2) & D.W. &= 2.01 \quad (VI.9) \\ & & F. &= 89.6 \end{aligned}$$

From this relationship we obtain $A_1 = .760$, $A_2 = -.311$ and $-\frac{A_1}{A_2} = 2.44$. The product of the latter ratio with the rate of growth of aggregate income of 9.8 per cent during the period 1968-1984 equals to 23.9 per cent, which gives the saving-income ratio on the assumption of constant linear growth. On the assumption of a constant exponential growth rate, application of (III.110) with the above values of A_1 and A_2 and with $g = .098$ we get a corresponding saving-income ratio of 18.2 per cent. The latter has to be compared with the 17.1 per cent found on the assumption of a rate of growth of real per capita disposable income of 9.3 per cent during the period 1968-1984 on the basis of the equation (VI.4).

The estimates of the regression coefficients of the income change and of the lagged saving are significant in both (VI.2) and (VI.9) equations. Comparison, on the other hand, of these two relationships in terms of goodness of fit is carried out by their translation into the same dependent variable. The standard error of estimate of the relationship (VI.2) is 275 drs and the corresponding one of the relationship (VI.9) is 1,695 million drs. The initial standard deviations of the real per capita saving and of the real aggregate saving is 682 drs and 6,080 million drs respectively. Dividing now the standard error of the estimate of the real aggregate personal saving (1,695 million drs) by the average population in the period 1949-1968 (8,190,000) we get 207 drs. This per capita standard error of estimate of saving derived from the relationship (VI.9) is lower than the corresponding standard error of estimate of per capita saving obtained directly from the relationship (VI.2).

Despite the lower standard error of the estimate derived from the relationship (VI.9) than the corresponding one given by the relationship (VI.2),

(15) It is inferred that the volume of saving may become an important constraint to the target of filling the gap of the per capita income of Greece with the average one of the E.E.C. countries within the period 1968-1984.

the forecasting performance of the latter relationship is somewhat better than that of the former relationship. Thus, as it is shown in table VI.1.2, the forecasted value for the year 1969 from the relationship (VI.2) is 93 per cent of the actual value of the same year, while the corresponding number from the relationship (VI.9) is 89 per cent. Theil's coefficient obtained from the relationship (VI.2) is .04 which is also lower than the corresponding one (.06) derived from the relationship (VI.9). The fact that the value of the Theil's U is lower with the relationship (VI.2) than .05 and that the point estimate of the forecast has 7 per cent error from the actual per capita saving of the year 1969, gives a comparative advantage to this relationship against (VI.9) in terms of forecasting performance.

Table VI.1.2.

Forecasted Personal Saving for 1969 with the Estimates of VI.2 and VI.9

<u>Dependent Variable</u>	<u>Actual</u>	<u>Estimated</u>	<u>Relationship</u>	<u>(2):(1)</u>	<u>Theil's U</u>
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
$(S/P)_t^{(a)}$	26,345	23,532	VI.9	.89	.06
$(S/NP)_t^{(b)}$	2,982	2,759	VI.2	.93	.04

(a) In million drachmas

(b) In drachmas

Source: Relationships VI.2 and VI.9, National Accounts of Greece 1960-1969, No 20, Athens 1971, National Statistical Service of Greece.

These comparisons give conflicting indications with regard to the goodness of fit of the relationship in aggregate and in per capita terms within and outside the period of observation. It does not permit choice of the relationship (VI.9) which has been obtained with the magnitudes in aggregate real terms against the relationship (VI.2) expressed in real per capita terms, as the life-cycle hypothesis of saving maintains. In view of this ambiguity, we are going to come back on the problem of the judgment of the merits of this hypothesis in the case of Greece, especially in section VII.3. On the other hand, the forecasting performance of the relationship (VI.2) does not seem to be further improved by the application of the T.P.L.S. (VI.4). Thus, the real per capita ^{saving/}of the year 1969 estimated on the basis of the relationship (VI.4) is drs 2,643 which represents 88 per cent of the actual value against a corresponding 93 per cent derived from the relationship (VI.2).

The results of the relationship (VI.2) do not seem to be distinctly preferable to those of the corresponding relationship with current per capita income and lagged per capita consumption expenditure (equation /1/, table V.4.4). Thus, the regression coefficients are significant in both cases, while the t ratio of the difference of \bar{R}^2 's after transformation to Fisher's zets has been found to be $.64 < 1.96^{(16)}$. Also comparison of the tables V.4.6 and VI.1.2 presents similar difficulty for choice between the relationship VI.2 and equation /1/ of table V.4.4. It is reminded that the former consists of testing of the relationship (III.102) which has derived from the relationship (III.25) after adoption of an assumption about a proportional relationship between consumers' wealth and the last year's personal consumption expenditure.

- (16) Testing the significance of the difference in goodness of fit between these two relationships in terms of coefficient of determination is permitted in view of the fact that the dependent variable in both of them is the same (i.e. real per capita personal saving).

VI. 2. The Rate of Return on Savings.

The growth of assets of consumers is associated with the variety of functions they perform as means of transactions and stores of value or other sources of utility. Increase in the price level reduces the store of value function of assets since it bears capital losses from the resulting cutting down of the real value of assets in fixed money values. In addition, increases in the price level reduce the real rate of return of assets defined as the money yield on savings deflated by the increase in the prices. Thus, the cutting down of the rate of increase in the price level since mid-fifties in Greece would increase ceteris paribus the real rate of return on savings and so would have some positive influence on the realized increase in the saving-income ratio. Leaving aside the reservations about the importance of the rate of return on the flow of saving on theoretical grounds⁽¹⁷⁾, the testing of this kind of relationship is prohibited by lack of sufficient data, as it has been noticed already.

With the available data we can make some use here the rate of interest on savings deposits with commercial banks. So, it is observed that the fall of the rate of growth of prices during the period 1957-1968 was accompanied by a decline of the rate of interest on deposit accounts during the 1961-1968 period (columns /1/ and /2/, table VI.2.1). The fall of the rate of growth of prices was relatively high in the period 1957-1960 with the result an increase in the real rate of interest on deposit accounts to 5.6 per cent per annum (column /3/). During the same period the rate of increase in savings deposits as a proportion of personal disposable income was higher than the corresponding one of the proportion of income saved (columns /4/ and /5/, table VI.2.1).⁽¹⁾ Quite the opposite has taken place during sixties, when both the nominal and the real rate of interest on deposit accounts was reduced. This kind of developments seem to imply that 'the rate of interest' may be more closely associated with the composition of saving by form than with the flow of saving, as expected on theoretical grounds⁽¹⁹⁾.

(17) See e.g. Harrod R.F. (1948), Graaf J.D. (1950).

(18) This is due to the forementioned (section IV.3) massive shift from inventories of commodities and gold sovereigns to savings deposits during that period.

(19) In decisions regarding the composition of saving the structure of the rates of return is associated with the composition of the current flow of saving and of the total portfolio of the savers as wealth owners. In fact, the rates of return affect the composition of the capital account of individuals through the demand for each saving form in comparison with its supply. Our concentration in this context on the causation from the rates of return to the composition of saving, stems on the implicit assumption that these rates are fixed largely by the existing stocks of assets. This assumption is more realistic for assets which have very high volume of stock in comparison with the flow of demand and supply per annum, which is not the same between different types of assets and seems to be less realistic as a rule in less developed countries.

Table VI, 2. 1.

Average Annual Changes in Prices and Savings Deposits Rate
(In percentages)

	Price Changes (a)	Deposits Rate (b)	Real Rate of Interest (c)	Ratios to P.D.I.	
	(1)	(2)	(3)	Deposits (d)	Saving (e)
1949-1952	+10.5	+8.0	-2.3	+ .1	+6.0
1953-1956	+10.2	+7.0	-3.0	+ .2	+7.8
1957-1960	+1.9	+7.7	+5.6	+3.2	+9.1
1961-1964	+1.5	+4.5	+3.0	+2.8	+11.7
1965-1968	+2.3	+5.0	+2.6	+3.8	+13.6
1949-1968	+5.3	+6.6	+1.2	+2.0	+9.6

(a) Average annual change of the implicit price index of private domestic consumption expenditure (1958=100).

(b) Average annual rate of interest on savings deposits with commercial banks.

(c) Derived as $\frac{100 + \text{column } /2/}{100 + \text{column } /1/} - 100$.

(d) Average annual changes of savings deposits in drachmas over average personal disposable income at current prices.

(e) Average ratios of personal saving over personal disposable income.
P.D.I. = Personal Disposable Income.

Sources: National Accounts of Greece 1948-1965, no. 16, 1960-1968, no. 19, Bank of Greece, Monthly Statistical Bulletin, May 1959, May 1961, December 1969.

It has to be pointed out once more that the above used deposit accounts rate may represent insufficiently the yields of other saving forms, in view of the forementioned frictions of the Greek capital market (section IV.3)⁽²⁰⁾. In addition, the rate of return of other forms of saving includes capital gains and losses net of taxation. To allow for this we use here the available estimates of the average rates of return during the period 1956-1965 of saving deposits, bonds, shares, flats of two rooms and gold sovereigns. The rate of return is defined more specifically to include capital gains and losses and to allow for taxation of a single individual⁽²¹⁾ with personal income of drachmas 150 thousand (£ 2,080), but not for changes in the price level⁽²²⁾. The so estimated average rate of return of these five saving forms during the period 1956-1965 is 10.3 per cent, and the corresponding real rate of return is 7.8 per cent after deduction of the average annual rate of increase in the implicit price index of the personal consumption expenditure in the period 1956-1965 (2.4 per cent).

It is now plausible that the average rates of return of these saving forms (column /2/ table VI.2.2) are not capable to interpret sufficiently their relative amounts of accumulation during the period 1956-1965 (column /1/, table VI.2.2). Thus, the disproportionally high investment expenditure in housing is accompanied by one of the highest average annual rates of return of alternative saving forms (11.5 per cent). At the same time the accumulation of shares is extremely low, though the rate of return of this saving form is very similar to that of housing (11.6 per cent). The amount of savings deposits is, on the other hand, disproportionally high compared with the average annual rate of interest (6.5 per cent). This kind of disparities is of course associated with the possibility that the estimates of the rates of return in table VI.2.2 are poorly connected

(20) Given that the rates of interest on deposits and credit are administratively fixed in Greece, the term structure of interest rates can hardly be fully interpreted on purely economic grounds.

(21) Namely income tax, given that taxation of property or unearned income in the form of capital gains does not exist in Greece.

(22) Thus the structure of the rates of return for which we are concerned here does not change if they are divided by the same number of the change in the price level during the period 1956-1965.

with the marginal utility of these alternative forms of saving. One of the main reasons is that the yields as fixed in the market do not sufficiently account for the various differences of the alternative forms of savings in terms of 'divisibility', 'marketability', 'liquidity', 'transaction costs' and 'incon-
viencies' (23).

Table VI. 2,2.

Change in Holdings and Rates of Return of Five Main Forms of Saving.

(1956-1965)

Form of Saving	Change in Holdings		Average Net Return (c)	Variation of Prices (d)
	Million drs. (a)	%		
	(1)	(2)	(3)	(4)
Housing	55,875 (b)	69.0	11.5	.215
Shares	1,120	1.4	11.6	.898
Bonds	6,530	8.1	8.5 (e)	.165
Savings Deposits	18,431 (f)	22.8	6.5 (g)	-
Gold Sovereigns	-1,059 (h)	-1.3	-0.4	.126
Total	80,897	100.0	10.3 (i)	-

(a) At 1958 prices.

(b) Net private investment in housing 1956-1965.

(c) Average earned yield plus capital gains minus capital losses minus taxation corresponding to total personal income of drachmas 150 thousand (in percentages).

(d) Standard deviation divided by the mean price of the period 1956-1965 (coefficient of variation).

(e) On the basis of the issue of the Public Power Corporation in 1958 at 8 per cent interest.

(f) With commercial banks and other financial institutions.

(g) Average annual rate on savings deposits with Post Office Savings Bank.

(h) Net purchases by the Bank of Greece during the period 1956-1965.

(i) Average of column /3/ weighted correspondingly by column /2/.

Sources: Bank of Greece, The Greek Economy 1965 and 1966, Monthly Statistical Bulletin, various issues, National Accounts of Greece 1948-1965, no.16, 1960-1968, no.19.

(23) For the controversy about the definition of these attributes of assets see chiefly Hicks Sir John (1967), Ball R.J. (1964).

A further breakdown of the estimated rates of return in earned yield and capital gains or losses is also relevant to the composition of saving by form. It is so observed that gold sovereigns have no income yield, so that their rate of return (-.4 per cent) represents in total capital losses. On the contrary, savings deposits have only income yield while they bear capital losses from the increase in consumer prices which is not included in 6.5 per cent. Bonds bear 8 per cent yield and only .5 per cent capital gains while shares, on the contrary, have capital gains over 8 per cent given that dividends rarely exceed 3 per cent of share capital in Greece⁽²⁴⁾. Housing seems to bear about the same percentages of rent and capital gains given that the average annual rate of increase in prices of exchanged dwelling units during the period 1956-1965 is about 6 per cent⁽²⁵⁾. This size of capital gains in a rapidly accumulated asset, like housing, may suggest reservations to the view that the Greek savers count much more on current yield than on capital gains and losses. Therefore the low rate of accumulation of shares has not to be attributed to the fact that their rate of return consists largely of capital gains.

The possibility that the Greek savers do not face quite differently the current yield and capital gains implies that saving is not purposing to add to the sources of income and is possibly associated with planning in a long-run time horizon⁽²⁶⁾. Otherwise the rate of accumulation of housing would be smaller

(24) The rate of return of the Greek corporate sector after taxes is estimated in 10.7 per cent (average annual rate of the period 1958-1964), according to the Federation of Greek Industry. This rate is very close to the forementioned weighted average of the rates of return on the five savings forms included in table VI.1.3. This rate is also close to the corresponding rate of return of the manufacturing industry in the United Kingdom (9.5 per cent in the period 1948-1958), in the U.S.A. (9.2 per cent in the period 1949-1958) in Canada (9.9 per cent in the period 1948-1957) and much lower than that in Japan (10.7 per cent in the period 1951-1957). See Houthakker H.S. (1965), table 2, p. 217.

(25) Source: National Statistical Service of Greece, Statistical Yearbook of Public Finance, 1968.

(26) This means that the observed increase in the saving-income ratio is due to a minor extent to saving "for a raining day" in comparison with other motives like acquisition of consumer durables, capital consumption at retirement and bequests.

than it has actually been. Capital gains may be realized, of course, more quickly and with relatively low transaction costs with shares but their high rate of return in comparison with other saving forms does not seem so attractive to the Greek savers. One possible explanation is the often sharp and quite irregular short-run fluctuations of the prices of shares. It has been estimated that the coefficient of variation of the prices of shares during the period 1956-1965 approaches the unit (column /4/, table VI.2.2) and is much higher than the corresponding coefficient of other saving forms in Greece. Also housing has much lower variation than shares, though both have almost the same average annual rate of return. Other saving forms have comparatively low variation of prices coupled with relatively low rates of return. Thus, in so far as the amplitude of the variation of prices is related to the subjectively estimated uncertainty by the savers, it is easier to understand the composition of personal saving by form in Greece as it appears in table VI.2.2. It is not overlooked, of course, that the involvement of the factor of uncertainty here may raise more questions than give answers⁽²⁷⁾. It is not however possible with the available data to go through this kind of questions as regards the composition of the personal portfolio in Greece. It is noticeable anyhow that the composition of the flow of saving seems to be compatible with the structure of the rates of return and the variation in prices. This observation is not sufficient to prove that the flow of saving and its composition is consistent with the theory of assets choice under conditions of uncertainty⁽²⁸⁾, though it seems to be in favour of the assumption that Greek savers are predominantly risk-aversers. In that case the diversification rule may apply to the existing stock of wealth as well as to its increments through saving.

(27) See e.g. Hicks Sir John (1967), Jobin James (1965).

(28) See Sandmo A. (1968), Phelps S.E. (1967), Uzawa H. (1968).

VI. 3. Income Distribution and Saving.

It is recalled here that the type of income distribution which is most relevant to saving decisions depends on the hypothesis that applies to a specific place and time. Since the investigation so far has not permitted a complete choice among alternative hypotheses of saving in Greece, we have to make use of whatever data on income distribution available in this country. The national accounts of Greece do not include a sufficient breakdown of the functional distribution of income. Thus, the total agricultural income is given by one number which comprises also income from hired labour in the farm sector⁽²⁹⁾. Moreover the series of income from property and entrepreneurship includes altogether profits, interest payments, and rent of the non-farm sector. This deprives us from the opportunity of investigation of the possible different saving propensity by source of income.

The forementioned level of aggregation does not furnish similarly a clear-cut of the distribution of income by type of recipient since agricultural income is not obtained altogether by farmers, while income from property and entrepreneurship is shared between the 'capitalists' and the 'workers' in a modern state of social capitalism. Therefore we are not permitted to test for instance the assumption of the Cambridge-England school of economic growth⁽³⁰⁾, that the 'capitalists' have higher propensity to save than the workers.

The available data (table VI.3.1) show a declining share of farm income to the total income of households before tax, offsetting by an increasing share of labour income, and a fairly stable portion of income from property and entrepreneurship during the period 1954-1968 (lines /1/, /2/ and /3/ respectively). There is no breakdown of the non-farm income for the years before 1954, so that labour income is lumped into the income from property and entrepreneurship in that period. The comparison of the movement of shares of the available types of income is useful for our purposes since we take into explicit account the taxation and the transfer payments.

(29) Given, however, that the average size of holdings is too small and that the land belongs to the farmers' families in Greece after the last major land reform in twenties, hired labour is especially low in this country. See Malindretos V. (1970).

(30) See e.g. Pasinetti L. (1961).

Table VI. 3, 1.

Income of Personal Sector Before Income Tax by Source*(Percentage Distribution)

	<u>1954</u>	<u>1955</u>	<u>1961</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>Difference</u> <u>1968-1954</u>
1. <u>Farm Income</u> ^(a)	<u>30.7</u>	<u>30.2</u>	<u>29.1</u>	<u>27.3</u>	<u>26.1</u>	<u>25.2</u>	<u>22.5</u>	<u>-8.2</u>
1a. of which: <u>Transfers</u> ^(b)	<u>1.3</u>	<u>2.6</u>	<u>3.0</u>	<u>5.1</u>	<u>5.6</u>	<u>5.1</u>	<u>5.0</u>	<u>+3.7</u>
2. <u>Labour Income</u>	<u>36.2</u>	<u>36.5</u>	<u>37.4</u>	<u>40.0</u>	<u>41.1</u>	<u>43.4</u>	<u>44.9</u>	<u>+8.7</u>
2a. of which: <u>Pensions</u>	<u>2.4</u>	<u>3.1</u>	<u>3.5</u>	<u>4.5</u>	<u>4.8</u>	<u>5.5</u>	<u>5.8</u>	<u>+3.4</u>
2b. <u>Other Transfers</u> ^(c)	<u>2.1</u>	<u>1.6</u>	<u>2.0</u>	<u>1.8</u>	<u>1.5</u>	<u>2.3</u>	<u>2.2</u>	<u>+ .1</u>
2c. <u>Wages and Salaries</u>	<u>31.7</u>	<u>31.8</u>	<u>31.9</u>	<u>23.7</u>	<u>34.8</u>	<u>35.6</u>	<u>36.9</u>	<u>+5.2</u>
3. <u>Income from property</u> <u>and entrepreneurship</u> ^(d)	<u>33.1</u>	<u>33.3</u>	<u>33.4</u>	<u>32.7</u>	<u>32.8</u>	<u>31.4</u>	<u>32.6</u>	<u>- .5</u>
3a. <u>Rent of Dwellings</u>	<u>9.3</u>	<u>9.4</u>	<u>9.6</u>	<u>8.4</u>	<u>8.4</u>	<u>8.5</u>	<u>8.7</u>	<u>- .6</u>
3b. <u>Others</u>	<u>23.8</u>	<u>23.9</u>	<u>25.2</u>	<u>24.3</u>	<u>24.4</u>	<u>22.9</u>	<u>23.9</u>	<u>+ .1</u>
<u>Subtotals</u>								
2 + 3a	<u>45.5</u>	<u>45.9</u>	<u>47.0</u>	<u>48.4</u>	<u>49.5</u>	<u>51.9</u>	<u>53.6</u>	<u>+8.1</u>
1a. + 2b	<u>3.4</u>	<u>4.2</u>	<u>5.0</u>	<u>6.9</u>	<u>7.1</u>	<u>7.4</u>	<u>7.2</u>	<u>+3.8</u>
<u>Total</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

* It differs from personal disposable income mainly by direct taxes on income, which are not broken down correspondingly.

(a) Includes also income from dependent labour in agriculture.

(b) Including 'current' transfers from abroad plus subsidies from government.

(c) Including health services, unemployment and social security allowances and student and other welfare allowances.

(d) Excluding Depreciation and retained earnings by corporations.

Sources: National Accounts of Greece 1948-1965, No 16, 1960-1968, No 19, account 4 and tables 3, 9 and 11.

As it has been pointed out already, transfer payments to Greek households come in big amounts from abroad. Since a great number of emigrants have farm origin and most of these transfers are sent to emigrant families, the total of these transfers is lumped here into the farm income (line 1). This is a source of upward bias of the farm income, which is supposed to be counterbalanced by the inclusion of most of the transfers from the government to labour income. The total of the latter transfers differs from the net transfers of the Greek government to the household sector which are going to be discussed in the next section. The assumption of the counterbalance is based on the fact that a part of the pensions is received by farmers, especially after 1962 when a low pension to farmers was introduced by the government without direct contribution of them. In addition, other transfers (line 2b) are in part channelled to the farm sector in the form of payment by the budget of salaries of doctors in the villages or health services to farmers by public hospitals.

A further breakdown of the income from property and entrepreneurship is possible by the income from rent of dwellings. It is obvious that the rent of dwellings (item 3a) is the only source of the observed fall of the proportion of income from property and entrepreneurship to the total income of households. This is attributed in part to some fall of the rate of return of this kind of investment expenditure and to a possible underestimation of the imputed rent. On the other hand, comparison of the data of income from property and entrepreneurship with the data on tax records from the Statistical Yearbook of Public Finance shows a closeness of movement. This may indicate a downward measurement bias of the income from property and entrepreneurship, in so far as tax evasion (on which we are going to come back in the next section) is relatively high for incomes not recorded at source.

Allowance is now made for the fact that the account of the income distribution comprises data on income before tax. It is observed that the revenue out of direct taxes on personal income retain a fairly stable proportion of the personal income before taxes (about 10 per cent in 1968 against 8 per cent in 1954). To enable therefore a comparison with the results of the statistical testing using personal disposable income as an independent variable, we may adopt the assumption that there is a proportional relationship between income tax and income before

tax in the case of Greece,⁽³¹⁾ i.e.

$$DT_t = e Y'_t \quad (VI.10)$$

where DT_t and Y'_t are the direct taxes on personal income and personal income before tax respectively.

Given now the definition of the personal disposable income:

$$Y_t = Y'_t - DT_t \quad (VI.11)$$

the relationship of per capita personal saving and of personal disposable income can therefore take the following alternative form:

$$\left(\frac{S}{NP}\right)_t = s_0 + s_1 \frac{Y'_t - DT_t}{N_t P_t} = s_0 + s_1 (1-e) \left(\frac{Y'}{NP}\right)_t \quad (VI.12)$$

Thus, the regression coefficient of the real per capita income before taxation has to be divided by $(1-e)$ to become comparable with the corresponding coefficient of the real per capita disposable income of the personal sector under the Greek conditions. However, our purpose is to use the income of the household sector broken down in accordance with the forementioned available data of the national accounts. Given that a corresponding breakdown of the income recipients is not available, strictly speaking we cannot get series of per capita income of the farmers, workers and of income from property and entrepreneurship. Nevertheless it seems to make no difference if we do not express the available data on income distribution in per capita terms, since population does not exert significant influence on the regression coefficient of income. Testing so the aggregate real personal saving with real personal disposable income and last year's consumption has given the following results:

$$\left(\frac{S}{\bar{P}}\right)_t = -6,950 + .185 \left(\frac{Y}{\bar{P}}\right)_t + u_t \quad \begin{array}{l} \bar{R}^2 = .950 \\ D.W. = 2.26 \\ F. = 43.2 \end{array} \quad (VI.13)$$

$$\left(\frac{S}{\bar{P}}\right)_t = -6,214 + .321 \left(\frac{Y}{\bar{P}}\right)_t - .170 \left(\frac{C}{\bar{P}}\right)_{t-1} + u_t \quad \begin{array}{l} \bar{R}^2 = .955 \\ D.W. = 2.03 \\ F. = 22.7 \end{array} \quad (VI.14)$$

The regression coefficients of income and lagged consumption of (VI.13) and (VI.14) are statistically significant at the 5 per cent level as the corresponding

(31) In so far as DT_t is a non-linear function of Y'_t , say, $\left(\frac{DT}{NP}\right)_t = a_0 + a_1 (Y'/NP)_t + a_2 (Y'/NP)_t^2$, the relationship (III.81) takes the form $(S/NP)_t = s_0 + a_0 s_1 + s_1 (1-a_1) (Y'/NP)_t - s_1 a_2 (Y'/NP)_t^2$. Testing this relationship has given negative but insignificant regression coefficient for the variable $(Y'/NP)_t^2$.

ones of the equation /1/ of tables V.3.1 and V.4.4 expressed in per capita terms. Close also are found the standard errors of estimate of the relationships VI.13 and VI.14 divided by population, with the corresponding standard errors of equation /1/ of tables V.3.1 and V.4.4, respectively. In addition, incorporation of the total population as an independent variable in the relationships VI.13 and VI.14 has given insignificant regression coefficient for population. Consequently omission of the population in testing with income before taxes does not affect significantly our results, since the rate of growth of population is well below 1 per cent per annum (see more in section VII.1). Nevertheless the breakdown of the aggregate income of households into farm and non-farm income during the period 1949-1968 is misleading, given the expansion of the immigration (see section VII.2). Thus, the actual per capita farm income has been growing at faster rate than the aggregate farm income, in view of stagnation if not absolute reduction in the farm population in Greece during the period under consideration (table VI.3.3).

Testing now (VI.13) and (VI.14) with total personal income before taxes in place of personal disposable income has obtained the following results:

$$\left(\frac{S}{P}\right)_t = -6,298 + .162 \left(\frac{Y^t}{P}\right)_t + u_t \quad \begin{matrix} \bar{R}^2 = .949 \\ D.W. = 2.31 \\ F. = 14.3 \end{matrix} \quad (VI.15)$$

$$\left(\frac{S}{P}\right)_t = -5,042 + .288 \left(\frac{Y^t}{P}\right)_t - .177 \left(\frac{C}{P}\right)_{t-1} + u_t \quad \begin{matrix} R^2 = .952 \\ D.W. = 2.13 \\ F. = 21.6 \end{matrix} \quad (VI.16)$$

To compare these results with the corresponding ones of equations (VI.13) and (VI.14) we first divide the regression coefficient of the personal real income before tax by (1-e) in accordance with (VI.12) where we consider the .10 as a reasonable value for the coefficient e. This value derives estimates of the regression coefficient of the income variable .180 from equation (VI.15) and .320 for equation (VI.16), which are almost identical with the corresponding estimates of equations (VI.13) and (VI.14) respectively.

We are now entitled to test saving with farm and non-farm income before taxes for the period 1949-1968. This testing is carried out in terms of static and dynamic saving functions. The latter incorporates as before lagged consumption expenditure as an independent variable:

$$\left(\frac{S}{P}\right)_t = -7,185 + .174 \left(\frac{Y_a}{P}\right)_t + .136 \left(\frac{Y_{na}}{P}\right)_t + z_t \quad \bar{R}^2 = .922$$

(4.8) (2.0) (3.7)

D.W. = 2.03 (VI.17)
F. = 20.4

$$\left(\frac{S}{P}\right)_t = -5,391 + .282 \left(\frac{Y_a}{P}\right)_t + .260 \left(\frac{Y_{na}}{P}\right)_t + .145 \left(\frac{C}{P}\right)_{t-1} + v_t \quad \bar{R}^2 = .925$$

(2.4) (2.1) (2.3) (2.2)

D.W. = 2.07 (VI.18)
F. = 13.4

where, Y_a and Y_{na} are farm and non-farm income respectively.

With due reservations about possible bias of the regression coefficient of the lagged consumption expenditure in equation (VI.18), simple transformation of this as usually into the corresponding consumption function, gets long-run estimates of the marginal propensity to save .160 for the farm income and .134 for the non-farm income. In view of the fact that income tax is virtually paid by the non-farm sector in Greece (section VI.4) and the ratio of taxes on income to non-farm income is 13 per cent, the above estimate of .134 increases in .154 in accordance with the relationship (VI.12). This estimate of the long-run marginal propensity to save from non-farm income is very close to the above corresponding propensity from farm income (.160). Use further of non-farm income deduced by income tax besides farm income and lagged consumption as independent variables in testing with real personal saving has similarly given close long-run coefficients of farm and non-farm income.

Further transformation of the regression coefficients of the relationship (VI.18) into beta coefficients shows the beta coefficient of non-farm income to exceed slightly the corresponding one of the farm income (column /5/, table VI.3.2). This means that an increase in non-farm income by one standard deviation is followed by somewhat larger increase in saving (measured in standard deviation units) than the corresponding effect of increase of one standard deviation of farm income. This comparison is, however, in part misleading as being attributed to the influence of the relatively high rate of growth of aggregate non-farm income on the standard deviation of this kind of income, though the cyclical variation of farm income exceeds that of non-farm income. It may be expected that the divergence between the rates of growth of per capita farm and non-farm income is lower than the corresponding divergence between the aggregate rates of income growth in a developing country like Greece because of urbanization (section VII.2). This may reduce the gap between the standard deviations of farm and non-farm income, and the disproportional effect on the beta coefficient of non-farm income. Therefore, if testing were possible to be made in per capita terms the relative order of the

beta coefficients might be not quite different from the corresponding order of the regression coefficients of total farm and non-farm income.

Table VI,3,2.

Measures of Net Relation of Saving with Variables of Equation VI.18.

Independent Variable	Regression Coefficients (a)	Correlation Coefficients		Standard Deviations (d)	Beta Coefficient
		Simple (b)	Partial (c)		
	(1)	(2)	(3)	(4)	(5)
Farm Income	.282	.927	.417	24,800	1.150
Non-farm Income	.260	.951	.662	29,017	1.240
Last Year's Consumption	-.145	.942	.590	27,773	-.580

(a) Significant at the 5 per cent level.

(b) The correlation coefficients of farm and non-farm income and of each of them with lagged consumption expenditure are .922, .923, and .990, respectively.

(c) Significant at the 5 per cent level.

(d) The standard deviation of the real personal saving during the period 1949-1968 is drs 6,080. The coefficients of variation of personal saving, farm income and non-farm income are .64, .91 and .42 respectively.

We have to turn now our attention toward searching for an interpretation of the comparable marginal propensity to save from farm income with the corresponding one from non-farm income in Greece. It is first observed that the per capita farm income at the census years 1951 and 1961 is about the half the per capita non-farm income in the same years (table VI.3.3). The close marginal propensity to save out of so different levels of per capita income can be taken as consistent with the linearity of the estimated previously saving-income relationship in aggregates.

Looking now at the rates of growth of farm and non-farm income in Greece⁽³²⁾ reassures the relatively low rate of growth of farm income (column /9/, table VI.3.3). It is further however observed that farm population is virtually stagnant

(32) Empirical researchers in advanced countries have furnished a number of alternative interpretations to the possibility of high saving rates of farmers. See e.g. Duesenberry J. (1949), Friedman M. (1957), Klein L.R. (1960), Tobin J. (1951), Friend I. and Schor S. (1959), Komiya R. (1966).

between the census years 1951 and 1961 (columns /3/ and /4/). As a result of this the rate of growth of per capita farm income between these years is almost identical with the rate of growth of per capita non-farm income at 11 per cent (column /10/). The close rate of growth of per capita farm and non-farm income removes the possible first impression given from table VI.3.1 that the observed fall in the share of farm income may be one of the main factors of the increase in the saving-income ratio in Greece.

Table VI.3.3.

Per Capita Farm and Non-Farm Income in Census Years 1951 and 1961^(a)

	Total Income		Population		Per Capita Income				Growth Rates	
	(in million drs)		(in thousand)		In drachmas Country=100				1951-1961(%)	
	1951	1961	1951	1961	1951	1961	1951	1961	Total	Per Cap.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Farm Sector ^(b)	11,138	31,303	3,623	3,674	3,074	8,520	65	67	10.8	11.1
Non-Farm Sector ^(c)	24,833	76,106	4,023	4,724	6,172	16,110	131	126	11.9	11.0
Country Total	35,971	107,409	7,646	8,398	4,705 ^(d)	12,790 ^(d)	100	100	11.6 ^(d)	11.0 ^(d)

(a) Income is taken at current prices. The implicit price index of the personal consumption expenditure in 1961 was 169 (1951=100).

(b) Including current transfers from abroad.

(c) Including transfers from the government to households.

(d) Country averages.

Sources: National Accounts of Greece, No 16, No 19, Statistical Yearbook of Greece 1968.

The high rate of growth of per capita farm income seems to cast doubts about whether the cyclical variability of farm income in Greece is one of the most important factors of the size of the propensity to save. Thus, the cyclical component of the time series of farm income has been likely reduced in the last two decades after extension in the use of fertilizers, machinery and land improvement. Government intervention in the form of protection of prices and incomes of farmers in the post-war period have exerted a further negative influence on the cyclical variation of farmers' disposable income in this country. Emigrant remittances may

also perform in part a similar function, namely support of the family income especially in bad years. This kind of factors seem to affect negatively saving of the farmers for precautionary purposes (reserve balances), in comparison with the pre-war period. Still there may be of course a positive influence on the marginal propensity to save of the farmers because of a lower ratio of the variance of permanent to total income than the corresponding ratio of non-farm income, provided that the proportion of permanent income consumed is the same for farmers and for urban residents (see equation III.115). A similar positive influence on farmers' saving may be associated with environmental factors of the Greek farmers (small villages and small size of holdings as seen in some detail in the next chapter).

In addition, there seem to be a series of other factors favouring the saving of the Greek farmers. Thus, they may have had particularly low assets-income ratio, in view of low or no saving in the prewar period. This is particularly important in the case of 'liquid assets' of those farmers who turned for first time into the market which resulted in increase in the degree of monetization of the Greek economy, as we have seen already in section IV.3. This increase has actually taken serious dimensions especially after the huge expansion in the production of wheat following the price support policy applied since the second world-war. The production of wheat for sale has been also induced by the taxation system (section VI.4) ^{and/} implied the introduction of the farmers into the trade which per se created the need for transaction balances (apart from change in the form of farmers' savings for other purposes).

Institutional factors are also seemingly favouring the farm saving in Greece. Thus, the Post Office Saving Bank System has been extended in the post-war period to the smallest village and agglomeration. This reduces inconvenience and besides, the P.O.S.B. offers a slightly higher rate of interest compared with the corresponding one paid by the commercial banks. The latter have also founded at an increasing rate branch offices in small provincial towns (branch banking system) to face the competition in attracting the small savers. The value system and the plans for children education seem also favouring the saving of the Greek farmers (chapter VII).

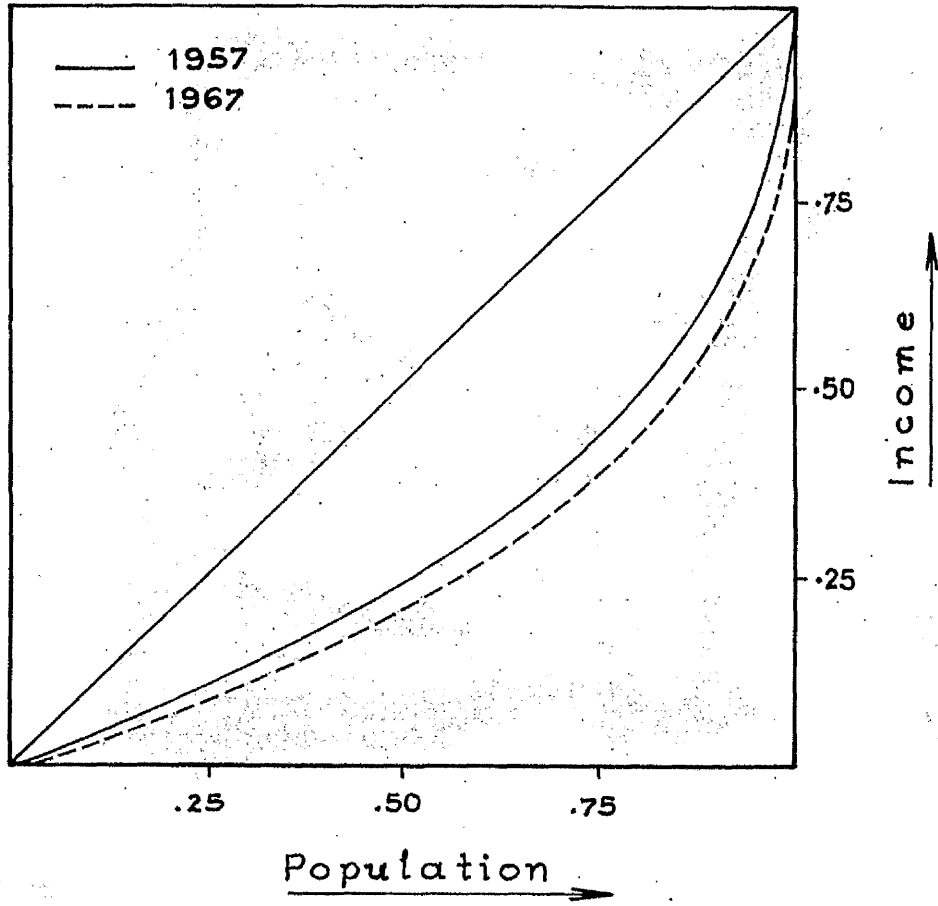
We come now back to the forementioned possibility that the marginal propensity to save does not rise with the level of income in Greece. This has been also assured from the satisfactory fit of a linear form of consumption-income relationship to the budget survey data (see section V.4). Nowwide divergence of the marginal saving ratio by size of income results in an increase in the inequality of the income distribution by size through time (see section II.1). Use of data from tax records of the years 1957 and 1967 shows that the coefficient of inequality is higher in the latter (.423) than in the former fiscal year (.415). However, in spite of this slight increase in the inequality of the income distribution between 1957 and 1967, the coefficient of inequality in Greece is still below the estimated one for certain advanced countries like West Germany (.45), Netherlands (.45) and Denmark (.44) and higher than the corresponding one in the United Kingdom (.41) and Sweden (.38)⁽³³⁾. Similarly, the first three quartiles had in 1967 in Greece about 37 per cent of the total income, compared with a corresponding 36 per cent in the United Kingdom, 34 per cent in the United States, 28 per cent in India, 30 per cent in Ceylon and 24 per cent in the Puerto Rico.

These comparisons permit us to say that even after the observed increase in the degree of inequality of the income distribution in Greece, this country is still nearer to the advanced than to the less developed countries in this respect. Doubts may further arise on whether the observed increase in the inequality of the income distribution in Greece is totally true. These doubts are based on the fact that in 1962 and 1967 there were increases in the minimum exemption allowances which reduce the number of the low income receivers with obligation of submission of tax record. Similar reservations have also been already raised by Komiya (1966) for the United States and advanced countries of West Europe, where a tendency toward more equal income distribution in the post-war period has not been followed by a falling trend in their saving ratios. In the case of Greece a considerable increase in the saving-income ratio has not been followed by parallel increase in the inequality of the income distribution by size. This provides some indications that in Greece the 'rich' either have relatively low marginal propensity to save or allocate their saving into wealth outlets with relatively low rate of return. Under such conditions the income

(33) See United Nations (1961).

CHART VI.3.

LORENZ CURVES OF PRE-TAX INCOME DISTRIBUTION



from property of the 'rich' does not rise fast to increase their share to the total.

In so far as the 'rich' belong to the business community, it is quite difficult to suppose that there is a low rate of return of their wealth due to limited knowledge of the investment opportunities, in fact quite the opposite is usually maintained. Therefore, we have to consider as more reasonable that they put voluntarily a part of their wealth into forms which get relatively low market return. A number of costly luxury consumer durables falls in this category and some of them, like paintings and antiques, may realize capital gains not counted as income by the national accounts statistics. The possibility of this kind of allocation of the wealth of the rich is further supported by the finding that, in contrast to the relationship (VI.17), the regression of the real non-farm income over real personal saving broadly defined ($.349 \pm .047$) is higher than the corresponding one of the farm income ($.301 \pm .155$). On the other hand, the indicated in the section V .4 comparatively low variance of the transitory component of the total income does not seem to encourage the prospect of a particularly high marginal propensity to save of income from rent and profits. In addition, the imperfections of the Greek capital market, as outlined in section IV.3 and in appendix IV, establish the assertion that the scarcity of liquid-type capital especially of workers' families and of non-farm self-employed families, compared with the high rate of growth of the Greek economy, have induced higher desired levels of liquid-type saving ratios of these two groups (34).

The available information favours the view that the 'rich' have not in Greece a particularly high marginal propensity to save with saving ordinarily defined. We face therefore some inconvenience to accept that the other major type of non-farm income, namely the income of the workers, has a relatively low marginal propensity to save. Lack of sufficient breakdown of the income from property and entrepreneurship by the Greek national accounts adds difficulties to the attempts

(34) As far as the workers are concerned, it has to be noticed here that statistical testing of the relationships (III.7) and (III.8) for the period 1954-1968 for which sufficient breakdown of data is available has given statistically insignificant regression coefficient. This result is inconclusive regarding the magnitude of the marginal propensity to save of the workers. Additional testing of the relationships (III.5) has not improved the results in terms of significance of the regression coefficients.

of exact measurement of the marginal propensities to save of the workers and of the businessmen in urban Greece. The available information casts only reservations to the view that this country offers another example of a considerably low marginal propensity to save of the workers. A particular source of reservations derives from the seemingly rapid extension of the bonus payments to the Greek employees during the last two decades. These payments include a half monthly wage payment for holidays and a bonus granted by the issue of the annual balance sheet. The latter bonus, which is granted voluntarily by the employer and involves a comparatively high transitory element, exceeds usually the wage of a month. The increase in emigration (section VII.2) and the gradual reduction of tax evasion (section VI.4) seem to act as favourable factors of further extension of these bonus payments in seventies.

It has further to be noticed that the contribution of farm income to the increase in the aggregate real personal saving between the years 1949-1950 and 1967-1968 (drachmas 17,286 million at 1958 prices) is about one-third. This finding is based on a point estimate of .282 for the marginal propensity to save from farm income (VI.17) and the increase in the farm income and in real personal saving between 1949 and 1968 (drachmas 21,400 million and 16,546 million respectively). Estimation of the contribution of the workers in active life and in retirement and of the receivers of rents and profits separately to the total increase in saving is not easy with the available data. Only certain assertions can be made in so far as the marginal propensity to save of the workers is comparable with the one of those who live primarily on income from property and entrepreneurship. In that case, given the increase in the share of the income from labour during the period under consideration, it is inferred that the contribution of the 'workers' to the increase in saving ordinarily defined in Greece may be higher than the corresponding one of the 'capitalists'. Thus, it is reminded that the share of only wages and salaries, namely without transfer payments and pensions, exceeds the corresponding share of the income from property and entrepreneurship, including rent and interest which is received in part by the workers (lines 2c and 3, table VI.3.1).

VI. 4. Taxation and Personal Saving

The so far indicated negative effect of taxation on personal saving is not sufficient to show the total influence of taxation on the growth of saving in Greece⁽³⁵⁾. Thus, the tax burden - defined to comprise direct and indirect taxes and to exclude contributions to social security - as a ratio of the net national product at market prices has been increased from 9.1 per cent in 1950 to 17.6 per cent in 1968 (line 4, table VI.4.1). This increase is not so much impressive as it seems to be, if one counts for the high rate of growth of income in Greece and for the international experience which shows that this ratio is usually higher than 20 per cent.

Besides the not extremely heavy overall tax burden in Greece it is observed a low proportion of direct taxes, namely less than one-fifth of the total (line 6, table VI.4.1). In this respect particularly Greece is much similar to less developed countries⁽³⁶⁾. A further particular characteristic of this country is the tendency of the proportion of direct taxes to the total to fall despite the forementioned high rate of growth of the per capita income. This composition of taxation may have been a positive factor to the observed increase in the ratio of personal saving over personal disposable income. However, it does not lead directly to the conclusion that the very high income groups have the lion share in the increase of this ratio in view of a not particularly high progressiveness of the income tax scale on one hand and indications of increasing tax evasion with the level of income on the other. Thus, the marginal tax rate varies today (P.L. 239/1967) from 2 per cent to 49 per cent above reported income of one million drachmas (€ 13,890).

(35) For a comprehensive description of the Greek taxation system see Break G. and Turvey R. (1964).

(36) See Prest A.R. (1962), pp. 27-28.

Table VI. 4. 1.

Transfer Payments and Net Tax Burden in Greece.

(As percentages of N.N.P.)

	1950	1955	1960	1965	1966	1967	1968
1. Total Transfers to Households	5.2	4.5	5.2	6.8	7.0	8.4	8.6
2. Social Security Contributions (a)	4.2	3.8	4.6	6.4	6.9	7.2	7.5
3. Net Transfers (1)-(2)	0.9	0.8	0.4	0.4	0.1	1.2	1.1
4. Tax Revenue (a)	9.1	12.7	13.1	14.2	15.4	16.2	17.6
5. Net Tax Burden (4)-(3)	8.2	11.9	12.7	13.8	15.3	15.0	16.5
6. Direct Taxes (b)	23.1	26.8	19.1	14.1	15.6	16.0	16.6

(a) Excluding social insurance contributions.

(b) As a percentage of total tax revenue.

Sources: National Accounts of Greece 1948-1965, No 16, 1960-1968, No 19, tables 1, 3, 4 and 11.

It is noticeable that tax evasion has a negative influence on government saving which is only in part offset by private saving. Thus, the invested income from business needs not to evade tax since it is largely exempted from tax duty⁽³⁷⁾. On the other hand, no strict economic criteria apply to the allocation of the part of income which evades tax. More specifically according to some estimates the tax evasion is twice the income tax revenue⁽³⁸⁾. Therefore the leakage of revenue corresponds to about 11th million drachmas given that the direct tax on income is 5.5 thousand million drs. (1968). This lost revenue of 11 thousand million drachmas deduced from personal disposable income would reduce it to 170 thousand million drs and represent 6.1 per cent of it. With a marginal propensity to save about .2, if the evaded income were recorded, personal saving would be less by 2.2 thousand million drs to 23.3 thousand million in 1968. As a result the ratio of personal saving over personal disposable income would fall from 14.1 per cent to 13.7 per cent (1968). Therefore we cannot attribute the observed rise in this ratio mainly to tax evasion.

(37) Despite a variety of incentives for investment in manufacturing industry in Greece it was not achieved to be lifted up fastly in the period under review. See C.E.P.E. (1966).

(38) See Karagiorgos D. (1964).

We have identified so far three characteristics of the Greek taxation which may be relevant to the observed rise in the proportion of personal income saved, namely low tax burden, relatively low share of taxation on personal income and likely spread tax evasion particularly of income not captured at source. The kind and the magnitude of the influence of each of these characteristics on saving depends on a number of factors which determine the incidence of taxation and the marginal propensities to save of various income and social classes. What we can do here is to try to show how these characteristics of the Greek taxation are consistent with other sections of this study and to give some further details of the Greek taxation which are mostly associated with saving decisions and the distribution of saving by form.

The possibly high tax evasion and the low share of direct taxation do not seem to affect primarily the observed increase in the proportion of the personal income saved in Greece as it might be thought. The possibility that the income which evades tax has not high marginal propensity to save is consistent with the indications in the last section about a seemingly low regression coefficient of income from property and entrepreneurship. It is so often maintained that tax evasion in Greece comes mostly out of this kind of income. To the extent that the income which evades tax obligation is directed to luxury consumption, ^{it/} is not included in the ordinary definition of personal saving. Thus, although in quantitative sense Greece is far behind other European countries in terms of per capita stock of main consumer durables (table IV.3.4), a visitor of Greek airports and beaches can face the view of quite a number of private planes, yachts and luxury cottages.

The accumulation of luxury durables is getting easier by the tax evasion and is realized despite the heavy taxation of these commodities most of which are imported in Greece. The taxation of imported commodities is shown by the simple fact that the revenue from import duties exceeds the total of other indirect taxes altogether. Under these conditions the taxation on expenditure seems to discriminate in part against present and future consumption and in favour of saving for accumulation's sake, as it is usually maintained by theorists⁽³⁹⁾. This kind of discrimination seems to apply more to low than to high

(39) See e.g. Musgrave R.A. (1959).

income classes which can afford to pay. The restoration of relative price stability since mid-fifties and the abolition of the quantitative restrictions on imports do not favour the debt incurrence at high cost for buying durables at present rather than in the future. It happens, however, particularly in the case of housing and land, the prices of which are steadily increasing and involve capital gains to the owner. This is related with the fact that almost half of the private fixed investment expenditure is directed regularly to housing construction in Greece.

The forementioned allocation of saving by form is favoured by the definition of taxable income to exclude capital gains and losses in the case of Greece⁽⁴⁰⁾. The absence of wealth or capital gains taxation may be interpreted as a positive factor of the net rate of return on savings. This coupled with the not particularly high progressiveness of the income tax scale seems to imply that income tax does not act in Greece as an important disincentive to save by the 'rich' in comparison with the possible alternative of an expenditure tax of equal revenue⁽⁴¹⁾.

Personal property and land are virtually taxed in Greece only in the cases of inheritance and of gifts and dowries. All these three property transfers fall under a common tax scale (after deduction of the donor's debt), which is the steeper the more remote is the family relationship⁽⁴²⁾. Dowries in particular are exempted from half of the tax duty and in total for a value up to 30 thousand drachmas. Gifts of the past three years are added in the definition of the tax duty, which makes somewhat difficult the escape from the progressive tax scale by a series of small transfers at short time. Windfalls are taxed in Greece by a flat rate of 22 per cent in excess of 2 thousand drachmas.

As a partial substitute of the absence of property tax in Greece there is a transaction tax of 11 per cent of the value of the exchanged real estate defined to include land, buildings, ships and busses⁽⁴³⁾. The responsibility

(40) The absence of capital gains tax along with the light burden of direct taxes are considered as important factors of the realized increase in private saving in less developed countries in the post-war period. See Maddison A. (1970), p.69.

(41) See on the controversy of this subject in Kaldor N. (1955), Prest A.R. (1962).

(42) This tax scale is not however associated to the prior property of the donee. For the relevant proposal see Kaldor N. (1955).

(43) Exemptions of this tax refer to special uses (such as industrial estate) and to the source of finance (foreign exchange partially exempted).

of payment of this transaction tax, which resembles Stamp Duties elsewhere, falls by law to the seller, though in practice it has been transferred on the shoulders of the buyer, given the sellers market in this field in recent years in Greece⁽⁴⁴⁾,

The income tax law offers also encouragement to small savers, especially to the farmers who are exempted from tax duty for income up to 140 thousand drachmas, compared with a per capita income of 21.6 thousand drachmas in 1968⁽⁴⁵⁾. Furthermore there is a minimum of subsistence allowance of drachmas 15 thousand and a further 30 per cent allowance for income from dependent labour without limit and allowances of drs 9 thousand for the housewife and of drs 7-10 thousand for each child depending on their number. There is also separate taxation of the wife's income (except for its part which comes out of business partnership with the husband), and lumping of the unearned income of the children with parents' income.

In addition, there are a few tax exemptions of the income channelled to particular purposes, such as compulsory contributions to social security, and premiums of life and accidents insurance of the taxpayer, his wife and children up to 18 years of age. Financial institutions are not allowed to reveal their depositors to the revenue office, while income from savings deposits and government bonds are exempted from tax duty. The same can also apply to bonds of business corporations for new loans after government approval. This kind of exemptions seem to favour particularly the over the middle wage earners who do not easily evade tax, and secondarily farmers and urban small savers who are under the family allowances⁽⁴⁶⁾.

(44) It is reminded that transaction costs increase the durability of the asset portfolio. See Hicks Sir John (1967).

(45) The exemption of the farmers from tax obligation was based on collection costs considerations and seems to have contributed to increase in the degree of monetization of the Greek economy and the spread of the habit of saving among the farmers in that country.

(46) For relative neglect of small savers as a rule in less developed countries, see e.g. Maddison A. (1970), p.70.

Distributed income from profits and dividends falls into the individual's total taxable income while retained profits are subject to a flat rate of 35 per cent which is lower than the corresponding one in other countries, notably in the United Kingdom (where it was until recently 42.5 per cent)⁽⁴⁷⁾. The effective rate is of course much lower than 35 per cent in view of the forementioned exemption of invested profits and the recognition of relatively high depreciation rates, varying by type, age of equipment and region of the country. In addition there is a two-year carry forward loss offset applying to all business, so that taxation seems to affect both the rate of 'return' and the uncertainty attached to income from business⁽⁴⁸⁾.

(47) An additional 15 per cent of the tax duty of corporations in Greece exists in favour of O.G.A. (Organization of Farmers' Insurance) which can however be treated as deductible expenditure.

(48) See for the relevant discussion in Domar E.D. and Musgrave R.A. (1944).

CHAPTER VII

SOCIAL, CULTURAL AND VALUE FACTORS OF SAVING.

VII. 1. Main Factors of Population Growth and Family Planning.

The so far obtained results of this study have raised some doubts about whether the rate of growth of population has exerted a significant influence on the observed increase in the proportion of income saved in Greece in the period 1949-1968. This is due to the fact that the rate of growth of population in this country was less than 1 per cent per annum during this period (.8 per cent). Indeed, the rate of growth of population had a decreasing tendency throughout the post-war period (1950-1960 : .96 per cent, 1961-1968: .69 per cent) but this fall was not sufficient to affect positively the saving much more than in the past. On the other hand, the post-war fall in the rate of growth of population consists of the continuation of a tendency of long-run nature which constitutes a phenomenon of a country with small fertility rate (rate of growth of population during the period 1926-1940: 1.38 per cent).

Table VII. 1. 1.

Main Component Factors of Population Growth in Greece

(Period Averages in Percentages)

	<u>1926-1940</u>	<u>1950-1960</u>	<u>1961-1968</u>
1. Live Births	2.83	1.93	1.80
2. Crude Deaths	<u>1.57</u>	<u>.73</u>	<u>.79</u>
3. Natural Growth (1)-(2)	1.26	1.20	1.01
4. Net Emigration	<u>-.12</u>	<u>.24</u>	<u>.32</u>
5. Net Population Growth	1.38	.96	.69

Sources: National Statistical Service of Greece, Statistical Yearbook, 1968, 1969, tables II: 3 and II: 12.

It seems therefore that Greece resembles more to developed countries than to underdeveloped ones in terms of rate of growth of population⁽¹⁾. This rate often exceeds 2,5 per cent and is stable or increasing in underdeveloped countries. It is usually noticed that the high rate of growth of population in less developed countries causes a slower rate of growth of income per head even if total output is increasing faster than in rich countries. Greece enjoys consequently a privileged position in this respect, in the sense that the low rate of growth of population affects favourably the personal per capita disposable income available for consumption and saving. This kind of influence depends on whether the low rate of growth of population is a restraining factor of the rate of growth of income, which does not seem to apply so far to the Greek case. However, the difference between the rates of growth of population in the post-war and pre-war periods was not high enough to constitute one of the main factors of the increase in the proportion of income saved⁽²⁾. It is reminded anyway that the influence of the decrease of the rate of growth of population on saving may have been somewhat underestimated in the statistical testing, in view of the trend-like movement of population as well as of income and the relatively strong influence of income on saving.

The observed post-war fall of the rate of growth of population is attributed to a higher rate of reduction of the fertility rate than of the death rate and to increase in the rate of emigration. More specifically, the live births, taken as a proportion of population, have decreased between the periods 1926-1940 (2,83 per cent) and 1961-1968 (1,80 per cent) by 1.03 per cent (columns /1/ and /3/, table VII.1.1). The low rate of fertility in Greece is mainly the result of late marriages and voluntary birth control at pre-marital and marital relations through contraceptives and abortion, though the latter is illegal. The resort to these methods has been intensified in

(1) It may be said that Greece has an outstanding performance in the sense that the rate of growth of population of this country was decreasing along with an accelerated world population in the post-war period. See Maddison A. (1970).

(2) Thus, the fall in the rate of growth of population by about .3 per cent between 1950-60 and 1961-68 has to be compared with the corresponding increase by 2.7 per cent in the rate of growth of aggregate real personal disposable income (1951-60: 4.8 per cent, 1961-68: 7.5 per cent).

the post-war period, in view of the fact that the fall in the rate of growth of population came along with a rise in the rate of marriages. Thus, the latter rate has reached in the period 1961-1968 the .87 per cent compared with .79 per cent in the period 1950-1960 and .66 per cent in the period 1926-1940 (column /1/, table VII.1.2). There was so acceleration in the rate of growth of marriages rather than delayed marriages that accompanied the observed fall in the birth rate in Greece. The rate of marriages was fastened in old age groups rather than in young ages, as it has happened in the United Kingdom in the nineteenth century. Young couples, as passing the early stage of the life cycle, are more likely dissavers and possibly less amenable to family planning than couples of middle ages. There is a common attitude in Greece that the groom-bride must have been settled before marriage and that the bride can not manage sufficiently a household before maturing⁽³⁾.

Table VII. 1.2.

Rate of Marriages, Family Size and Literates

	Rate of Marriages ^(a)	Family Size		Proportion of Literates ⁽ⁱ⁾
		At Census Dates ^(b)	From Budget Surveys ^(c)	
	(1)	(2)	(3)	(4)
1926-1940	.66	4.25 ^(d)	-	58.0 ^(d)
1950-1960	.79	4.11 ^(e)	3.8 ^(g)	76.0 ^(e)
1961-1968	.87	3.78 ^(f)	3.3 ^(h)	82.2 ^(f)

(a) As a percentage of the total population (period averages).

(b) Covering total population.

(c) Covering population of over 10 thousand residents.

(d) 1940 (e) 1951 (f) 1961 (g) 1957-58 (h) 1968-69.

(i) Over total population above 10 years of age.

Sources: National Statistical Service of Greece, Statistical Yearbook, 1968, tables II: 9, II: 12 and V: 5, Household Survey of the Urban Areas 1957/58, Unpublished data for the Survey 1968/69.

(3) The conditions are also in part indicative of a low stage of economic development where the opportunities of jobs are limited and the women are not still sufficiently educated.

It is important to notice that the observed increase in the rate of marriages has taken place along with a parallel decrease of the average size of household, namely from 4.25 persons in the census year 1940 to 4.11 persons in 1951 and to 3.78 persons in the last population census of the year 1961 (column /2/, table VII. 1. 2). The average size of households in towns seems also to be falling, as it is estimated by the sample budget surveys of urban households, at a somewhat faster rate than in the case of rural households. This is not attributed entirely to higher fertility rate in the rural sector, in view of the high rate of urbanization and of higher rate of family fragmentation in towns. The small number of observations provided by the available classification of the household budget surveys by level of income and family size (6 groups) has prevented obtaining a statistically significant regression coefficient for the family size, though it has the expected sign (positive). It seems to indicate that the observed fall in the average family size must have had some positive influence on saving, though the magnitude of this influence and its connection with the composition of household remain still an open question⁽⁴⁾.

The phenomenon of family planning in Greece is similar to the impetus to family limitation which appeared in the United Kingdom and in the United States of America during the last century⁽⁵⁾. The existing conditions in Greece suggest that the families plan to improve the quality of the human wealth by giving birth to a smaller number of children in order to provide more education as a means of better life for them. It seems worth noting that almost 90 per cent of the children complete the compulsory primary education of six years and about half of them continue secondary education of another six years and a 43 per cent of those who complete it (40 per cent of the attendants) continue University studies.

No direct relationship seems to exist between these plans and the flow of saving, in so far as education, which substitutes for food and other services and durables, is also counted as consumption expenditure in the national

(4) We are going to come back on this question in section VII. 3.

(5) See e.g. Kindleberger P.C. (1958).

accounts statistics⁽⁶⁾. This change in the composition of consumption expenditure affects, however, the volume of saving per annum, since even so the expenditure for education of children is made after starting school and mainly in higher education in Greece. Thus, the primary and secondary education are public in this country, though in towns private colleges have increased in recent years.

Spending for higher education is as a rule a greater amount per student than for primary education and involves a long time lag between the planning and the realization of spending. The accumulated saving for this purpose has, on the other hand, to allow for future changes in the price level and the cost of education in the mean time⁽⁷⁾⁽⁸⁾. The need of spending in large amounts for higher education of children is associated with the small number of Universities, i.e. only two, while Scotland with comparable population with Greece has seven Universities. With the two Universities operating in the two biggest towns of Athens and Salonica, householders in all other places have to be prepared for long time to cover the living and accommodation expenses of their children during the time of their University studies away from families⁽⁹⁾.

This kind of expenses were augmented by a tuition fee of three thousand drachmas which was eventually abolished in 1964. This fee corresponded to about one-fifth of the per capita income of that year. Saving for children's education has in addition to allow for failure in the first attempt to enter

(6) If the education provided by the government is not adjusted sufficiently to the demand, then private colleges may be established for better 'quality' of education especially for kinds of education to which government response is particularly low and private initiative is not prohibited.

(7) This may have contributed to some extent in the observed rapid rate of accumulation of 'liquid' assets in Greece after the restoration of relative price stability since mid-fifties, on which see section IV.3.

(8) This may become a source of positive influence up to certain point of increase in the price level on the flow of saving. See moreⁱⁿ Section VI.1.

(9) It is worth noting that the proportion of children in the age group 20-24 years enrolled in University is, according to data published by the Observer of O.E.C.D. (1968-9), in Greece (10.7 per cent) comparable with the corresponding ones in the United Kingdom (13.4 per cent), West Germany (11.3 per cent), Turkey (5.5 per cent) and Portugal (6.7 per cent).

the University because of strict entrance examinations, in view of a rapidly increasing number of candidates and the inelasticity of Universities to expand. Under these circumstances, most of the candidates need to attend private colleges operating in big towns even before leaving secondary school to prepare for the entrance exams. First failure is often followed by a new attendance these colleges for giving entrance exams in the next year or an increasing number of them go abroad for undergraduate studies after some preparation in the foreign language(10).

On the other hand, those of the pupils who plan a career as secretaries have to attend courses of up to one year after leaving secondary school. The need for this attendance is due to the fact that the secondary education has a classical and religious orientation not adjustable to the current needs of the practice. These courses are offered by private colleges, established at an increasing rate during fifties and sixties, and include accounting, typing and foreign languages. In addition, quite a number of technical colleges of secondary education have been founded in recent years to provide special courses useful for particular branches of navigation, industry and farming.

Saving for children's education is likely higher than dissaving as the absolute number of births increases and parents plan for their children to get more education than their own. This may be one of the reasons of the indicated relatively high marginal propensity to save from farm income (section VI.3). The particular emphasis which is given by the farmers to the education of their children is explained by the fact that while about 10 per cent of the children of the urban workers attend University studies the corresponding proportion of the farmers' children is 14 per cent. This is indicative of a system of social mobility in Greece, according to which the education of children offers social prestige to the farmers, as we are going to see in more detail in section VII.4.

(10) Within the frame of the system of foreign exchange control, the Bank of Greece grants permission of fixed amounts of monthly remittances by the families to the students abroad. This kind of invisible payments is overoffset by emigrant remittances, receipts from tourism, etc.

VII. 2. Population Movements.

Greece offers an example of a developing area with relatively massive population movements throughout country and emigration⁽¹¹⁾. The changes in the place of residence are likely planned to improve the standard of living given the interregional differences in per capita incomes, so that they are associated with saving decisions in a number of ways. Table VII.2.1 shows that the gross emigration was increasing in the post-war period to reach .93 per cent of the population per annum during the period 1961-1968 (col. 4). This represents an overdoubling of the average annual number of gross emigration in sixties (column /3/, table VII.2.1) which corresponds to almost one per cent of the population. Net emigration is, however, much smaller than the gross one in view of the returning back of immigrants particularly from countries of Europe to settle home for retirement or for business or because of inability to live permanently away from their country.

Table VII. 2. 1.

Gross Emigration from Greece

(Annual Averages in Thousands)

	<u>Place of Destination</u>			<u>(3) over Total</u>
	<u>West Europe</u>	<u>Overseas</u>	<u>Total</u>	<u>Population^(a)</u>
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>
1926-1940	1.5	4.5	6.0	.09
1949-1955	2.5	13.0	15.5	.20
1956-1960	15.8	16.9	32.7	.40
1961-1968	55.5	25.3	80.8	.93

(a) In percentages.

Sources: National Statistical Service of Greece, Statistical Yearbook.

(11) Population movements are generally massive during the development process so that to modify the town and regional structure of developing countries. See Donnison D.V. (1967).

The increase in emigration from Greece in sixties consists of a part of a more widespread movement from the less developed countries of Southern Europe (Spain, Italy, Greece, Turkey and Yugoslavia) to the advanced countries of West Europe, particularly to West Germany, France and Switzerland and to a less degree to Belgium, Netherlands and the United Kingdom. This movement was accelerated as the countries of West Europe approached the limits of full employment of their manpower by the end of the first post-war decade. There are certain differences of this emigration from Greece to West Europe from the pre-war emigration to the new world, namely to the U.S.A., Canada, Australia, and New Zealand. Thus, the emigrants to West Europe offer their services as a rule on the basis of annual contracts, which may exert a positive influence on their saving for the precautionary motive. In addition, many of them come to Greece for holidays and plan to settle home at the latest for retirement. These conditions are directly associated with the observed increase in the remittances in the form of transfers to Greek households from abroad (section IV, 1).

In addition, there is evidence that the great majority of emigrants have come from the rural country and been virtually unemployed before departure. Thus, out of 115,004 emigrants in 1968, 69,310 have recorded to come from regions other than Athens and Salonica and 37,218 had no prior occupation in farms⁽¹²⁾. Therefore the increase in the per capita income from emigration is disproportionally high in the farm sector which receives also a high proportion of the remittances.

Interegional population movements have been also intensified since mid-fifties, i.e. the time of the relatively high rate of growth of the saving-income ratio. Thus, between 1955 and 1961 about 645 thousand people have changed place of residence within Greece. This has to be compared with a net increase in the population by 433 thousand people during the same period. About 60 per cent of the total immigration came from villages of less than 2 thousand inhabitants in 1961 and over 40 per cent of the total immigration was

(12) Data taken from the N.S.S.G., Statistical Yearbook, 1968, tables II:24 and II:26.

directed to the two biggest towns, Athens and Salonica (table VII.2.2)⁽¹³⁾.

Table VII. 2. 2.

Immigration: Population Inflow and Outflow by Geographic Region.

(Period 1955-1961, in thousands)

	<u>Athens</u>	<u>Salonica</u>	<u>Other Towns (b)</u>	<u>Semi-Urban Areas (c)</u>	<u>Villages (d)</u>	<u>Total</u>
	(1)	(2)	(3)	(4)	(5)	(6)
Inflow	218.2	46.8	143.4	76.4	160.0	644.8
Outflow	40.5	15.7	129.2	89.4	370.0	644.8
Net Change (+) ^(a)	+177.7	+31.1	+14.2	-13.0	-210.0	-

(a) + for net inflow, - for net outflow.

(b) Towns with over 10 thousand inhabitants in 1961.

(c) Towns between 2 and 10 thousand inhabitants in 1961.

(d) Agglomerations with less than 2 thousand inhabitants in 1961.

Source: National Statistical Service of Greece, Results of the Population and Housing Census, Volume V, Internal Emigration, Athens 1963, table V.2., p.40.

Expenditure for accommodation and settlement of the immigrants in towns seems to have positively contributed to the observed increase in the proportion of income saved, given that the financing of building construction is counted as saving. The increase in the supply of labour in towns had also contributed partly to the observed relatively high rate of growth of the real per capita income. The possible positive influence of the urbanization in Greece on saving during the period under review is not necessarily opposite to the view that urbanization acts as a shifting factor of the consumption-income relationship so that to prevent rising in the saving-income ratio⁽¹⁴⁾. The same effect may

(13) Immigration from villages to towns accelerates the decrease of the unemployment in the countryside and the removing of the dualistic character of the Greek economy.

(14) It is reminded that this view was originally maintained by Smithies A. (1945) in favour of the interpretation of the long-run constancy of the saving-income ratio in ^{the} U.S.A. in accordance with the absolute income hypothesis.

be also exerted by the urbanization in Greece in the long-run, in so far as the marginal propensity to save of the farmers is higher than the corresponding one of urban residents.

For the time being, urbanization and emigration seem to affect positively the farmers' saving through increase in the output per farmer coupled with a further rise in their disposable income by transfers to them. The frequent contact, however, of the emigrants with their families at home seems to consist a gradual restraining factor of their saving motives. Thus, when emigrants visit home for holidays or come back for settlement, bring with them modern appliances if not private cars, which they enabled to buy by the income obtained abroad. This to some extent irritates friends and relatives to obtain the same durables when their income rises sufficiently. This involves a gradual extension of the demonstration effect, which may exert a negative influence on the proportion of income saved in the long-run⁽¹⁵⁾.

All these factors combined tend to suggest that population movements in Greece contributed to the observed increase in the proportion of personal income saved in Greece in the period 1949-1968. So, there are reasons sufficient to set up the expectation about a gradual counterbalancing effect of the conditions created by population movements on the saving-income ratio in the long-run.

(15) It is not precluded, of course, that a part of the observed population movements, which have somewhat modified the work-leisure pattern in Greece, have been initiated by the desire to acquire modern durables according to the discussion in section II.1 (pp. 26-27). However, there are some doubts whether the farmers have been informed about these commodities mainly by frequent contact with the inhabitants of the towns, (as the relative income hypothesis maintains) who were after all very few in the country before the period under consideration. In addition, there are the plans of the Greek farmers to educate their children, which aim primarily to achieve more decent conditions of work and living in the towns than their own in the farms. There are doubts whether saving for later acquisition of modern durables is yet comparable with saving for other motives, notably for the education of the children.

VII. 3. Composition of Population by Age and Sex.

The relationship of the age distribution of population with the rise in the saving-income ratio in Greece has to be investigated in the face of a number of special conditions of this country during the period under consideration. Thus, the departure of the German occupants in 1944 was followed by a civil war until 1949 which increased disproportionately the cost of the war in terms of human lives in active and retirement age groups. Therefore, the data of the population census of 1951 may overstate the proportion of children and understate to some extent the share of the active and retirement age groups. Under these conditions the fall in the proportion of children under 14 years of age (table VII.3.1) between 1951 (28.8 per cent) and 1968 (25.2 per cent) by 3.6 per cent and the rise in the proportion of retired people over 65 years of age in the same period (from 6.7 per cent to 9.6 per cent) by 2.9 per cent have to be considered with due caution.

Table VII, 3.1.

Age Structure of Population of Greece.

(Percentage Distribution)

<u>Age Group</u> <u>(1)</u>	<u>1951</u> <u>(2)</u>	<u>1959</u> <u>(3)</u>	<u>1960</u> <u>(3)</u>	<u>1961</u> <u>(2)</u>	<u>1966</u> <u>(3)</u>	<u>1967</u> <u>(3)</u>	<u>1968</u> <u>(3)</u>	<u>Difference</u> <u>1968-1951</u>
0-14	28.8	26.3	26.1	26.7	25.4	25.3	25.2	-3.6
15-39	41.0	40.1	40.0	39.3	38.7	38.4	38.0	-3.0
40-64	23.5	25.6	25.8	25.7	26.7	26.9	27.2	+3.7
15-64	64.5	65.7	65.8	65.0	65.4	65.3	65.2	+0.7
65 and over	6.7	8.0	8.1	8.3	9.2	9.4	9.6	+2.9

(1) In years.

(2) Census data.

(3) Mid-year estimates of the National Statistical Service of Greece.

Sources: National Statistical Service of Greece, Statistical Yearbook
1968, 1969, table 11:6.

The fall in the proportion of children is associated in part also with the forementioned decrease in fertility rate in Greece on the contrary to other developing countries.

It has been maintained that an increase in the number of retired persons causes a greater reduction in the saving than an equal increase in the number of children⁽¹⁶⁾. If this applies in the case of Greece then the rise in the proportion of the elderly of the forementioned magnitude may overoffset the positive influence on saving due to the somewhat greater fall in the proportion of children. This possibility is however subject to three main reservations. First, according to an estimate of the National Statistical Service of Greece, the expected life at birth is 67.5 years for males and 70.7 years for females. Since retirement starts at 65 in Greece, the elderly may have arranged their saving plans for longer expected life than the actually life.

Secondly, as a result of the acceleration of urbanisation, a disproportionately high number of the elderly stays in the countryside and are farmers. They dissave rather less than those retired in towns, since their consumption rarely includes modern commodities or services (eg. many Greek villages have not electricity yet). It may be objected that they have also saved less at their working age in the prewar period which is not however necessarily so in view of the variety of the saving motives. On the other hand, they may be somewhat subsidized by current transfers of their children who work in towns and abroad, and they probably use only a part of these transfers for consumption and parallel they breed some domestic animals, cultivate vegetables, etc.^(16a).

Thirdly, to the extent that the fall in the proportion of children is due to the cutting down of the birth rate and to the plans to offer better education to them, there may be a relatively high saving for this purpose. These reservations seem to make unlikely the possibility that the observed above opposite movements in the share of children and retired are just offsetting regarding their influence on saving.

(16) See Duesenberry James (1949), p.63.

(16a) Post-retirement jobs, which reduce the applicability of the life-cycle hypothesis of saving (see section II.1), are also quite often in towns especially in cases of certain professions (e.g. accountants and officers).

In addition, the moderate only increase in the proportion of active population of 15-64 years of age (by .7 per cent between 1951 and 1968) seems to raise serious doubts on the possibility that the life cycle hypothesis of saving can sufficiently explain the observed increase in the saving-income ratio in Greece. The moderate stability of the share of working age group (15-64 years) to the total population consists of an average of stronger changes in opposite direction of the younger and older age groups. Thus, between 1951 and 1968 the age group of 15-39 years has lost share of 3.0 per cent, while during the same period the age group of 40-64 has gained 3.7 per cent. The latter increase may be particularly relevant to the rise in the saving-income ratio, because the nearer the retirement the higher may be the provision for it. Furthermore, the wage structure in Greece is exceptionally strongly attached to the years of work, which means that the earnings rise at high rates in older working age. Thus, a comparison of Greece with other countries shows that the rise in the wage rate by age is higher than in other countries like West Germany, if not Japan⁽¹⁷⁾.

Table VII. 3. 2.

Average Weekly Earnings of Workers in Greek Manufacturing⁽¹⁾
(Comparative Indices by age, October 1966)

<u>Age Groups (in years)</u>	<u>10-18</u>	<u>19-24</u>	<u>25-44</u>	<u>45 and over</u>
Males	100	172	244	253
Females	100	117	122	125
Average	100	142	197	213

(1) Establishments with 10 workers and over.

Source: N.S.S.G., Statistical Yearbook 1969, table VII:6, p.125.

On the other hand, the decrease in the proportion of the age group of 15-39 years is especially connected with the observed expansion in emigration which achieved record rates in sixties (see table VII.2.1). Thus, it seems

(17) For data on corresponding indices of wages of males in West Germany and Japan see Komiya R. (1966), table 8-7, p.174.

that about three fourth of the emigrants belong to the age group of 15-39 years if the years 1967-1968 are representative. In so far as a great number of emigrants is unemployed, it means that the fall in the proportion of this age group is associated with a rise in the income of their families, because their heads may belong to the age group of intense savers of 45-64 years.

Looking at the composition of the Greek population by sex we first observe a slight increase through time in the proportion of females to the total (line /1/, table VII.3.3)⁽¹⁸⁾. On the other hand, the increase in the proportion of females over active population is relatively more rapid (line 2). The increase in the proportion of female active population in advanced countries is often interpreted as a partial substitution of home appliances for housewives. According to this view, the increase in the proportion of the female active population per se may exert a negative influence on the saving-income ratio with saving ordinarily defined. In addition, there may be a positive influence on the proportion of family income saved particularly in so far as the work earnings by a single girl or a housewife have as a main purpose the purchase of a dwelling. However, it may be not the sole or the main plan of the educated females, who may be relatively more eager to purchase modern consumer durables. Therefore, the observed increase in the proportion of females over total literates (line /3/, table VII.3.3) may be a not particularly favourable factor to saving ordinarily defined.

Table VII. 3. 3.

Proportions of Female and of Literate Population.

(In percentages)

	<u>1928</u>	<u>1951</u>	<u>1961</u>	<u>1964</u>
1. Females to Total Population	49.6	51.0	51.2	51.3
2. Females to Active Population ^(a)	n.a.	38.0	39.0	39.6
3. Females to Total Literates ^(b)	35.4	43.9	45.8	n.a.

(a) Definition of active population adjusted to the census of the year 1961.

(b) Over total number of literates above 10 years of age.

Sources: National Statistical Service of Greece, Statistical Yearbook 1968, Tables II.2, VI.1, Royal Research Institute, Long Term Prospects of the Greek Economy.

(18) This must have been a positive factor to household saving in view of the high responsibility of the family to settle the female dependants as we are going to see in the next section.

On the basis of available cross section data in Greece (see section III.2) we have proceeded into the estimation of household saving in an attempt to control, though roughly, the 'equivalent adult' problem by the formula

$$\frac{c}{n} [1 + (n_i - 1)a]$$

where, c and n are the average household consumption and size of households respectively, n_i is the size of household bracket and a is coefficient of weighting the other members of household apart from the head.

Table VII, 3, 4 presents the series of actual household saving (column /1/) and of saving estimated according to the life-cycle model and with alternative values of a, 1, .75 and .50, all expressed in per capita terms. The standard deviation of household saving (102.4drs.) is lower than the one derived from application of the life-cycle model with all the alternative values given to the coefficient a. Otherwise stated, if this model applied we might expect for given household income, consumption and saving to variate more than it actually variated in the year 1957/58 among urban households. We cannot therefore accept without serious reservations the basic assumption of this model that the average consumption expenditure is held constant over the life-cycle. (19)

This kind of reservations is of course subject to the qualification that the data available in Greece refer not to a detailed composition of households by age groups of the heads, but ^{only/} to adults over 16 years and to children under this age. A further qualification concerns the assumption about constant per capita consumption and the association of the household consumption with the household composition on the basis of the available data. Thus, the change in household consumption expenditure may not be parallel to the change in the number of household members beyond the head, because expected income and resources of the household are not available and sufficiently represented by the household income in the survey date. As it is obvious from the table VII,3,4, by the increase in the size of households which comprise ^{only} adults from one to four members, household consumption rises at faster ^{rate/} than if the life-cycle model applied (comparison of the first four lines of the column /2/

(19) A similar conclusion has been reached by application of the same method in the case of ~~another~~ other less developed country, the Indonesia. See Kelley A. C. and Williamson J.G. (1968).

with the corresponding ones of the columns (3/-/5/). Similar is the behaviour of households consisting of two adults and one kid and three adults and one kid⁽²⁰⁾. In both cases consumption increases disproportionately to the increase in the size of household with result lower household saving than expected. On the contrary, when the number of children exceeds one, household consumption rises less than proportionately and household saving is higher than expected consistently with the assumption of the life-cycle model⁽²¹⁾. It does not seem therefore that household consumption variates solely in accordance with the household composition.

Table VII. 3. 4.

Household Income and Saving in the Urban Sector 1957/1958

(Actual and estimated saving in drachmas)

	Household Income	Household Saving			
		Actual	a=1	a=.75	a=.50
	(1)	(2)	(3)	(4)	(5)
1A	375.7	-3.2	164.7	164.7	164.7
2A	621.8	24.2	199.8	252.8	305.3
3A	842.6	57.6	209.6	315.6	420.6
4A	1,114.6	104.8	270.6	428.9	587.1
2A+1K	702.9	6.3	69.9	175.9	280.9
2A+2K	650.4	18.8	-193.6	-35.3	122.9
2A+3K	662.4	29.6	-392.6	-181.6	29.4
3A+1K	1,020.2	111.9	176.2	334.5	492.7
3A+2K	897.0	11.8	-158.0	53.7	264.0
S.D.	223.0	102.4	651.0	549.0	984.7

Source: National Statistical Service of Greece, Household Budget Survey 1957/1958.

where: A means Adults, and K means children under 16 years of age.

(20) It means that with the first kid, household consumption increases disproportionately as it happens by the addition of an adult.

(21) Thus, the increase in the number of kids from one to two restrains saving and increases household consumption less than ⁱⁿ the first child.

Household income rises by the increase in the number of adults with some exceptions in the case of parallel increase in the number of kids. In the latter case, however, the actual household saving is higher than the estimated one, which is in contrast with the life-cycle formulation. One possible interpretation is that families with relatively high number of kids are usually poor families in terms of ownership of wealth, which becomes a restraining factor to their consumption. However this interpretation is only an assertion which cannot be directly verified, in view of lack of data on household wealth and its distribution by households of different composition. Another possible factor of the higher than expected saving of households of big size, is the adjustment of the family saving to the plans for children's education in accordance with the discussion in section VII.1. These factors combined with other possible ones seem to reduce the applicability of the life-cycle hypothesis of saving in the case of Greece.

VII. 4. Value and Kinship System.

One of the features of the Greek value system relevant to saving decisions is that Greece has never been a society of 'landed aristocracy'. This is due to historical factors and to the physical conditions of this country. Thus, the mountainous of the Greek soil does not favour particularly the concentration of the land to a relatively small number of big landowners. In addition, the participation of all Greeks to the War of Independence from the Turkish slavery during the nineteenth century, has resulted in the distribution of land to all farmers. Criteria of social justice have further led in the early nineteen twenties into a land reform, according to which the remained land under the ownership of the church and monasteries was distributed to farmers without land. In addition parallel to the land reform, a state sponsored Agricultural Bank has been founded, which has in effect prevented the concentration of the land to the lenders of the farmers.

The farm fragmentation, expressed by the fact that about 83 per cent of the farmers own holdings of between 2.5 and 12.5 acres, does not constitute a source of important social stratification in the agricultural community. Economic power and prestige are based there largely on the ownership of land. These conditions have not particularly favoured saving in the period between the two world wars in view of low productivity and overpopulation in the farm sector. During the last twenty years a fast growth in the use of fertilizers and secondarily machinery have taken place, a system of voluntary consolidation of land has started to apply, and immigration has been accelerated, as we have seen already. These factors combined have contributed towards a relatively fast rate of growth of per capita disposable income of Greek farmers. In older times a primary outlet of saving was the accumulation of rural property. During the post-war period there has been a partial shift toward purchasing of urban property, while other motives of saving notably for children's education have increased their importance, as it was mentioned already.

On the other hand, the gradual development of the Greek industrial sector in this century under conditions of heavy and long lasting tariff protection have favoured the emergence of an 'industrial aristocracy' in Greece⁽²²⁾.

(22) The class of the wealthier comprises shipowners, bankers, wholesale traders and industrialists. They do not enjoy any traditional social distinction, so that their stratification is largely based on ownership and on competition in consumption.

However it has not formed yet a discrete social class, since Greece is still a developing country and follows a process of structural changes. This implies that the newly created rich do not immitate usually the consumption standards of the richest of the community but solely demonstrate to their family in broad sense and friends who are still poor. They feel temptations of behaving like the richest but they postpone this until and insofar as they will become sufficiently more wealthy and less satisfied by moderate demonstration to their old environment.

The influence of the demonstration of the rich and the richest on saving has to be compared with the behaviour of the gradually extended middle class in towns, defined to comprise intellectuals, self-employed persons and collar workers, specialized manual workers, etc. This middle class includes the majority of the urban population, and its social stratification is based not solely on property but also on education. The forementioned extension of education has offered a gain to this basis of social stratification, which is considered as a characteristic feature of the process of economic development⁽²³⁾. This kind of social stratification is compatible with social mobility in Greece and the absence of social casts⁽²⁴⁾.

The urban centres also have a distinct third social class comprising those who have neither property nor education. Members of this social group are the low-paid manual workers, the parasitically employed and the totally unemployed. This group, in contrast to the middle class, has deep the feeling of frustration and social injustice which favours the consumption of whatever amount passes their hands. From section VI.4, we have concluded that the application of the welfare state in Greece has little to compare with the welfare state in the United Kingdom. Thus, the members of this group in Greece have little if any incentive to save, whatever the increase in their income. In contrast to what happens in the industrialized advanced countries, the social mobility in Greece does not lead towards a parallel relaxation of family connections. Thus the kinship system is not so joint as in Middle East or in other countries of Asia, but nevertheless the relations of the members of family

(23) The public recognition of education as a criterion of social stratification is not so welcome by the members of the first generation of the low educated industrial aristocracy. This may be associated with the observed low share of income from labour in Greece compared with other countries (section VI.3).

(24) The social mobility is constrained somewhat by the influence of families with power in favour of their members and by the unemployment of a large number of University graduates.

are more close than in the United Kingdom, the U.S.A. and the countries of West Europe. These connections are in Greece, as a rule, reduced to parents, brothers and sisters. When kids come to age and settle down, the connection with the parent family is virtually eliminated regarding the activities concerned with wealth creation and management. The personal ownership and administration of wealth implies that when a adult is married or does ~~not~~ contemplate a wealth increasing activity through saving, he does not only bear the costs but also enjoys the fruits of the return. We have, in other words, under this system a high degree of independence in terms of disposition of personal income and ownership of property, which becomes a favourable factor to saving decisions. This independence is so intense that to overcome in the majority of cases possible reactions of family to permit particularly girls to achieve a career in towns. In these respects the Greek family system does not become an important disincentive to work or to save, as in advanced countries.

Despite the relaxation of the kinship system in Greece through time, there are still some worthnoting cases of joint ownership of wealth and joint decisions with regard to save. Thus, the immigrants to the towns leave their share on the parent property to the members of their family who stay in the village and are entitled to cultivate the land of their parents at very low payment mostly in kind, as an indicative rent to their brothers and sisters who have settled in towns or abroad. This factor raises in effect the net rate of return of investment in land improvement and the personal disposable income of the farmers, so that to affect positively their saving.

In addition, business corporations in Greece, as in most less developed countries, are owned and managed by the families of their founders. This is indicative that these families are not big spenders so that to dispose the inherited wealth. They avoid doing so, however, because this ownership offers on the one hand social prestige to all the members of the family and on the other profits as well as employment to a number of family members and relatives. The transfer of this property to bequests consists a way of providing to the successors of the founders, employment with security and cover in case of a 'rainy day', as well as in old age. This is associated with the forementioned (section IV.3) low advance of the life insurance in Greece. How this kind of situation affects the

saving of the companies and of the owners is hard to find out, in view of double-counting which is favoured by the coincidence of management with ownership. It may be submitted that this coincidence gives the possibility to each member of the family to spend more than if he had shares of the same size in another company.

Another case of joint family decisions with regard to wealth creation activity derives from the habit that the family is responsible for the settlement of the female members, namely daughters. This responsibility stems on the habit of dowry, which has its roots to the East where it was originally considered as a price for the purchase of the groom-bride (just the opposite of what happened in North Europe where the groom-bride was supposed to purchase the bride by a payment to her father). In Greece the habit of dowry has more or less maintained the form it has taken in medieval times, namely as a contribution to the burden of the family operation. During the period in which the Greek economy was predominantly agricultural and the level of per capita income was too low to permit sufficient saving, the family offered virtually the whole property for the marriage of the daughters. As a consequence the birth of females was not welcome, since the loss of farm property for their marriage could hardly be replaced but by dowry got by the brother(s).

In recent years there were two kinds of changes relevant to the dowry which are associated with saving decisions. One is that the dowry takes in the majority of cases now the form of urban property, which has to be acquired either by saving or by selling of rural property. This shift from the rural to the urban property is associated with the forementioned intensive urbanization, the relative rates of return, etc. The other relevant factor is the discussed shift toward provision of more education to the children of both sexes. Educated females are emancipated and by employment can contribute to the burden of family operation, which removes the need for dowry. Therefore the provision for education can directly and indirectly act as a substitute of the saving for the habit of dowry. In the same direction also seems to affect the cutting down of the massive unemployment in Greece due mainly to emigration, so that the habit of dowry may be expected to disappear gradually in Greece, bringing it also in this respect nearer to the countries of West Europe.

STATISTICAL APPENDIX

Main Time Series of Data Used in Statistical Testing

(1949-1968)

	Personal Saving and Income			Population	Prices	Personal Saving and Income			Income			Annual Rates of Growth ^(c)		
	Current Values (mill. drs.)					Constant	Per Capita	Before Taxes (1958 values)		Income	Population	Prices		
	S ₁ (t)	S ₂ (t)	Y _t			Values (dks)	Capita	Total	Farm				Non-Farm	
	(1)	(2)	(3)			(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1949	2,153	2,855	24,644	7,483	.519	603	755	6,345	49,574	16,580	32,254	-	-	-
1950	1,493	2,397	28,646	7,566	.560	352	510	6,757	53,928	16,590	36,338	16.3	1.2	7.9
1951	1,987	3,021	33,515	7,646	.623	417	576	7,031	57,738	17,878	39,860	17.1	1.1	11.2
1952	1,467	2,601	35,028	7,733	.655	290	453	6,915	58,053	16,898	41,155	4.5	1.0	5.1
1953	4,659	6,091	46,899	7,817	.754	791	982	7,959	66,903	23,306	43,597	34.0	1.2	15.1
1954	1,635	3,795	53,320	7,893	.846	245	513	7,980	68,104	21,903	46,201	13.6	.9	12.2
1955	5,032	7,810	61,422	7,965	.897	705	1,051	8,601	74,156	23,417	50,739	15.2	.9	6.0
1956	7,252	10,509	71,681	8,031	.964	937	1,336	9,260	80,085	24,957	56,128	16.8	.9	7.5
1957	7,534	11,478	76,645	8,096	.977	957	1,450	9,688	84,892	26,822	58,070	6.8	.9	1.3
1958	6,137	10,690	79,310	8,173	1.000	751	1,308	9,704	85,661	24,847	60,814	3.5	.9	2.3
1959	8,225	12,846	82,322	8,258	1.025	971	1,445	9,725	86,842	24,465	62,377	3.8	1.1	2.5
1960	7,760	13,097	87,451	8,327	1.039	896	1,437	10,100	91,297	24,108	67,189	6.3	.8	1.4
1961	11,708	17,380	98,948	8,398	1.056	1,320	1,930	11,160	101,713	29,643	72,070	13.0	.8	1.6
1962	10,374	17,733	104,567	8,448	1.065	1,153	1,867	11,620	107,198	29,823	77,375	5.6	.6	.99
1963	13,605	22,295	116,887	8,480	1.089	1,473	2,286	12,660	117,115	32,883	84,232	12.8	.4	2.3
1964	17,495	27,981	129,677	8,510	1.100	1,869	2,847	13,860	128,587	35,710	92,877	10.9	.4	1.0
1965	19,356	32,076	146,746	8,550	1.137	1,991	3,158	15,090	140,815	38,500	102,315	13.1	.5	3.4
1966	20,351	35,663	160,343	8,614	1.182	2,018	3,322	16,760	149,230	38,899	110,340	9.3	.7	3.9
1967	24,782	42,378	172,889	8,716	1.203	2,362	3,772	18,460	158,932	40,104	118,828	7.1	1.3	1.8
1968	24,510	44,860	181,701	8,809	1.205	2,404	4,230	17,050	169,159	37,960	131,173	4.6	.9	.2
Average	9,963	16,378	89,700	8,190	1.945	1,125	1,765	10,710	96,496	27,265	69,231	10.7	.8	4.4
S.D.	7,815	13,529	48,500	370	.216	.682	1,145	3,370	35,587	24,800	29,017	7.4	.3	4.3
C.U.	.786	.826	.541	.045	.228	.606	.649	.31	.37	.91	.42	.69	.37	.98

(a) In thousand persons

(b) 1958 = 1.000

(c) in million drachmas

(d) in percentages

Sources: National Accounts of Greece 1948-1965, No 16, Athens 1967, 1960-1968, No 19, Athens 1970, N.S.S.G., Statistical Yearbook: 1969, Athens 1970.

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