THE CONSUMPTION FUNCTION

A Study of Relations
Between Income and Consumer Expenditures

by

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# TABLE OF CONTENTS

## PREFACE

## CHAPTER

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>SHORT RUN FLUCTUATIONS IN CONSUMER SAVING</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>APPENDIX A - SOME STATISTICAL CONSIDERATIONS</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>APPENDIX B - CHARACTERISTICS OF LOW INCOME GROUPS IN 1935-36</td>
<td>101</td>
</tr>
<tr>
<td>III</td>
<td>THE THEORY OF CONSUMER BEHAVIOUR</td>
<td>108</td>
</tr>
<tr>
<td>IV</td>
<td>EMPIRICAL TEST OF THE LONG RUN INCOME-CONSUMPTION RELATION</td>
<td>157</td>
</tr>
<tr>
<td>V</td>
<td>SUMMARY AND CONCLUSIONS</td>
<td>205</td>
</tr>
</tbody>
</table>

## ADDENDUM

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>229</td>
</tr>
</tbody>
</table>

## BIBLIOGRAPHY
PREFACE

The title of this work will be self-explanatory to any one who has followed the literature of the theory of income determination in the past ten years. It is meant to indicate that this is a study of the relationships which determine the rate of aggregate personal saving. No attempt has been made to explain corporate saving not because such saving is unimportant but because its analysis involves considerations different from and independent of those involved in analysis of personal saving.

The whole work is devoted to investigation of a single relationship and no attempt has been made to give a complete explanation of income determination or to make any policy recommendations. A complete theory of income determination requires analysis of a large number of relationships and a proper theory would require at least as detailed analysis for each of them as that given here for the consumption function.

Although the main body of the thesis contains a good deal of methodological discussion something needs to be said here about methodology in general. The methodology of most of the leading economists in England and the United States may be described about as follows: (1) Certain economic variables are to be explained,
e.g., prices, wages, income, investment. (2) Certain relationships exist between the behaviour of individuals or firms with respect to variables within their control and the values of certain variables economic or otherwise not within their control. (3) When all these relationships are considered together the economic variables are explained in terms of the non-economic magnitudes and the parameters in the relationships. (4) The economist's problem is then a two-fold one. He must find the behaviour or technical relationships under (2) and he must deduce from them the explanation of the values to be explained.

Most of the emphasis has been put upon the deduction problem. The fundamental relationships have been assumed on the basis of introspection or general observation. It may be said that this is true of even empiricists like the Cowles Commission group. For although they investigate the parameters of their relations by elaborate empirical methods, the form of the relations and the variables entering into them are based on perfectly orthodox postulates.

Now many important economic relationships are psychological in character. The traditional treatment of these relationships is based on a hedonistic psychology which has been outmoded for many years. Moreover in passing from relationships applying to single in-
dividuals to groups economists as a rule completely neglect sociological considerations. It is the writer's belief that economics will not make much further progress unless there is some attempt to make use of the recent gains made in the fields of psychology and sociology. This is difficult because workers in these fields have not ordinarily been directly concerned with problems of economic behaviour. Chapter III represents an attempt to revise the economic postulates about consumer behaviour in the light of modern sociology and psychology. In fact the result is a mixture of propositions based partly on work in these fields and in part on the introspection and general observation of the writer. It is hoped that it will be possible to undertake a more systematic approach to these questions at a later time. In any case Chapter III is at least a departure from hedonistic postulates whether a fruitful one or not.

Another important methodological problem is that of verification. It cannot be said that empirical work is one of the strong points of economics. A great many economists have been content to deduce the logical consequences of a set of postulates and let it go at that. On the other hand a certain school of which some of National Bureau's workers are representative goes to the other extreme. They simply assemble masses of facts
and catalogue them in the hope that somehow the truth will reveal itself. Emphasis on the collection of data is sometimes mistaken for the scientific method of the physical sciences. But this is not the case.

The method actually used in physical sciences is one of interaction of hypothesis making and testing. Hypotheses are made in such a way as to be consistent with all previously observed data. Their consequences are then deduced and experiments are set up which test whether these consequences actually occur. If they do not a new hypothesis has to be made. The possibility of making experiments greatly facilitates the testing process but that is all. The fundamental character of the process is the same whether the data used to test a hypothesis are obtained intentionally by experiment or whether they just happen. However certain special statistical problems do arise when data just happened. These are discussed in Chapter I. These special problems together with the general shortage and inaccuracy of data make hypothesis testing difficult for economists but not impossible.

In so far as possible I have tried to test the hypotheses made here against available data. However, because of the lack of data it has been necessary to do this by a sort of catch as catch can or weight of evidence method. It should be noted that no hypothesis
can be proved. All that can be done is to consider all
the hypotheses which can explain some phenomenon and
see if they can be reduced to one by disproving the
others. In attempting to do this I have not been able
as a rule to set up a single test which disproves the
alternative hypotheses but only to show that it is im­
probable on each of several tests. I have, of course,
tested to see whether my own hypotheses are consistent
with available data.

The hypotheses presented here were worked out in
Washington where I had the benefit of much constructive
criticism and advice from Richard Musgrave, Lloyd
Metzler, and Alfred Sherrard. At a later stage in
Cambridge most of the results were discussed with Paul
Samuelson and Robert Bishop of the Massachusetts Institute
of Technology and with Professors Alvin Hansen and
Wassily W. Leontief of Harvard. Most of all I am in­
debted to Evsey Domar and Mary S. Painter, with whom I
discussed the problems of this thesis almost every day
for over six months.

Cambridge, Massachusetts J. S. D.
June 1947
CHAPTER I

INTRODUCTION

Of all the new ideas introduced by Keynes in the General Theory the concept of the consumption function was, perhaps, the easiest to accept. Few wished to deny that consumption expenditures are primarily dependent on income; Keynes' arguments for the stability of the function were cogent enough to convince a great number of economists. The opportunities for empirical work opened up by the introduction of the new concept were at once apparent. Here, for once, was a theoretical relationship involving magnitudes which could be measured practically as well as theoretically. Econometricians went to work with a will and their efforts were amply rewarded. They were not only able to find a relationship between income and consumption, but they found that virtually all the variation in consumption was explained by variation in income.

Yet, in spite of these empirical successes, the consumption function is a more controversial subject today than it was ten years ago. For empirical investigation has yielded not one consumption function
but many, and each of them explains all the variations in consumption.

I

When regression methods were used to obtain empirical consumption functions, the regressions fitted so well and conformed so completely to the Keynesian hypothesis that they seemed to provide a complete verification of the stability of the income-consumption relationship. A number of economists have used consumption functions based on data covering the inter-war years to estimate post-war consumption.\(^1\) In view of the great difference between prewar and postwar levels of income, projections of this sort can be justified only if the 1919-1940 variations in consumption really do represent movements along a stable income consumption schedule.

However, this position has become progressively less tenable in the years since the publication of the General Theory. The weaknesses in the use of a single income-consumption schedule as an explanation of consumption have been pointed up by new data which

have become available in the last few years. The re-
sults of the Study of Consumer Purchases\(^2\) and of
Spending and Saving in Wartime\(^3\) are difficult to
explain in terms of relationships involving only in-
come and consumption. These studies gave the actual
yearly expenditures of families at given levels of
income. By making some assumptions about the dis-
tribution of income it was possible to estimate
aggregate consumption at various levels of aggregate
income.\(^4\) (This could be done only on the assumption
that families in any income bracket would spend the
same proportion of their income regardless of the
general level of income.) When such estimates were
made it was found that actual consumption during
the twenties and thirties did not deviate greatly
from the estimates. But, when consumption was esti-
rated for levels of aggregate income substantially
above those of the 1919-1940 period, the estimates
obtained from the budget studies were below those ob-

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2 Summarized by the National Resources Committee in
"Consumer Expenditures in the United States," 1938;
"Consumer Incomes in the United States," 1939;
"Family Expenditures in the United States," 1941.


4 See J. Cornfield, W. D. Evans and M. Hoffenburg,
tained from regressions based on aggregate data. However this did not create a serious problem. For the aggregate regressions could be regarded as linear approximations to the curvilinear relation derived from the budget studies.

Projections in a downward direction led to results which were more difficult to explain. Estimates of consumption at levels of income ruling (say) 50 years ago show consumption exceeding income. This is true whether the estimates are based on the budget studies or on the aggregate regressions although the budget study estimates of consumption exceed the regression estimates. It is known that net capital formation did take place even when national income was very low by present standards.

Moreover, Kuznets' data on income and consumption in the period 1879-1929 show that consumption was a nearly constant proportion of income throughout that period.\(^5\) It follows that the reconciliation of the results of the short period and long period studies must necessarily include some elements beside income. For there is no question that over the business cycle consumption changes less than in proportion to income. But if average consumption over

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long periods is a constant proportion of income we cannot explain the short and long period variations in consumption by a single relationship unless the relationship includes variables other than income.

The reconciliation can be made fairly easily if a trend factor is introduced. It can be argued that, at any moment, there exists a certain consumption function which determines a definite rate of consumer expenditure for every level of income. Such a function is analogous to the instantaneous demand functions used in value theory. For our purposes the important property of this type of consumption function is that consumption at any moment is supposed to be completely determined by income. In particular consumption, at a given level of income at a given moment, is supposed to be independent of the level of employment and other cyclical variables. (Since income is always rising trendwise it is possible to achieve any level of income at any stage of the trade cycle.) But, while consumption at any instant may be completely determined by income, the whole consumption function may be supposed to shift upward through time. If the instantaneous function is linear, the marginal propensity to save may be higher than the average so that the percentage of income saved tends to rise with income. This tendency can
be offset by an upward shift in the whole schedule so that over long periods the percentage of income saved remains constant.

To get an empirical consumption function reflecting the theory just outlined it is necessary to find the multiple regression of consumption on income and time. This was done by A. Smithies who used data covering the period 1923-1940. Estimates of consumption in earlier years based on his regression were found to be consistent with the Kuznets data.

The theory implicit in Smithies' work is plausible enough and is consistent with the data, but it is by no means the only theory with these properties. Professor Hansen has maintained that the variations in consumption recorded in the inter-war period do not represent movements along a stable income-consumption schedule. He argues that actually consumption is a function not only of income but of a number of other variables of which the most important is the percentage of unemployment. When consumption is observed over a short period it will be highly correlated with income because all of the

6 Smithies, loc. cit.

cyclical factors which influence consumption are strongly correlated with income. Hansen maintains that within a cycle consumption rises and falls with income but at a less than proportional rate. From cycle to cycle, however, consumption has risen in proportion to income. In explaining the long run stability in the average percentage of income saved Hansen emphasizes the introduction of new goods and the trend toward urbanization. These are the same factors as those used by Smithies in explaining the upward shift in his income consumption schedule.

Before attempting to test these hypotheses we ought to consider what methods of testing are suitable for dealing with the hypotheses that arise in aggregate economics.

II

When we deal with a problem in aggregate economics we usually seek for relationships which are, in some sense, invariant. By invariance we do not mean a historical invariance like the Pareto law. Rather, we mean that the relationship between a certain set of variables is unaffected by changes in some other variables. The concept of an invariant relationship is therefore a relative one; a relation may be invariant with respect to one set of variables
but not with respect to some others. Indeed it might be said that hardly any economic relationship can be regarded as completely invariant. For no economic relation is likely to continue to hold good both before and after a fundamental change in social organization. In fact one of the objects of economic policy is the modification of social organization in such a way as to produce relations of a desirable type among economic variables.

Our idea of invariance is somewhat as follows. We conceive that at any one moment certain variables within the control of households or firms are related in a definite way to certain other variables not within their control. For example, we suppose that the consumption expenditure of families depends on their income. The form of these relations is governed by the behavior characteristics of individuals and by institutional factors such as laws or customs. The relations we seek are invariant with respect to all variables except these psychological or institutional factors. A relation which satisfies that criterion may be said to be more or less stable according as these factors are more or less constant. We can make satisfactory predictions if we can find invariant relations of
this type which are highly stable.  

If an invariant relation of this type holds for the variables associated with individual households or firms, then a corresponding invariant relation must hold among some functions (not necessarily sums) of all the household or firm variables of the same kind. If we can write \( y_i = f_i(x_i) \), for every household (when \( x_i \) and \( y_i \) are variables applying to the \( i \)th household), then we can write \( \phi(\gamma_1, \gamma_2, \ldots, \gamma_n) : \psi(\gamma_1, \gamma_2, \ldots, \gamma_n) \). The invariance of the second relation will depend on the constancy of the behavior characteristics and in-

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8 Finding invariant relations of this sort actually helps in only one kind of policy problem. We may conceive of the "structure" of the economy as being described by a certain set of invariant relations. Then one kind of policy consists in fixing the values of certain of the variables which enter into these equations without otherwise disturbing any of the relations. Fixing an interest rate or tax rate is a policy of this sort. If we know all the invariant relations necessary to describe the structure we can predict the effect of this sort of policy (at least in the sense that we can assign a probability to any values of any economic variable at each point in the future).

On the other hand, many of the most important policies involve changes in the structure. If a law is changed which has never been changed before then we may know that certain structural equations will be changed but we may not be able to foretell exactly what the new equations will be like. Or, to take a simple example, if the Treasury undertakes a campaign to get people to save more, it will be difficult to know what [cont.]
stitutional elements which determine the invariance of the original relations. Aggregate relations which can be deduced from household or firm relations, I shall call fundamental aggregate relations. (There are of course some additional fundamental aggregate relations which are definitional and need not be deduced from anything.)

Now consider a pair of such fundamental aggregate relations:

\[
\begin{align*}
(1) & \quad \phi_t(x_1, x_2, \ldots, x_n) = \psi_t(y_1, y_2, \ldots, y_n) \\
(2) & \quad \phi_s(x_1, x_2, \ldots, x_n) = \psi_s(j_1, j_2, \ldots, j_n) \text{ where the} \\
& \quad \gamma_j \text{ are exogenous variables}
\end{align*}
\]

It is clear that a further relation (3)

\[
\phi_t(y_1, y_2, \ldots, y_n) = \psi_t(j_1, j_2, \ldots, j_n)
\]

may be derived from the first two. Further, this relation will be invariant so long as (1) and (2) are invariant.

As a matter of fact it seems probable that most of the economic policies of really fundamental importance involve structural changes of this sort. To the extent that this is true economists can be regarded as competent to judge the effect of these policies only by default on the part of the social psychologists.
This type of relation I shall call a derived aggregate relation. 9

Now suppose that we observe the historical invariance of the relation 3 and conclude that it is a fundamental relation. We might then conclude, that by changing the z's, we could manipulate the y's. But we might find instead that we had merely invalidated the relation (2), without having any effect at all on the y's. Derived relations like (3) may break down either as a consequence of policy changes or structural changes in the economy. In addition there is an important class of derived relations which are likely to hold good only during the course of a single trade cycle. For example, a certain variable may be partly dependent on the level of unemployment. Within the course of a single trade cycle, income is very closely associated with the level of unemployment. If we have data covering only a single trade cycle, we might conclude from the empirical evidence that Z is determined by income. Actually, we have a derived relation between Z and income, which is bound to break up because the upward trend in income will ultimately change the

association between income and unemployment. It is clear from these considerations that many of the relations observed empirically may be only derived relations which will break down because of a structural change in one of the fundamental relations on which they are based. This is particularly true of relations whose existence has been tested against the data of only a single trade cycle. Whether we are concerned with policy or with prediction, we shall often make errors if we treat derived relations as though they were fundamental ones. The difficulty of distinguishing between these two kinds of relations is one of the fundamental difficulties of economic hypothesis testing.

Let us now return to a consideration of the adequacy of correlation methods of hypothesis testing. Suppose we have a hypothesis which asserts that total consumer expenditure is dependent on disposable income. We can fit a regression to the data for income and consumption and compute the correlation coefficient. When we find a significant correlation what, exactly, have we found? We have not shown that the "data are consistent with the hypothesis." We have merely disproved the null hypothesis. That is we have shown that the association between income and consumption was too strong to
allow us to ascribe it to chance. Then we should be reasonably confident in asserting that we had found either (a) a fundamental relation between income and consumption or, (b) a derived relation between them. We might exploit our results a little further. If it could be shown that the lower confidence limit on the correlation was (say) .95, we could assert that during the period income was linearly related to all the variables fundamentally related to consumption. But this is about as far as we can safely go. It can be argued, of course, that a derived relation will tend to produce lower correlations than a fundamental relation. But, when our data cover only short periods, the connections between economic variables may be so close that the differences in correlations between the two sorts of relations may be too small to be statistically significant. Moreover, if the variables in a derived relation have a lower observational error than those in the fundamental relation, the correlation in the derived relation may be the higher one.

A very simple example of a derived relation is that which appears to have existed between consumer expenditures in dollars and disposable income in dollars during the period 1929-1940. Just as good a correlation is obtained by using undeflated as by
deflated data. This can only be true because the price level was linearly related to income during the period. If real consumption is fundamentally related to real income, the money relationship is a derived one and will break down in the post-war period. Conversely, if money consumption is fundamentally related to money income the relation between the real variables is a derived one and will break down. Now it is obviously of vital importance to know which is the fundamental relation, but the correlation test is not very helpful.

The difficulties we have just been discussing arise because of the existence of derived relations among aggregate variables. But, ordinarily, such derived relations will not hold for individual firms or households. This suggests that in testing hypotheses we ought to operate on the following principles. First, every hypothesis ought to be stated in terms of the behavior of individual firms or households, even when we are only interested in aggregate results. This does not, of course, prevent us from considering interactions among individuals, any more than the use of the theory of the firm in analysis of monopolistic competition prevents us from dealing with interactions among firms. Second, in so far as it is possible, we ought to test our hypotheses against data
which indicate the behavior of individual households or firms. This does not mean that we ought to abandon statistical procedures. Nearly every hypothesis has to allow for random elements in behavior so that in making tests we have to measure the average behavior of groups. But by dealing with relatively small groups we may escape the net of interrelations which makes it impossible to test aggregate hypotheses.

Suppose we are faced with the following situation. One hypothesis asserts that saving varies with income and the price level, another asserts that saving depends on income alone. Aggregate income and the price level are linearly related in the period for which data are available. Then, if one of these hypotheses is true, it will be impossible to disprove the other by means of aggregate data alone. But, while movements of aggregate income may have been correlated with those of the price level, there are certainly some individuals whose incomes moved in a different way. By studying the behavior of these individuals it will be possible to disprove one of the hypotheses. When this has been done the parameters in the chosen relation may be fitted by the use of aggregate data (though in some cases this may still be difficult because of
multi collinearity).

Of course it will not always be possible to find the data necessary to test every hypothesis. But there is a great deal of microeconomic data, which has never been properly exploited because of the tendency of econometricians to emphasize parameter fitting rather than hypothesis testing. Actually it is much more important to work with a true hypothesis than to make extremely precise estimates of parameters.

III

In Chapter II the above methodological considerations are used in an analysis of hypotheses about the short run consumption function. The hypotheses which make consumption depend primarily on real income are considered first. These hypotheses specify that consumption at a given level of income is independent of the position in the trade cycle at which that income is achieved. (No major modification of this statement is involved if the price level or the rate of change of income is included as an additional variable in the relationship.)

This kind of hypothesis can be tested by the use of budget study data. The Consumer Purchases Study of 1935-36 showed that families in the low in-
come groups had very large deficits during the period of study. The deficits were of such magnitude and the number of families involved was so large that it cannot be supposed that families normally in these income groups have similar deficits at all times. Moreover, it can be shown that the families involved were those whose principal earner was partially unemployed during the year but who had not gone on relief. That is they were families who had previously been in higher income brackets. The deficits occurred because these families prevented their consumption from falling by the full amount of the decrease in their income. This shows that consumption in one year is affected by the level of income attained in previous years (at least when that income was higher than the current one). This means that all hypotheses, in which the only income variable is the current level of income, can be rejected.

The above argument can be extended to form the basis of a new hypothesis. We concluded that the unemployed dissave in order to reduce the decline in their standard of living. But a depression causes a decline in the incomes of all groups. In fact the Lorenz curve for the income distribution of 1933 is almost identical with the 1929 curve. There is
nothing about the characteristics of the unemployed which makes them more eager than any other group to protect their living standard. Moreover, the higher income groups are better able to do so than are the wage earners. Those groups who save large amounts during prosperous periods can keep their consumption up when income falls by merely reducing their savings. It can be concluded, therefore, that the consumption of all groups depends on previously attained levels of income as well as on the current level of income.

Saving in the trough of a cycle (that is in the period between the peak of one upswing and the point in the next upswing at which income per capita reaches the previous peak) ought to depend very largely on the ratio of current income to some weighted average of previous incomes. The heaviest weights should apply to the highest previous incomes and if the time unit for measuring income is as long as a year we should obtain a good approximation to the true result if we say that consumption is a function of the ratio of current income to the highest previous income.

The above argument gives an explanation of saving during the trough of a depression. But what happens when income exceeds the highest level previously attained? Here we have to know how consumers will react to levels of income which they have not
experienced before. Except for lags in adjustment, their behavior in this situation will not be dominated by the past but by the factors which determine secular changes in the propensity to consume.

It will be argued in Chapters III and IV that, in the long run, consumption tends to rise in proportion to income. Suppose that at the peak of one cycle consumers save 10% of disposable income. During the ensuing decline in income savings will fall to less than 10% of income and rise again as the recovery proceeds. When income has reached its previous peak level, saving should have again reached 10% and (provided that further rises in income are slow - say 2% or 3% per year) should continue at that level during further rises in income.

Now consider the relation \( \frac{s}{y_x} = a \frac{γ}{γ_o} + b \)

\( s \) = consumer saving per capita, \( y_x \) = current real income per capita, \( γ_o \) = highest previously attained level of income. When income increases at a rate of 2% per year \( γ/γ_o \) will be nearly 1 and \( a/y = \) approximately \( (a + b) \). Suppose we fit a regression of this form to the data for the twenties and thirties. Since the twenties were a period of secularly rising income and the thirties were the trough of a depression the result should correspond to the description of the cyclical movement given above and the value of \( a + b \) should ap-
proximate the long run propensity to save. When the regression is fitted we obtain $a = 0.152$, $b = 0.055$ so that $a + b$ is very close to 10%. Kuznets' figures indicate that saving out of disposable income was very close to 10% in every decade from 1869 to 1929. The theory therefore appears to be completely consistent with the data.

However, a number of qualifications must be made before we get a complete explanation of variations in saving.

A difficulty arises when we have to deal with the recovery from a prolonged depression. The potential income may rise a great deal during such a depression. Once recovery sets in, income may rise very rapidly so that in some periods current income may exceed the previous high income by as much as 10% or 15%. Adjustment to the new level may take some time so that consumption will be below the level predicted by the regression. Of course income can only advance at so rapid a rate for short periods, so that eventually consumption will catch up and the formula will be operative once more. There does not seem to be any evidence that the rate of increase of income has much effect until income passes the previous peak level. There is some evidence that downward rates of change have some influence but there are too few observations to make certain.
Finally there is some fairly strong evidence that speculative gains reduce saving and that speculative losses tend to increase it.

IV

It is not difficult to accept the proposition that within a single trade cycle the percentage of income spent on consumption depends on the current income relative to the previous cyclical peak income. But what evidence have we that consumption will rise in proportion to income as income rises secularly. We do know one important fact. Kuznets' data show that in the period 1879-1929 consumption did rise in proportion to income.

We know that consumption has tended to vary in proportion to income for many years but we do not know why this should have been so. The explanation which seems to be generally accepted today runs in terms of the cancellation of two opposing forces. On the one hand we have Keynes' dictum that "apart from short period changes in the level of income, it is also obvious that a higher absolute income will tend to widen the gap between income and consumption. For the satisfaction of the immediate primary needs of a man and his family is usually a stronger motive than the motives toward accumulation, which only acquire effective sway when a margin of comfort has been attained."
These reasons will lead as a rule to a greater proportion of income being saved as income increases. The existence of this tendency for saving to rise as income rises has been widely accepted. But in the face of facts adduced by Kuznets it has been necessary to postulate the existence of offsetting tendencies. The introduction of new goods, the urbanization of the population and the changing age distribution of the population are supposed to provide the necessary offsets to the tendency for saving to rise relatively to income.

The existence of both of the tendencies just discussed can be made plausible by proving the existence of one of them. Suppose that we accept a priori the tendency for saving to rise relatively to income as income rises. Since the proportion of income saved has not risen in the last half century, the tendency must have been offset by some sort of trend factors. If instead, we are convinced that the trend factors were in operation, then the proportion of income saved would have fallen unless some other tendency offset the trend factors. Since the percentage saved did not fall a tendency for savings to rise must have existed and the income factor is the most plausible explanation of this tendency. Conversely either argument fails.

if the other is disproven.

Keynes' proposition about the relation of saving to income is founded on both psychological and empirical considerations but neither of these foundations is particularly firm. It is well known that at any particular moment families in the high income groups save a higher proportion of their income than families lower in the income scale. This fact may be regarded as a confirmation of the Keynesian position. But it is also well known that families in a given real income position in (say) 1900 saved a higher proportion of their income than families in a similar position in 1940. Unless this is explained the proposition that saving increases more than in proportion to income can hardly be regarded as an empirical law.

From a psychological viewpoint Keynes' argument about the relative importance of saving and accumulation at different income levels does not throw much light on the situation to which it is supposed to apply. It is no doubt true that a family will not save when its income is so low that it cannot satisfy its immediate primary needs. But, in the United States at least, the problem of getting an income high enough to maintain physical existence has hardly existed (for families whose workers are employed) for many years. The problem is not one of saving or consuming enough
to maintain existence. It is one of choosing between a higher or lower degree of comfort at the moment and a lower or higher degree of security. Any psychological theory of saving must give an explanation of the resolution of the conflict between the desire for security and the desire for comfort. When the problem is put in this way the conclusion that saving rises more than in proportion to income is not at all obvious. Moreover, in view of the paucity and ambiguity of the empirical evidence, a psychological basis is necessary if an adequate theory of saving is to be constructed.

Such a theory already exists in the form of marginal utility and "indifference map" analysis but it is hardly adequate for our purposes. In the first place neither marginal utility analysis nor indifference analysis leads directly to any conclusions about the relations between saving and income. Such conclusions can be reached only adding special assumptions to the basic postulates of the theory of consumption. The basic concepts of the utility and indifference approaches are those suitable for an analysis of an instantaneous equilibrium adjustment. Decisions about saving are decisions about the time pattern of consumption and it is very difficult to apply essentially static concepts to such a problem.
Even if this technical difficulty could be solved preference analysis has more fundamental defects. The whole structure of demand analysis today is based on the assumption that one individual's preferences are independent of the actual consumption patterns of other individuals. It is this assumption which permits us to add up the demand functions of individuals to get a market demand function.

Yet consumption preferences can hardly be regarded as innate characteristics of individuals. Nor can they, in a society as dynamic as ours, be regarded as determined by tradition. There is a great deal of evidence to show that consumer taste is socially determined. This does not mean that consumers' tastes are governed by considerations of "conspicuous consumption." Rather it means that any individual's desire to increase his expenditure is at least partly governed by the extent to which the goods consumed by others are demonstrably superior to the ones which he consumes.

This argument which is more fully developed in Chapter III leads to the conclusion that the intensity of any individual's desire to increase his expenditures depends on the ratio of his expenditures to a weighted average of the expenditures of other individuals. To get a complete theory of consumption, however, we have
to consider not only the drive toward increased consumption but also the restrictions imposed on this drive by the desire to save. Here again relative rather than absolute magnitudes are important. Whatever the motives for saving the psychological significance of a certain rate of saving depends on the magnitude of that rate relative to the current rate of consumption. Men who make $2,000 a year do not try to save enough to retire on $5,000 while to men who make $50,000 a $5,000 pension appears inadequate.

From these propositions together with some others introduced in Chapter III it is concluded that the propensity to save for any individual is a function of his percentile position in the income distribution. (The parameters of the function are themselves dependent on the parameters of the income distribution.) It follows at once that an increase in income, with no change in its distribution will lead to a proportional increase in consumption expenditures.

Thus the static income consumption patterns found in budget studies are explained by the same theory which explains the secular stability in the ratio of aggregate consumption to aggregate income.

The argument of Chapter III is based partly on psychological theory and partly on the results of sociological and psychological observation. In
Chapter IV the theory is tested against the available empirical evidence. First the alternative hypothesis has to be tested. This may be done by testing the trend factors which are supposed to have accounted for the secular stability in the average propensity to consume. The trend factors which have been mentioned by such writers as Samuelson, Kuznets, Hansen and Smithies are (1) the introduction of new types of consumers goods, (2) the increase in the proportion of the population living in cities, (3) changes in the age distribution of the population.

Kuznets' data show that consumption as a proportion of national income was virtually constant from 1869 to 1919. The proportion rose somewhat during the decade of the twenties. Income was rising throughout the period but it certainly cannot be argued that new products were introduced at the same rate (or at a rate varying with the rate of increase in income) throughout this long period. It thus appears that the average propensity to consume was constant in periods of rapid development in the field of consumer goods and in those when there was little innovation. The drop in saving in the twenties was partly due to the change in the relation of disposable income to national income. This point is discussed in Chapter II. Some of the drop in proportion
of national income saved may have occurred even while the proportion of disposable income saved remained constant. The introduction of the income tax and the increase in corporate saving changed the relationship between national income and disposable income.

Some comparisons between the rates of saving of farm families and urban families make it possible to evaluate the significance of the trend toward urbanization. These calculations seem to indicate that although urbanization did tend to raise the propensity to consume the magnitude of the change was very small.

Offsetting the effects of urbanization two other factors worked in the opposite direction. First, changes in the age distribution over the last fifty years have had some tendency to depress the propensity to consume. A similar tendency results from increases in the institutionalization of saving through insurance. These factors have therefore offset the influence of urbanization. On balance, therefore, there does not seem to be any evidence that trend factors significantly influenced the propensity to save in the period for which data are available. It is always possible that some factors not considered here were operative but no evidence of their existence has been presented so far.
In view of the long run stability of the propensity to consume we must accept the proposition that consumption tends to rise in proportion to income unless some trend factors of the type just discussed can be found. The hypothesis of Chapter III is thus verified in a negative way by the data on trend factors.

However, some more direct evidence is also available. The hypothesis of Chapter III implies that certain relations ought to exist among the income aspirations of different income and social status groups. Some evidence on these relationships is available and it appears to be consistent with the implications of the hypothesis. Similarly the hypothesis implies some relationships among the rates of saving of families in cities and racial groups with differing income distribution. It can be shown that the differences in savings of Negroes and Whites in the same city and of Whites in cities with different income levels are explained by the hypothesis of Chapter III. These differences are very difficult to explain on the hypotheses that the propensity to save depends only on the absolute level of real income. The hypothesis of Chapter III is therefore consistent with all the available data while the principle alternative hypothesis appears
to be inconsistent with the data at several points.

In Chapter V the results of the preceding chapters are brought together to form an integrated theory of the relations between income and consumption. The theory is then applied to the problem of forecasting consumer saving at levels of income consistent with full employment. It is shown that the estimates of past transition saving by consumers made by linear regressions exceed by as much as 50% the estimates made on the basis of the results of this paper.

The psychological argument of Chapter III obviously reflects on the validity of existing welfare theory. In particular it can be shown that consumer tastes are dependent on the distribution of income and past relative prices of goods. This means that it is necessary to completely recast the theory of welfare.

Finally it is argued that redistribution of income is not in the long run an effective technique for reducing the propensity to save. This does not mean that a redistribution is undesirable. It does mean that the arguments in its favor are either ethical or welfare arguments rather than fiscal policy arguments. If it is desired to reduce the propensity to save the most effective technique is the provision of increased income security for all groups and particularly the middle income group.
Finally it should be noted that the consumption theory developed here is more than a theory of aggregate consumption. While their full implications cannot be worked out here, the postulates of Chapters II and III can be made the basis of a complete theory of demand for particular products. Of greatest importance is the fact that this theory is a genetic theory and can therefore be applied to the problem of the growth of new industries which is left completely unsolved by demand theory based on static preference functions.
CHAPTER II

SHORT RUN FLUCTUATIONS IN CONSUMER SAVING

It seems to be generally agreed that changes in national income and consumer saving were linearly related during the period between the two World Wars. This is a most important fact but it does not in itself tell us anything about the fundamental nature of the connections between saving and income. Did consumption and income move together because there is some sort of invariant relation between them or is consumption really determined by some other variable which happened to be related to income during the twenties and thirties? This question underlies much of the recent controversy over the nature of the consumption function.

The problem can be defined by noting the points on which most writers are agreed and those on which there is disagreement. Since the consumption function problem has usually been attacked from an empirical viewpoint we can begin by considering the evidence with which we have to work.

I. The Data

Most of the empirical work on the short run income-consumption relationship has been based on ag-
aggregate income and consumption data covering the period 1919-1941. The relevant income variable is real disposable income per capita.

The use of real rather than money income does not commit us to the assumption that the consumption function is homogeneous with respect to prices. If it is desired to introduce either general price level or relative prices into the relationship, this should be done explicitly by the use of additional variables in the relationship.

It might also be argued that income and consumption should be deflated by the number of consuming units rather than by the whole population. In the short run, however, the changes in the ratio of consuming units to total population are largely due to the fluctuations in income. If families double up in a depression and thereby reduce expenditures per capita this is to be regarded as one of the consequences of the fall in income and should therefore be reflected in the relationship of consumption to income.

Finally there are some grounds for supposing that expenditures out of a given disposable income will vary with the relation of disposable income to income before taxes. That is, a high gross income coupled with high income taxes may lead to a different consumption reaction from that which would occur if the
same net income were obtained from lower gross income and lower taxes. In fact, however, very satisfactory explanations of changes in saving can be obtained without the use of taxes as an additional variable. There is therefore no empirical evidence that taxes have had any serious effect on saving (other than that already taken into account by using disposable income instead of income payments plus government transfers). The values for this series and the corresponding consumption and saving series are given in Table I.

If the regression of income on saving is calculated the result is

\[ y = 4.19 \, S + 38.28 \text{ billion} \, (y = \text{disposable income}, \, S = \text{consumer saving}) \]

or \[ S = .24 \, y - 9.1 \text{ billion} \, \] (units are the same as those in Table I)

Similar results have been obtained by other writers and there does not seem to be any doubt that there was a strong linear correlation between consumer saving and disposable income during the twenties and thirties. [See Appendix A for discussion of significance tests of the correlation and biases in the regression.]
Table I

<table>
<thead>
<tr>
<th>Year</th>
<th>Real Disposable Income per Capita x 1929 Pop.</th>
<th>Real Consumer Expenditures Per Capita x 1929 Pop.</th>
<th>Real Consumer Saving Per Capita x 1929 Pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1919</td>
<td>57.3</td>
<td>48.2</td>
<td>9.1</td>
</tr>
<tr>
<td>20</td>
<td>52.9</td>
<td>47.3</td>
<td>5.6</td>
</tr>
<tr>
<td>21</td>
<td>47.9</td>
<td>46.0</td>
<td>1.8</td>
</tr>
<tr>
<td>22</td>
<td>52.1</td>
<td>49.2</td>
<td>2.9</td>
</tr>
<tr>
<td>23</td>
<td>58.5</td>
<td>53.3</td>
<td>5.2</td>
</tr>
<tr>
<td>24</td>
<td>58.0</td>
<td>52.9</td>
<td>5.1</td>
</tr>
<tr>
<td>25</td>
<td>58.8</td>
<td>54.3</td>
<td>4.6</td>
</tr>
<tr>
<td>26</td>
<td>60.3</td>
<td>56.0</td>
<td>4.3</td>
</tr>
<tr>
<td>27</td>
<td>60.8</td>
<td>56.1</td>
<td>4.7</td>
</tr>
<tr>
<td>28</td>
<td>61.7</td>
<td>57.4</td>
<td>4.3</td>
</tr>
<tr>
<td>29</td>
<td>64.5</td>
<td>57.4</td>
<td>7.1</td>
</tr>
<tr>
<td>30</td>
<td>58.2</td>
<td>53.4</td>
<td>4.8</td>
</tr>
<tr>
<td>31</td>
<td>53.5</td>
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<tr>
<td>32</td>
<td>45.2</td>
<td>42.7</td>
<td>2.9</td>
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<tr>
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<td>46.3</td>
<td>44.1</td>
<td>2.2</td>
</tr>
<tr>
<td>34</td>
<td>51.0</td>
<td>47.7</td>
<td>3.3</td>
</tr>
<tr>
<td>35</td>
<td>54.6</td>
<td>50.6</td>
<td>4.0</td>
</tr>
<tr>
<td>36</td>
<td>62.2</td>
<td>56.3</td>
<td>5.9</td>
</tr>
<tr>
<td>37</td>
<td>63.7</td>
<td>57.6</td>
<td>6.1</td>
</tr>
<tr>
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<td>58.2</td>
<td>54.1</td>
<td>4.1</td>
</tr>
<tr>
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<td>63.2</td>
<td>57.7</td>
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</tr>
<tr>
<td>40</td>
<td>67.2</td>
<td>60.5</td>
<td>6.7</td>
</tr>
<tr>
<td>41</td>
<td>76.3</td>
<td>65.5</td>
<td>10.8</td>
</tr>
</tbody>
</table>

It was pointed out in Chapter I however that the existence of correlation is not proof of the existence of an invariant relation between two variables (even when the invariance is qualified by a ceteris paribus clause). It is necessary, therefore, to make use of other data before any firm conclusions about the significance of the income consumption regression can be reached.

Budget studies like the Consumer Purchases Study of 1935-36 provide a great volume of information on the effect of income differences on consumption and saving. The Study of Consumer Purchases includes income data from 600,000 families and expenditure data from 60,000 families. The expenditure data are classified by income, city size, region, occupation of principal earner and family size and composition. In the bulk of the tabulations the families included/restricted to native white, non-relief, unbroken families. Limited data are available for Negroes, foreign born families, single individuals and relief families. The calculations for the United States as a whole made by the National Resources Committee include all of these groups as well as estimates for expenditures of high income families not included in the sample studies.²

² "Consumer Expenditures in the United States," pp. 91 and ff.
In the original sample studies, considerable effort was made to avoid error in the individual measurements by checking the difference between stated income and stated expenditure against the stated changes in assets and liabilities. Schedules which could not be brought into agreement to within 5% were eliminated. However in spite of these checks, there is considerable evidence that income was somewhat understated by the low income groups. In addition, the estimates for the higher income groups included in the sample are somewhat unreliable both because of the small number of cases and because of bias introduced by the high refusal rate encountered among these groups. The data include only 90 families with incomes of $10,000 - $15,000, 21 families with incomes from $15,000 - $20,000, and 15 with incomes over $20,000. Tucker has also argued that the communities selected for the sample were less prosperous than the average for cities of equivalent size.

3 An unpublished paper by Harold Lubell shows evidence of considerable discrepancy between the data on wage incomes given by the Social Security Board and those shown in the budget studies. Miss Dorothy Brady of the Bureau of Labor Statistics indicated in conversation with the writer that there was some underestimation of low incomes in the budget study.


His evidence for this is that the growth rates of these cities were below average.

All of these difficulties mean that one cannot expect to obtain very accurate estimates of total consumer expenditure from the 1935-36 study. Later studies are more reliable partly because they were less ambitious. The 1935-36 study was intended not only to give information about the distribution of income and the relations of income and expenditure but also to give information on the influence of factors such as place of residence, occupation, age and family size on expenditure patterns.

In later war time studies the samples were designed so as to get adequate representation in each income group and a representative selection of communities and regions was included but the effect of family size and occupation was taken care of by randomization. In the wartime studies data are given for urban and rural families by income class but not by any other criteria. This means that to the extent that there is an association between income and (say) occupation the influence of the occupation factor is allowed to be reflected in the figures for the average expenditure for each income class. Randomization properly carried out insures that, except in so far as there is a correlation between
income and other factors, the influence of these factors is cancelled out so that the differences between expenditures for different income classes represent the influence of income and income correlated factors alone except for sampling errors. The smaller sample taken in the wartime surveys made it possible to scrutinize the individual income and expenditure schedules more carefully than in the earlier study and also to keep the refusal rate to a minimum. The two wartime studies although yielding less total information than the 1935-36 study were much more reliable with respect to the more limited set of questions which they attempted to answer.

In spite of all these difficulties a good deal of valuable information can be obtained from the budget studies. For on many points their internal consistency and the consistency between different studies make their results very reliable particularly if they are used to establish general tendencies rather than precisely quantitative relationships.

First, the evidence of the budget studies seems to establish beyond doubt that among individuals at a given time and in a given community the percentage of income spent on consumption declines with income. 6

It appears that in most cities the lowest third of the income receivers (relief families being excluded) actually had deficits while saving exceeded 10% of income only for the highest 10% of income receivers. Since these figures are for an open end classification with lower limits of $3000 to $10,000 the percentages saved would be even higher if detailed figures were available for the group with say $15 to $20,000. The national average for the $15 to $20,000 group is given as 40% by the National Resources Committee, and 50% for the over $20,000 group. It appears that about three quarters of the total net savings of families and individuals were made by income receivers with over $10,000. While the exact values given above may be somewhat in error there does not seem to be much doubt that the proportion of income spent on consumption decreases with income and that in the upper brackets it decreases rapidly.

Similar results are obtained from the 1941-42 study. In 1941 families with incomes of under $500 had deficits averaging 41% of income while those with incomes of $5000 to $10,000 saved 17.6% of income. It should be noted that families at a given income level appeared to save less in 1941 than in

We shall discuss the reasons for this phenomenon in detail at a later point.

II

Granting that the percentage of income saved increases with income when different income groups are compared at one time what is the connection between this static relation and the variation of aggregate consumption and aggregate income from year to year? If it can be assumed, first, that when a family's income is increased over time from (say) $1000 to $2000 the increase in its consumption will be the same as the difference between the consumption of $1000 and $2000 families at a given time, and second, that the distribution of income (in the Lorenz curve sense) is constant, then the connection between the static and dynamic relationships is a simple one. The problem raised by the possibility of variations in the income distribution was discussed thoroughly by Marschak. 8

Let \( r \) be individual (or family) income and \( x(r) \) be the individual consumption function. Then if \( f(r) \) be an initial frequency distribution of incomes

and the relation between changes in individual income and changes in aggregate income is given by
\[ 1 = l (r, \frac{R}{R_i}) \]
where \( l \) is the individual's new income, \( R \) is the new average income and \( R_i \) the initial average income. Then \( x(R) = \int_{x(\infty)}^{x(0)} \left[ \int_{x(\infty)}^{x(0)} \left( \frac{R}{R_i} \right) f(x) \right] dx \]
where \( x(R) \) is the individual consumption function and \( m \) and \( n \) are the initial limits of \( r \). In the special case in which all changes in income are proportional the relation reduces to \( X(R) = \int_{x(\infty)}^{x(0)} \left( \frac{R}{R_i} \right) f(x) dx \)
The collective marginal propensity to consume is \( X(R) = \int_{x(\infty)}^{x(0)} \frac{dX}{dR} \frac{dR}{R_i} f(R) dR \) and in the case of a constant Lorenz curve this is \( X(R) = \int_{x(\infty)}^{x(0)} \left( \frac{R}{R_i} \right) f(x) dx \)
from which it follows that if the individual marginal propensity to save were constant with respect to income the aggregate marginal propensity would also be constant. All of Marschak's analysis depends of course, on the validity of the first of the two assumptions. That is each individual's consumption must depend on his income alone.

Now what about the validity of these two assumptions? The first test, of course, should be to take the results of an individual budget study and calculate aggregate consumption for various aggregate incomes according to Marschak's rules. The results should check with the actual aggregate consumption at equivalent incomes. This was done by the Stones, who
made use of the Brookings data for the figures on individual consumption. The Stones obtained results from the aggregation of budget study data which conformed very closely to the actual aggregate data. This led them to conclude that the assumptions discussed above were fulfilled.

Staehle\textsuperscript{10} approached the problem by a different route. He estimated the degree of inequality of income among some German labor groups and then took a regression between their aggregate income, a measure of inequality and their expenditures. He found that variations in equality were nearly as important as income itself in accounting for variations in expenditure. However, no one else has ever achieved similar results and it seems probable that Staehle's results were due to multi collinearity.\textsuperscript{11}

The National Resources Committee aggregated the data from the 1935-36 study and made estimates of aggregate consumption at aggregate incomes of from


50 to 80 billion dollars (1935-36 prices and population). The income corresponds to disposable income except that it includes direct taxes. Recalculating the figures so as to get an estimate based on disposable income we obtain the following results:

<table>
<thead>
<tr>
<th>Income</th>
<th>$47,545</th>
<th>56,887</th>
<th>66,186</th>
<th>75,459</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saving</td>
<td>$3,465</td>
<td>6,103</td>
<td>8,932</td>
<td>11,965</td>
</tr>
<tr>
<td>Saving as % of income</td>
<td>7.3</td>
<td>10.7</td>
<td>13.5</td>
<td>15.9</td>
</tr>
<tr>
<td>Marginal Saving %</td>
<td>28.2</td>
<td>30.4</td>
<td>32.7</td>
<td></td>
</tr>
</tbody>
</table>

The results show a definite but slight curvilinearity in the relationship. However, in the range of incomes from 50 to 80 billion dollars a linear approximation would give very good results and, since this range covers almost all the variation in income for the period for which we have data on aggregate income, a linear approximation fitting the figures above should also fit the aggregate data. A close fit to the data above can be obtained from the relation saving = 0.304 (Disposable Income) - 11 billion dollars. In the preceding section we showed that the line of best fit to the aggregate data was

Saving = .24 (Disposable Income) - 9.1 billion dollars.

If one wished to support the view taken by the Stones, one could argue that the difference between the two slopes is due to errors in the budget study and that the results are not so different as to be inconsistent with the view that the two assumptions as to distribution of income and reactions to changes in income made above are true.

III

Cyclical Variations in Income Distribution

It is also possible to get some direct evidence on the magnitude of cyclical variations in the distribution of income. Unfortunately this is a subject on which empirical data are sorely lacking. However, a number of recent studies have thrown some light on the problem.

A study of the income tax data by N. O. Johnson indicates a fairly strong cyclical movement in the Pareto coefficient of equality of income. Crum, however, has criticized Johnson's work on


the ground that the data do not actually fit the Pareto law nearly as well as Johnson appeared to think. This is due to the fact that small deviations from a logarithmic relation may actually represent very large absolute deviations. Aside from this criticism the significance of Johnson's results is somewhat limited because they do not indicate whether any change took place in the relative shares received by those in the upper few per cent of the income distribution and the remainder. Moreover, the use of total income from income tax returns reflects some of the effect of capital gains which are not properly income although they undoubtedly have some effect on consumption. There is also considerable possibility of a cyclical variation in income tax reporting error. In general the results of the income tax studies do not give sufficient evidence of a cyclical variation in the equality of income distribution to justify its use as a serious factor in explaining the variation of consumption.

Moreover, there is at least one fairly strong piece of evidence against the proposition that equality of income varies cyclically. Fig. 7 shows data for money incomes in 1935-1936 and 1941 plotted on a Lorenz diagram.\textsuperscript{15} It will be seen that the

\textsuperscript{15} Based on Bureau of Labor Statistics Bulletins 723 and 724.
FIGURE I

DISTRIBUTION OF FAMILY INCOME
U.S. 1935-36 AND 1941

SOURCE
B.L.S. BULLETIN 723
1935-36 ———
1941 ————

% OF TOTAL INCOME

% TOTAL FAMILIES
points for the two years fell almost exactly on the same curve. Now, of course, it may be argued that the two studies involved errors in the measurement of income but it seems a somewhat remarkable coincidence that the errors should work out in just such a way as to produce the same Lorenz curve for both years unless there were some basis for this result. Since the movement from 1935-36 to 1941 was about as large a cyclical movement as ever occurs the evidence from the budget studies seems to be strongly against the existence of any appreciable cyclical movement in income. Menderhausen's analysis of the distribution of incomes in 1929 and 1933, however, shows some well-marked changes in equality between those two years. Lorenz curves for most of the thirty-three cities included in his study and the curve for all the cities taken together show (1) an increase in inequality among the lower income receivers and (2) a decrease in inequality among the highest third of the income receivers. The 1933 Lorenz curve for most cities is below the curve for

1929 until about the 90th percentile of income receivers. Taking all the cities together, however, the share of the highest 10% of income receivers (and of groups within the highest 10%) appears to change by only a very small amount between the two years. The difference seems to be so small that its effect on saving is almost negligible.

This leaves us with a shift of income from the lower bracket into the upper middle brackets, i.e. the 70th to 90th percentiles. If we take the propensity to consume of the lowest 2/3 of income receivers as 1 then the distribution of relative losses among the low income group is unimportant. The percentage of income going to the lower income groups declined by about 4.5 from 1924 to 1933 and the shares of the upper middle brackets increased correspondingly. The average percentage of income saved by the income receivers between the 70th and 90th percentiles was about 5% in 1935-36. The shift in income distribution between 1929 and 1933 thus resulted in a change in aggregate saving of .22% which is so small that it may be safely neglected.

The budget study data covers income before taxes and gives somewhat inadequate representation to the highest income groups. A study of income tax data
by Mary Smelker\textsuperscript{17} shows that for the top 10\% of receivers income/inequality of income after taxes was about the same in 1929 as in 1933. For this group the Gini coefficient of equality was .637 in 1929 and .619 in 1933. Since groups not included in her study did not pay income taxes it does not seem necessary to qualify the results based on Menderhausen's study.

It may be concluded therefore that cyclical changes in the size distribution of income are not very important. However there is another aspect to the income distribution problem. The propensity to save may vary not only with size of income but also with the source of income. It is therefore necessary to consider whether changes in the relative size of different components of income had any effect on the aggregate propensity to save.

Farmers have a distinctly higher marginal propensity to save than urban families and there is some evidence that independent business and professional groups have a higher marginal propensity to save than wage and clerical workers although there is rather wide variation in the relationship. As to the share of these groups in the total income there appears to have been a cyclical movement in entrepreneurial net

\textsuperscript{17} Unpublished.
income as a percentage of national income. The Commerce Department's figures show a much wider variation than those of Kuznets.\textsuperscript{18} The Commerce figures also show a slight downward trend in entrepreneurial net income as a proportion of national income.

If the Commerce figures are accepted then the cyclical swing in relative income of entrepreneurs is about 4 or 5%, from 16.3% in 1929 to 12% in 1932 and back to 16.2% in 1941 with a peak of 17.1% in 1936. The percentage falls below 15% only in the years 1930, 1931, and 1932. Most of the variation in these years appears to be accounted for by the decline in farm income which fell from its average value of 9% for the period 1923-1940 to 6.8% in 1931 and 6.5% in 1932. The marginal propensity to save of farmers appears to be at least twice that of city families at a given income (when computed by taking differences between savings at different income levels). But the weighted average marginal propensity to save of farmers in 1935-36 was .33 against .25 for urban families.\textsuperscript{19} The difference being small


\textsuperscript{19} Calculated by (1) computing the marginal propensity to save as the ratio of change in saving to
because of the heavy weights applying to the low incomes for farmers. In 1932 both propensities would have been lower but if their relative magnitudes were near those of 1935-36 it can be seen that the shift of income away from farmers is not very important. For if 3% of income had been taken away from city families in 1932 and distributed in proportion to income among farmers aggregate saving would have risen by only .3%. The difference in other years would have been even smaller. It appears, therefore, that the influence of cyclical changes in income distribution may be entirely neglected.

Thus we have verified the first of the assumptions used by the National Resources Committee in passing from individual to aggregate consumption functions. We have now to consider whether it can be supposed that the influence of intertemporal changes in a family's income can be estimated by comparing the expenditures of families who have different incomes at a given moment.

19 [cont.] change in income for each pair of successive income classes for 1935-36 and (2) weighting the marginal propensity for each pair of income classes by the average percentage of total income received by families in those classes. The data are given by National Resources Committee in Family Expenditures in the United States, pp. 51, 61, 123, 130.
IV

In order to pass directly from a consumption function based on a budget study to an aggregate consumption function a heroic assumption is necessary. It must be assumed that when a family's income changes thru time its expenditures will increase by an amount which can be calculated by comparing the expenditures of families at different income levels as indicated by a budget study. It will now be shown that this assumption is false at least when the changes in income are cyclical in character.

One of the most unexpected results of the Study of Consumer Purchases was that a large number of families reported that expenditures exceeded income for the year. It would not be surprising to find that a number of individual families failed to balance their budgets over a period. Illnesses, purchases of durable goods and variations in income will often cause some families to have a deficit in a particular year. But if we consider all the families in an income group we should expect these variations to cancel out. While some families have extraordinarily high expenditures and run deficits others should be able to save more than the usual amount so that the group as a whole should not have a deficit.
Ordinarily we should expect to find that any large group would report positive average savings unless the group included a large number of retired persons living off their assets. But in the Study of Consumer Purchases it was found that, on the average, families whose incomes were under $500 spent about 50% more than their income. In the $500 to $1000 income group deficits averaged about 10% of income. These groups constituted respectively 14.27% and 27.5% of the non-relief families in the United States in 1935-36.  

It has been suggested by the National Resources Committee that these deficits were partly the result of extra large durable goods purchases brought about by the rise in income in 1935 and 1936. But the deficits of the low income groups aggregated $1200 million while consumer credit increased at a rate of $1100 million during 1935 and 1936. Moreover families with incomes of less than $1000 accounted for only a small proportion of total durable goods purchases. Among urban non relief families those with incomes of less than $1000 made only 10.7% of total expenditures for automobiles (including operating costs) and only 15.3% of total purchases of house

furnishings. Thus credit purchases of durables fail to explain the large deficits.

An explanation of these large deficits can be readily obtained by considering the composition of the income groups which showed net deficits. Families with low incomes will be members of one of the following groups:

(1) Those employed in industries paying relatively low wages.

(2) Retired persons living partly off their capital.

(3) Entrepreneurs or speculators who have suffered losses during the period.

(4) Families whose earners were unemployed for at least part of the year.

The first two groups are in existence at any time but those in industries paying low wages are not likely to have very large deficits. For they cannot have assets if they do not save sometime and their credit is not likely to be very good. Retired persons may be expected to have deficits in any year. Thus to the extent that retired persons account for them, the deficits shown are not a depression phenomenon. How-

ever, since about 40% of the nation's families were in the groups which showed net deficits no very great part of them can be accounted for by retired persons. Independent business men who have had losses and continue to maintain their old standard of living are important in accounting for deficits.

Whatever part of the deficits is not accounted for by the first three groups must be the result of unemployment. On balance the families with incomes under $1500 had total deficits of 1200 million dollars in 1935-36 which were divided as follows:

<table>
<thead>
<tr>
<th>Income</th>
<th>Deficit No. Families (000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Non Relief Families</td>
<td></td>
</tr>
<tr>
<td>0-$500</td>
<td>$200 mill 1071</td>
</tr>
<tr>
<td>$500-1000</td>
<td>166 mill 2135</td>
</tr>
<tr>
<td></td>
<td>366 mill 3226</td>
</tr>
<tr>
<td>Rural Non Farm Non Relief</td>
<td></td>
</tr>
<tr>
<td>0-$500</td>
<td>44 mill 546</td>
</tr>
<tr>
<td>$500-1000</td>
<td>65 mill 1203</td>
</tr>
<tr>
<td></td>
<td>109 mill 1749</td>
</tr>
<tr>
<td>Urban Non Relief</td>
<td></td>
</tr>
<tr>
<td>0-$500</td>
<td>260 mill 1016</td>
</tr>
<tr>
<td>$500-1000</td>
<td>224 mill 2817</td>
</tr>
<tr>
<td>$1000-1500</td>
<td>94 mill 3398</td>
</tr>
<tr>
<td></td>
<td>578 mill 7231</td>
</tr>
<tr>
<td>Total Non Relief Families</td>
<td>1053 mill 12,196</td>
</tr>
</tbody>
</table>

In addition 4,487,000 families who received relief at some time during the year 1935-36 had incomes distributed as follows: 23

<table>
<thead>
<tr>
<th>Income</th>
<th>No. Families (in 000's)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $1000</td>
<td>3,444</td>
</tr>
<tr>
<td>1000 - 2000</td>
<td>936</td>
</tr>
<tr>
<td>2000 - 3000</td>
<td>107</td>
</tr>
</tbody>
</table>

Nothing is known directly about their expenditures although it seems probable that they also had deficits. The National Resources Committee assumed that expenditure patterns for relief families would be similar to those of other families in a similar income position but this seems to be a somewhat doubtful proposition.

In order to determine whether the deficit figures given in the Consumer Purchases Study are plausible and also to know their significance we need to determine the distribution of the low income families among the four classes of unemployed, sub-standard wage earners, independent business and professional groups and retired persons.

An estimate of the distribution of the urban and rural non farm families showing deficits is given in Table II. (See Appendix B for derivation of this estimate.)

**TABLE II**

White Urban and Rural Non Farm Families Income

Under $1000 in 1935-1936

<table>
<thead>
<tr>
<th></th>
<th>Relief</th>
<th>Non Relief</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retired</td>
<td>600,000</td>
<td>600,000</td>
</tr>
<tr>
<td>Independent Business and Professional</td>
<td>100,000</td>
<td>600,000</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2,100,000</td>
<td>1,900,000</td>
</tr>
<tr>
<td>Fully Employed</td>
<td>2,400,000</td>
<td>2,400,000</td>
</tr>
<tr>
<td></td>
<td>2,800,000</td>
<td>5,500,000</td>
</tr>
</tbody>
</table>

Urban and Rural Non Farm non relief families had total deficits of $593 million in 1935-36. If we assume that fully employed families had no deficits, then 3.1 million families accounted for the $593 million. This means that the average non relief family had a deficit of $191.

We have now to consider whether it is reasonable to suppose that deficits of this size could have been incurred. As far as the group of retired families is concerned it does not seem difficult to accept
the proposition that there are 600,000 families whose workers are retired and who liquidate capital at an average rate of $191 per year. This result seems particularly probable since a number of people will reach retirement with insufficient assets to permit them to maintain any approximation to their previous living standards from incomes, but with enough assets to permit them to do so if they liquidate capital.

With respect to the unemployed groups and the low income business and professional groups the problem is more difficult. If we were to assume that the group who had deficits in 1935-36 also had them in every other depression year then we should have to assume that these families had assets or credit facilities averaging $1900 at the start of the depression. This, however, seems very improbable for a number of reasons. First, the turnover between employment and unemployment is very substantial. Although the average number unemployed in 1939 was 8 million (including those on WPA) the number of individuals who were unemployed at some time during the year was 19 million and the number who were unemployed for more than three months of the year was 12 million.24 This means that the total of the un-

employment was widely shared and it seems improbable that any group of families would bear a constant share of the burden. (Those who were more or less continuously unemployed through the depression would probably be among those receiving relief during 1935-36). The total number of families who shared the position of having their incomes forced down to low levels so that they spent savings or borrowed to avoid going on relief must have been very much larger than those found in this position in 1935-36. I know of no way to make a direct estimate of the total number of families who at some time during the depression had serious loss of income as a result of unemployment but did not go on relief but it seems safe to put the figure at a level higher than the 2,500,000 who were in this position in 1935-36. I do think we should exaggerate if we supposed that the total unemployment deficits over the depression were divided among as many as 5 million families. This would mean that on the average each of these families had resources or credit facilities of $950 at the start of the depression or acquired during the depression. It will be noted that the deficits discussed here need not have been net deficits if we take into account a longer period than one year. That is a family may have saved in a year of full
employment and had a deficit in a year of heavy un-
employment. If it is the case that the families who
had deficits in 1935-36 were more fully employed in
other years of the depression their net deficit for
the whole depression period may have been smaller
than $950.

Some direct evidence as to the resources and
credit facilities of unemployed families is avail-
able. In particular the work of Mrs. Gilboy and
that of Clague and Powell is important. Powell
studied the financial resources of 1439 family
heads who were applicants for made work in Philadel-
phia in 1931. These workers had been out of work
for an average of 9 months when they made application.
Most of them were at this time eligible for made work
on grounds of destitution. However, Powell states
that there was not much difference between the total
resources of those found eligible and those in-
eligible. The group studied, consisted of families
where assets were comparatively weak since there were
a large number of unemployed persons who at the time
did not apply for work relief. This was not because
these workers were unemployed longer than the average

25 E. Clague and W. Powell, Ten Thousand Out of Work,
Philadelphia, University of Pennsylvania Press,
1933.
since their average length of time out of work was found to be about the same as the average length of unemployment among all the unemployed. There were, however, a large number of families whose resources were smaller than those in Powell's sample since they had begun receiving charity at an earlier date. In addition the average resources of workers in Philadelphia should have been larger than those of workers throughout the country. It thus appears that the Powell sample includes workers whose resources were neither the very largest nor the very smallest of any group in the country. This does not mean, however, that the results obtained from a study of their resources would be very close to the national average.

Powell's 1439 families had resources in the form of cash savings, cash value of insurance policies, houses and personal property of $204,000 or about $141 per family. In addition they obtained credit either in the form of cash loans or credit from landlords and stores of $183,000 or $127 per family. Their assets and credit facilities thus produced a total of $268 per family. Since this was early in the depression it seems probable that had these families suffered somewhat less severe unemployment or been able to hold out longer on the basis of their other resources they
might have been able to go somewhat deeper into debt. This is partially verified by Mrs. Gilboy's study of applicants for work relief in the suburbs of Boston. Mrs. Gilboy reported that in 1935 the average indebtedness of the group whose position she studied was $234 per family or nearly twice that of Powell's Philadelphia workers in 1931. Of course, neither of these groups can be taken as representative so that not too much significance can be attached to these figures. However, Mrs. Gilboy's families were still making expenditure of about $4 per week per family in excess of income even while they were on relief.

Bakke's study of New Haven workers also shows that families on relief can still obtain credit. Bakke's families were getting net credit of about $2 per week while on relief. While Bakke's sample was exceedingly small (only 25 families) his report is of some value because his investigators were well acquainted with the unemployed families who gave information and because the families were paid to keep detailed budgets.

All the evidence available goes to support the view that unemployed families in both relief and non-relief categories do manage to make expenditures appreciably in excess of income. If the figures of

26 E. Gilboy, Applicants for Work Relief, Cambridge, Harvard University Press, 1940.
27 E. W. Bakke, The Unemployed Worker, New Haven, Yale University Press, 1940.
Bakke and Gilboy are significant even relief families are able to get credit of $100 or $200 per year. This does not mean that they accumulate indebtedness to this extent through the whole depression. Since the same families do not appear to be out of work continuously, it is possible for them to pay off some debt when in work. When it is considered that the deficits shown in the Consumer Purchases Study are those of families, who though unemployed and with low incomes were not on relief the figures reported by the National Resources Committee do not seem implausible.

V

We have now established the fact that very large deficits were incurred by low income families during the depression. The families in question were not on relief but a high proportion of them were unemployed during the period in which the deficits were incurred. What is the significance of this fact? A supporter of the view that consumption expenditures depend on real income would say, presumably, that

\[ s = f(y) \text{ and that } \int f(y) \text{ exceeds 1 for some positive value of } y. \]

When this value of \( y \) is reached those who have assets or credit will have deficits, the others will have to be content with spending all of their income.
In its simple form anyway this view is untenable. For the breakeven point (the income at which consumption just equals income) stood at about $800 in 1941 prices in the budget studies of 1901 and 1917. In 1935-36 the breakeven point stood at $1500 in 1941 prices.\(^{28}\) If consumption were merely a function of current income the breakeven level of income should have remained the same. To this the sophisticated Keynesian will reply by introducing a trend factor. Consumption at a given level of income can be changed by the introduction of new goods (this is about the only factor which can cause a trend in consumption of urban families and these are the families included in the budget studies in question). For the sake of the argument let us agree that introduction of new goods in itself increases consumption at a given level of income. (In the next chapter it will be shown that this is a very dubious proposition anyway). We know too that families in the low income groups were driving automobiles and using various recently introduced household appliances. This does not advance the argument much, however, for the families in question were for the most part using these

\(^{28}\) Cornfield, Evans and Huffenburg, \textit{op. cit.}, p. 181.
things rather than buying them. We can turn to
other new goods, movies, and silk stockings (say),
which were also consumed by the low income groups in
the 30's. Let us grant that a family with an $800
income did not buy these things in 1917 and did in
1935 (and neglect the possibility that purchases of
these goods represented substitution rather than
additional consumption). Then it follows that at
least part of the deficits in the 30's were due to
the fact that low income families bought new goods
which did not exist in the earlier period. But this
is not the whole story. We can say on the one hand
that families at an $800 income level in the 30's
spent more than families with that income in 1917
because they had got used to a high standard of living
(including silk stockings and movies) in the 20's and
found it difficult to give them up. Or we can say that
even if income had remained constant from 1917 to
1935 the attraction of these new goods was so ir-
resistible that they incurred deficits to get them
(or at least that they would have done so if they had
the necessary assets as credit). The latter position
seems to be a somewhat untenable one. But, if we ar-
gue that consumption depends on current real income
and trend, that is the position which must be main-
tained in order to explain the facts. For if we write
\[ \frac{c}{y} = f(y,t) \] nothing has been said about the influence of past living standards on current consumption.

This does not disprove the proposition that consumption at a given moment is dependent on real income alone but it does require the supporters of that proposition to subscribe to some very strong propositions about the influence of new products and similar trend factors. We can make a further test if we compare the deficits reported in 1935-36 with those reported in 1941. Deficits at given levels of income were much smaller in 1941 than in 1935-36. At every level deficits were less than 1/2 as great in 1941 as in 1935-36. How is this shift to be explained?\(^{29}\) Suppose the deficits, in both cases, were due to the fact that families whose incomes had fallen as a result of unemployment found it hard to reduce their living standards. Then the explanation is easy. The low income group consists primarily of two sub groups: Families whose earners are normally fully employed at low wages and families whose incomes have been reduced by unemployment. The second group will run deficits to protect the high living standard attained when they were fully employed. The first group balances its budget. Suppose now that we have complete data on families in

\(^{29}\) Cornfield, Evans and Huffenburg, op. cit., p. 181.
the $1000 income group in two periods. Suppose that the situation is as follows.

<table>
<thead>
<tr>
<th>Number</th>
<th>Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully Employed Families (with normal incomes)</td>
<td>5000</td>
</tr>
<tr>
<td>Partially employed families</td>
<td>5000</td>
</tr>
<tr>
<td>Average</td>
<td>$150</td>
</tr>
</tbody>
</table>

Suppose that in a second period we obtain reports from the same group but that half of the families in the $1000 group have increased their incomes. The situation in the $1000 group now is as follows:

<table>
<thead>
<tr>
<th>Number</th>
<th>Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully Employed Families</td>
<td>5000</td>
</tr>
<tr>
<td>Partially Employed Families</td>
<td>2500</td>
</tr>
<tr>
<td>Average</td>
<td>$100</td>
</tr>
</tbody>
</table>

Now suppose that instead of subdividing the families in this way our report had shown only the average deficit of the $1000 income families. We would have observed a reduction in the average deficit from $150 to $100 per family without knowing why. The differences in the 1935-36 and 1941 studies seem to correspond very closely to the examples just given. In 1935-36 there were about 8 million unemployed; in 1941 there were only 3 million. In 1935-36 a
much higher proportion of families in the low income groups were there because of unemployment than in 1941. If therefore, we accept the proposition that the deficits were due to unemployment, or to incomes low by comparison with previous ones, the difference between the two studies is easily explained.

If we try to support the view that consumption depends on absolute income how shall we explain the difference? The trend explanation cannot be used in this case. For the breakeven point moves in the wrong direction (Note, however, that in the upper groups saving at each level of income was lower than in 1935-36. This means that some sort of trend factor was at work but does not explain the deficits. This movement can be explained by the long run theory of the next chapter.)

We can suppose that the families left in the low income groups would like to have run deficits but were unable to do so because they lacked the necessary assets or credit. But we have argued that a higher proportion of the low income group in 1941 were permanent members of that group than in 1935-36. It follows that the higher deficits in 1935-36 must have been incurred by the group whose incomes had fallen. For those permanently in the low income group were in more or less the same position in both years. Then
we have to explain the differences in the reactions of the two groups. There are three possible explanations. (1) The families with temporarily low incomes were technically in a better position to have deficits. That is they were not more willing to run deficits but more able to get the resources to do so. (2) The families with temporarily low incomes had expectations of reemployment and higher income in the future. (3) These families had had higher living standards in the past and were therefore more willing to have deficits to protect their living standards.

If either of the last two factors is influential then consumption must depend on past income (since this governs the expected level of income at full employment) as well as on current income. In this case a general rise in income to levels above the 1929 peak followed by a fall would bring about a recurrence of the deficits. For the standard of living and expectations of income would be based on the new peak. If income declined from this peak by the same percentage as 1935 income had declined from the 1929 peak deficits of a relative magnitude as large as those of 1935 would occur. This would be true even if the absolute level of income were as high as the 1929 level. On the other
hand if the breakeven point is independent of past levels of income no deficits would occur unless income were absolutely low.

The budget study data do not tell us anything directly about which of the three factors just mentioned are actually relevant. We must leave the question open for the moment. However, it should be noted that the hypothesis that consumption depends on past as well as on current income is consistent with all the data discussed so far. The alternative hypothesis that consumption depends only on current income can be made consistent with the data only if we are willing to accept some rather doubtful subsidiary propositions.

One further piece of evidence is available for testing these two hypotheses. The 1941 budget study reported income for the first quarter of 1942 as well as for 1941. Families at each income level were classified by the changes in their income. Savings for the first quarter of 1942 were separately reported for those whose incomes had changed less than 5%, for those whose incomes had increased more than 5%, and those whose incomes had decreased more than 5% from the 1941 level. The results are shown in Table III. Families whose incomes rose had about the same savings or deficits as those whose incomes
stayed the same.

TABLE III

Average Yearly Savings for City Families by Income
Change from 1941 to 1942

<table>
<thead>
<tr>
<th>Money Income Class in 1942</th>
<th>Consumers Whose Incomes in 1942</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decreased over 5%</td>
</tr>
<tr>
<td>0 to $1000</td>
<td>-337</td>
</tr>
<tr>
<td>$1000 to $1500</td>
<td>-181</td>
</tr>
<tr>
<td>$1500 to $2000</td>
<td>- 81</td>
</tr>
<tr>
<td>$2000 to $3000</td>
<td>0</td>
</tr>
<tr>
<td>$3000 and over</td>
<td>143</td>
</tr>
</tbody>
</table>

Annual rate for 1942 based on first quarter. Based on B.L.S. Bulletin 724.

On the other hand families whose incomes fell had much smaller savings or larger deficits than those whose incomes stayed constant. Now these facts can be interpreted in two ways. On the one hand we can say that they show that a rate of change factor is important in the determination of saving. That is we write \( \frac{c}{y} = f(y, y') \) where \( y' \) is the rate of change of income. On the other hand we can say that saving is low when income is low relative to past income. The two explanations are not the same. In a year when income is declining either explanation would lead to the same result. But suppose that income declines and then remains at a (more or less constant)
low level. After the decline has stopped the rate of change is zero but income is still low relative to its pre-depression levels.

It is fairly easy to tell which of the two hypotheses is correct. If the rate of change of income is an important factor it should show up in regressions of aggregate data. But it is well known that when the equation \( c = f (y, t, y') \) is fitted to aggregate data for the twenties and thirties the addition of the factor \( y' \) contributes very little to the correlation. In the face of the budget study data this is difficult to explain unless we accept relative income instead of rate of change as the explanation of the differences in saving at the same level of income.

The asymmetry in the results is also important. If we take the view that rate of change of income is a determinant of saving, then there are strong reasons for supposing that the adjustment lag works in both directions. On the other hand, if we argue that people whose incomes are low relative to their past incomes reduce saving to protect their living standard, the asymmetry is easy to understand. Those whose incomes rose were, for the most part, getting back to levels of incomes which they had previously experienced. In these circumstances they merely return

30 J. J. Pollak, op. cit.
to the expenditure patterns of the past and no adjustment lag is involved.

The data just discussed seem to show fairly conclusively that consumption at a given level of income does depend on past income. This hypothesis is consistent with the existence of deficits in 1935-1936, and 1941, with the changes in deficits (at given levels of income) from 1935-36 to 1941, with the upward movement of the breakeven point from 1901 and 1917 to 1935-36 and 1941, and with the differences in saving among families whose incomes had changed in different ways. It is difficult to explain all of these facts on any other hypothesis.

So far our argument has been a strictly empirical one. But it must be clear that it also has a strong psychological foundation. The fundamental psychological postulate underlying our argument is that it is harder for a family to reduce its expenditures from a high level than for a family to refrain from making high expenditures in the first place. Consider two families who have incomes of $1000 per year at a particular time. Now suppose one of these families has an income of $1000 per year for ten years thereafter. Suppose the other family gets an increase in income from $1000 to $1500 retains this position for nine years and then has its income
reduced to $1000 so that in the last year it is in the same position as the other family. Initially both families might have exactly balanced their budgets at $1000 and the first family might continue in this way for the whole ten year period. But when the second family had its income increased it would increase its consumption by (say) $400 and its saving by $100. When the reduction in income occurred it would certainly find it difficult to cut its consumption to the $1000 level. The first family had only to refrain from increasing its consumption expenditures to balance its budget. The second family had actually to give up consumption of $400 per year to achieve the same result. It would be surprising if a family in these circumstances succeeded in reducing its consumption sufficiently to balance its budget after the loss in income.

Since all of the data are consistent with the view that this does happen there does not seem to be much doubt that past income has an influence on current consumption and saving.

The argument so far has been devoted to explaining the deficits reported in the budget studies. But the significant result of this argument is not the conclusion that deficits will occur when income falls below previously attained levels but the more general
proposition that families are willing to sacrifice saving in order to protect their living standard. This proposition applies to all income groups who have suffered losses in income. We can argue in the following way. If a family has a certain income \( y \), and this income is higher than any previously attained it will save some amount. This amount will be a function of income \( S = f(y) \). If its income increases the same function will hold. But if after an increase income falls to the original level its saving will be less than \( f(y) \). If the family's income and saving are low throughout it will have a deficit after the fall in income. If the family is in a higher bracket it will simply save less after the fall in income than it did before the increase. This view is checked by the fact that savings in the last five years of the twenties averaged 10.2% of disposable income while from 1936 to 1940 they averaged only 9.0%. Real disposable income per capita was almost the same in the two periods.

We have now shown that consumption is dependent on current income relative to past income as well as on the absolute level of current income. The problem now is to find just which past incomes are relevant. In view of the argument just given we appear safe in supposing that past incomes lower than the current one
are not very relevant. This is pretty well demonstrated by the 1941-42 budget figures cited above. Families whose incomes rose to a given level saved about the same amount as those whose incomes had been at that level in the previous year. At first glance then it would then seem reasonable to suppose that current consumption depends on the ratio of current income to some weighted average of past higher incomes with weights decreasing as the time interval involved grows longer. There are, however, some fairly strong arguments against this position. The declines in income which occur in the depression are not uniformly distributed even though the size distribution of income remains more or less unchanged.

Income losses will be of three kinds (1) reductions in property incomes, (2) reductions in wages rates, (3) losses due to under-employment. Since real wage rates did not decline very much in the depression (and were even higher in the late years of the depression than in the twenties, losses of income are mostly of types (1) and (3). [A fourth class results from downgrading of workers either within or between industries but for our purposes this can be regarded as underemployment.]

Let us first consider the effect of losses of income in the upper income groups. It is not impor-
tant here whether the losses are due to reductions in property incomes or to salary reductions. It can be assumed, however, that unemployment among the upper income groups is not important. The upper 10% of the income distribution produces almost all of the positive saving for the whole economy. Moreover, families in this group save a high proportion of their income. This means that they have a good deal of leeway in maintaining consumption standards without running into deficits. When high income families suffer a loss in income therefore, they continue to live in the same kind of neighborhoods and maintain their contacts with others of the same socio-economic status. In general they maintain the way of life which was established before the onset of the depression. They will, of course, cut expenditures on some lines, particularly on durable goods. But in view of the high rate of savings maintained in prosperity they can absorb a considerable reduction of income by reducing saving without cutting consumption too deeply. Moreover, there is no reason why they should not continue in this position for several years. Suppose now that income falls sharply from a cyclical peak and then remains constant for several years. The peak year's consumption sets the standard from which cuts are made (provided the peak did not represent a mere spurt
in income). The higher the peak consumption the more difficult it will be to reduce consumption to any given level. After the initial reductions are made the situation becomes static. The peak year does not lose its influence because the consumption of the following years depends on the peak consumption. Of course if income began to fall again further consumption cuts would take place and the intermediate level of income would be important in determining the extent of the cuts as well as the previous peak income. But if the depression consists in a fall of income lasting only a couple of years followed by a rise or a low plateau the consumption of the peak year is likely to have very heavy weight in determining consumption in the depression. The influence of the peak consumption will not "fade away" unless income continues to fall steadily.

All of the above argument applies only to the upper income groups. Those who were in the lower 90% of the distribution in prosperity are in a different situation. For this group reductions in income are usually associated with unemployment. These people probably save very little even in prosperous times. In a depression they can only influence saving by having deficits. A considerable number of families in this group go nearly unscathed by the depression.
Their real wages do not fall and they never have serious losses of employment. These we may leave out of account since their savings are simply zero throughout. The remaining families suffer serious loss of employment at some point during the depression. These may also be divided into two groups. Some will remain employed up to a certain point then lose their jobs and never get steady employment again until a high level of prosperity is reached. These families will presumably run substantial deficits immediately after they become unemployed but as their assets become smaller they will have to adjust to the new situation and presumably balance budgets in which relief is the principal source of income. They may continue to have deficits for a long time, but in any case the influence of the prosperity living standard will certainly "fade away" as time passes. However, it should be noted that not all of the persons who will eventually constitute the "hard core" of unemployment get there at once. The result is that a certain number of families are going through the initial stages of long time unemployment at any time during the depression. Presumably, however, there are rather more families in this position during the downturn in the early years than later on. We should expect, therefore, to find somewhat greater deficits
and lower aggregate savings at a given income in the downturn than in the upturn. However, the total number of families in this group was not very large in the thirties and the differences in the numbers entering cannot have been great enough to cause numerically important reduction in aggregate savings.

The remainder of the unemployment is widely spread so that a large number of workers "take turns" being unemployed. Families lose income through unemployment and accordingly cut consumption but also run a deficit. When they get reemployed they may return to something very close to the prosperity consumption standard. Sometime later unemployment re-occurs and the process repeats. Those families who are very frequently in and out of employment will presumably gradually reduce consumption (even when employed) because of the decrease in their assets and the accumulation of debt. The influence of the peak standard will therefore gradually lose its effect. But a great part of the total unemployment can be accounted for by families who have only two or three stretches of prolonged unemployment during the depression. For these families the influence of the peak consumption standard will not fade away because it renews itself with each stretch of full employment.

We can conclude then that the income or consumption of the last cyclical peak will carry a special

31 Census of 1940, loc. cit.
and very heavy weight in determining consumption at a given (lower) level of income during a depression. In principle a weighted average of all the incomes from the peak year to the current year ought to be used. But with only a few observations it would be impossible to estimate the weights. In what follows we shall consider the relation of current consumption to the ratio

$$\frac{\text{current income}}{\text{highest previously attained income}}$$

but the results are to be taken as an approximation to the true relation.

VI

Let $S_x$ = current swing, $y_x$ = current income and $y_*$ = highest income previously attained with all the data corrected for prices and population. From the last section we know that we can write (I) $S_x = F(y_x, \frac{y_x}{y_*})$. Consider a period in which income is higher than ever before and is rising slowly, e.g. 1923 - 1929. In such a period $\frac{y_x}{y_*} = 1.02$ or $1.03$ in each year. The long run theory of saving outlined in Chapter I and developed in Chapter III shows that in such a period $\frac{S_x}{y_x} = \alpha$. Now consider the relation

$$\frac{S_x}{y_x} = \alpha \frac{y_x}{y_*} + \beta$$. When $\frac{y_x}{y_*}$ equals approximately $1$ $\frac{S_x}{y_x} = (\alpha + \beta)$. Moreover, the values of $\frac{y_x}{y_*}$ are
not likely to ever exceed the range of values covered by this variate during the twenties and thirties. If we get a good fit with this relation we need not worry about using it as an approximation even though the true relation may be much more complicated.

When the relation \( \frac{S_x}{Y_x} = \alpha \frac{Y_x}{y} + \beta \) is fitted to the data for the period 1923-1940 we obtain \( \frac{S_x}{Y_x} = 0.165 \frac{Y_x}{y} - 0.066 \), \( r = 0.90 \). The correlation is slightly better than that obtained by a linear regression of saving on income. The residuals are not significantly non random. The real test of the adequacy of the relation, however, does not lie in the correlation coefficient. It was shown that, when \( \frac{Y_x}{y} = 1 \), \( (\alpha + \beta) = a \). Our estimate of \( (\alpha + \beta) \) is \( (0.165 - 0.066) = 0.099 \). Now the value of \( a \) can be estimated independently. The data given by Kuznets show that from 1869 to 1919 net capital formation/national income nearly/constant at about .12. This figure is slightly higher than \( a \) because Kuznets' total saving both individual and corporate against national income while \( a \) is supposed to be the ratio of individual saving to disposable income. Kuznets' numerator exceeds ours then by the amount of corporate saving while his denominator exceeds ours by the sum of personal taxes and corporate saving. In the period in question personal taxes were negligible while corporate saving
amounted to 1 or 2% of national income. The denominators are therefore nearly the same but Kuznets' numerator is greater than ours by 1 or 2% of national income. It follows therefore that an estimate of a based on Kuznets' data must be very close to \((\alpha + \beta)\). Thus a statistical estimate of the parameters in our relationship (which combines both short and long run theories of saving) "predicts" Kuznets' data for a period completely different from that used in making the statistical estimate. It will be noted that the Kuznets data were not used in any way to calculate the values of \(\alpha\) and \(\beta\). We conclude therefore that the relation \(\frac{S}{Y} = \alpha + \frac{Y}{Y} + \beta\) is consistent with all of the available data. Since we have also shown that relations of the form \(S = f(y_t, t)\) are not consistent with the budget study data, it appears that ours is more satisfactory basis for prediction than the formulas now in use.

However, it must be noted that the argument used for justifying the particular variables used shows that actual saving in a depression is likely to be affected by the time pattern followed by income and by the relief and social security patterns followed. A depression with a more rapid or less rapid fall in income would probably be characterized by somewhat different levels of saving than those indicated by our formula. The formula should not be re-
garded as a machine for making predictions for no
simple formula can possibly take into account all
of the factors influencing so complex a phenomenon
as consumption behavior. If the general theory de-
veloped here is correct, then the formula should
provide a good base for making calculations. Esti-
mates in a particular situation will have to be modi-
fied in accordance with the differences between the
period of estimate and the last two decades. But
whatever modifications are made it seems clear that
this formula will give much better estimates than
those obtained from simple income consumption regres-
sions.
APPENDIX A

SOME STATISTICAL CONSIDERATIONS

I

Analysis of the aggregate data for income and consumption has been carried on chiefly through the use of linear regressions of consumption on some variable representing income. A number of income variables have been used in these relationships the choice being dependent on the theoretical structure erected and the availability of data. Those concerned with total saving have usually used national product or some series closely related to it as independent variable while those concerned only with individual saving have used aggregate income payments or more recently disposable income. Beside the choice of a basic income series two other problems in the selection of data must be solved before fitting an income consumption relationship. First there is the question of whether the data are to be used in their original form or whether they are to be deflated for price level and population changes. Second, there is the problem of whether any years in the series of available data should be left out. As a result of different decisions on these points a number of different regressions have been fitted each of which purports to give a relationship between
income and consumption.

For our purposes we need not consider regressions involving total income since we are not concerned with the propensity to save of corporations. The considerations leading corporations to save are certainly of a different order from those affecting individual families and since any regression relating economic variates reflects some point of view about the causes of human behavior it seems wise to analyze separately the saving decisions of corporations and individuals. By making this decision we are forced into arbitrarily including the savings of unincorporated businesses with the savings of families. However, the number of partnerships involving large numbers of partners is not very great and the savings of individual enterprises are individual savings even though they are directly invested in the enterprise. The fact that the considerations of small retailers in saving may be somewhat different from those of a professional man with equal income seems to be of the same order as the fact that white collar workers might have stronger reasons for trying to maintain a certain living standard than laborers. Moreover, as far as urban workers are concerned there is no evidence that independent business men save more or less than salaried
men with equivalent incomes. It is well known, however, that farmers have a higher propensity to save at a given income level than urban families. It would therefore be desirable to deal separately with consumption of farmers but this cannot be done because there are no data on the aggregate consumption of subgroups in the community. The only way to deal with this difficulty would be to use a multiple regression but this too is difficult because of collinearity.\(^1\) However, we have shown that in the recent past the propensity to save of farmers has not been an important cause of variations in the income consumption relationship.

Another question arises in connection with the question of desirability of using series which exclude corporate saving. Granted that the considerations which determine corporate decisions to save are of a different order from those determining individual decisions to save, may not the fact of corporate saving have some effect on the amount of individual saving at a given income level? This is certainly possible but we cannot find out from aggregate data, for corporate saving varies closely with total income and we cannot separate out the effects of income changes as such and changes in other variables whose movements are highly correlated with income. Of course, as long as this relationship between income

and corporate saving continues to hold it is a matter of no great importance to find out whether corporate saving as such has any effect in individual saving. If we wished to consider the full effect of an undistributed profits tax the case might be different. However, it seems probable that corporate saving has little effect on the propensity to save out of disposable income. In view of these considerations the proper variable to use in relating consumption to income is either aggregate income payments plus government transfers or disposable income. The principal difference between these two series is the exclusion of personal income taxes from the latter. The choice between them rests on the question whether consumption is a function of net or gross income. Although in general one would expect net income to be the relevant variable it is possible that for high income groups high tax payments accompanied by loud outcries may take the place of certain amount of "conspicuous consumption." Since adequate budgetary data are lacking for the high income groups no decision can be reached on this point. However, the error created by this factor is not likely to be great and we may therefore conclude that on balance disposable income is a more satisfactory series than income payments plus transfers.
We now have the problem of determining the proper adjustment for changes in population and price level. There can be no question that some correction for population changes is desirable. The question is, should income be measured on a per capita basis or on a consuming unit basis. If average family size were constant through time the two measures would differ only by a constant factor and it would not make any difference which was used. The average size of families, however, varies in two ways. First there is a downward trend due to the reduction in the birth rate and second family size varies inversely with income due to doubling up in depressions. For short periods the first factor is probably not of great importance but in long period problems change in family size will have an influence which must be taken into account. Short run variations in family size are the consequence of variations in income and if they permit a greater reduction in consumption than would be otherwise possible this must be regarded as one of the effects of a fall in income per capita. There seems, therefore, to be no objection to correcting for population changes by dividing by the total population rather than by the number of consuming units, provided the period under observation is sufficiently short to permit neglect of the long run downtrend in family size.
The problem of correcting for price level changes is somewhat similar to that of the correction for income taxes. Consideration of the static theory of consumers choice leads one to the view that real income is the variable appropriate to the determination of the level of consumption. However, when prices change rapidly it is quite possible that there is a lag in the adjustment of individual value systems to the new situation. If an individual's money income is cut in half and all prices fall by 50% then, except when contracts fixed in money terms are involved none of the individual's decisions should be changed. Actually, however, he may feel the effects of the fall in his money income much more immediately than he feels the fall in prices so that the net results of the fall in prices and incomes is to make the individual act as though he were poorer. In addition contracts to pay fixed sums of money, e.g. insurance may make the individual feel poorer. It is to be noted that these contracts do not balance out since many if not most of them are contracts requiring an individual to pay a business organization and vice versa and there is no reason for the two sets to be equal. In the case of insurance the individual is, of course, increasing his real assets in the form of insurance by making the greater real premium payment
but this is not likely to have much effect on his immediate action.

There are two methods of dealing with this problem. One method is to deflate the data by some price level index and suppose that any other price level influence is incidental to movements in aggregate income. The other method is to use money income and consumption data and use the price level as an additional variate. The use of this method, however, raises the problem of just how the price level should enter into the equation and this seems virtually insoluble with data at hand. I do not see any justification for the method of adding in the price level\(^1\) as another element in a linear equation. We have, therefore, used the first method which requires that any projection of results of this method should take account of the possibility that a different relation between price changes and income changes might exist in the future.

All the above considerations lead us to the conclusion that the appropriate income variable for income consumption relations is aggregate disposable income corrected for prices and population changes. The appropriate consumption figure is of course consumer expenditures corrected for price level and population. We have yet to consider the question

\(^1\) Cf. Pollak, op. cit.
whether any years for which data are available should be left out of account. When real disposable income and real consumption are related, periods of inflation must be left out of account because of the occurrence of forced saving. We usually suppose that at a given level of real income consumers will be willing to save a certain proportion of their income. But if in a period when real income is forced up to the maximum level possible in view of the national economic potential, investors insist on making real investments to an amount greater than that of the real savings provided by consumers at the maximum level of income, the consumers are forced into making more real savings than they wished. When an observation on real savings and real disposable income which represent the results of forced saving is included in the calculation of a regression intended to show the amounts consumers would be willing to save at a given level of income the results are obviously biased. Since the years 1919-1920 were clearly inflationary it seems clear that they should not be included in the regression.

The years 1921 and 1922 were also transitional years and have been left out although there is some doubt about the necessity for omitting them.

The year 1941 fits badly on almost any regression using real income and I have, therefore, left it
out of account. We shall show later the reason for the bad fit of the 1941 observation.

II

If we take the regression of Consumer Expenditures on Disposable Income we obtain: \( C = 0.80 \ y + 6.89 \text{ billion} \) (\( C \) = Consumer Expenditures per capita \( \times 1929 \) Population, \( y \) = Disposable Income per capita \( \times 1929 \) Population both in billions of 1936-1939 dollars), \( r = .994 \). Since similar results have been obtained from many related series it would appear that the existence of a strong association between income and consumption is established beyond question. Indeed no one has ever tried to deny its existence since the relationship was first stated. However, we shall show that the statistical proof offered in support of the income consumption relation has been very weak.

First it must be noted that the correlation used is always that between consumption and income not between saving and income. But consumption is a very large part of income and, therefore, we should be very surprised if there were no correlation between income and consumption even if consumption were a random variate. In fact suppose that consumption (\( C \)) and the sum (\( S \)) Gross Capital Formation + Government
Deficit - Corp. Saving and Depreciation which equals consumer saving by definition were random variates with variances $\sigma_c^2$ and $\sigma^2$ respectively. We have

$$y_\epsilon = S + C \quad y_\theta = \text{Disposable Income}$$

$$r_{\gamma c} = \frac{\frac{1}{N} \sum C \gamma_c'}{\sqrt{\frac{\sum (c')^2}{\sum (c')^2}} + \frac{\sigma_c^2 + \sigma^2 + \sigma_1^2}{\sigma_1^2}}$$

as $N$ increases $r_{cs} \text{ and } \sum SC$ go to 0 and $r_{yc} = \frac{\frac{1}{N} \sum \gamma_c'}{\sigma_c^2 (\sigma_c^2 + \sigma^2)^{1/2}}$

Let $\gamma = \gamma_c'$ then $r_{yc} = (\gamma_c')^2$. If $\lambda = 1$ $r_{yc} = .707$. If $\lambda = 20$ $r_{yc} = .97$. Since the actual ratio of the variances is slightly over 20 it follows that no correlation obtained between consumption and income gives any indication about the strength of the association between the income and consumption other than those that would exist from the fact that consumption is a large part of income.

To actually test the effect of income on consumption we should relate consumer saving to income. When this is done we obtain a correlation of .90 which though still significant is much less impressive. The regression equation is $y = 4.19 S + 38.28$ or $S = .24 y - 9.1 \text{ billion.}$ This reduction in the correlation is important because it increases our estimate of the variance of the regression statistics.

For with a correlation of .99 one tends to regard the variance in the regression coefficients
of the relation of income to consumption as negligible when based on only 18 observations. When the correlation is .90 however we get a variance of .25 for the slope of the regression and of \( y_\cdot \cdot \cdot - f \) of 5.98 for the constant. For a fiducial probability of .95 the limits on the slope are 3.14 and 5.24.

Thus although the estimates are subject to rather larger errors than has been supposed, ordinary correlation analysis seems to support the view that variations in consumer saving are closely associated with income. However the significance test applied to the correlation of .90 is derived from the assumption that the observations from which the correlation is derived are random drawings from a normal bivariate universe. But a serial correlation exists among the observations so that they cannot have been drawn from such a universe. The first serial correlation for saving is .36. Now it is well known that two serially correlated time series observed over short periods are likely to show high correlations even when they are actually completely independent.\(^1\)

Before accepting the evidence of the high correlation between savings and income as evidence of

the existence of a systematic association between them we need to devise some test of relationship such that if a correlation is found its significance can be tested by ordinary methods. Let us split the series of observations on income and saving into two sub series. One beginning with 1923 and taking every other term through 1939 and the other beginning with 1924 and taking every other term through 1940. The series beginning with 1924 shows weak serial correlations throughout. If a strong correlation exists between savings and income for these observations it cannot be attributed to the special phenomena arising in connection with serial correlation and if it meets an ordinary significance test it must be regarded as evidence of a real association between consumer savings and income. For the series beginning in 1924 and including each even year thereafter, the correlation between savings and income is .87. There are 9 observations and the probability of obtaining an observed correlation of .87 from 9 observations when the true correlation is 0 is less than .01. For a fiducial probability of .95 the limits on the coefficient are .35 and .98.

Another question which has not been discussed in the literature of the consumption function is that of the choice of regressions. Every student of ele-
mental statistics is aware that there are two regressions between any two variates. The regression coefficient of \( y \) on \( x \) is not the same as the regression coefficient of \( x \) on \( y \) unless the correlation between \( x \) and \( y \) is perfect. There is some tendency to use as independent variable the variate which is causally independent. When there are no observation errors this is generally a good working rule. But let us look behind it a little. If we have the hypothesis \( y_\infty = ax_\infty + b + \epsilon_\infty \) then it is easy to show that the least squares regression of \( y \) on \( x \) is an unbiased estimate of \( a \). But do those writers who use the regression of saving on disposable income believe that income determines saving or vice versa?

Using the same symbols as before our hypothesis is

\[
\begin{align*}
(1) \quad y_\infty &= S_1 + C_i \\
(2) \quad C_x &= a y_x + b + \epsilon_x
\end{align*}
\]

\( S_1 \) and \( \epsilon_i \) are random variates

then \( (3) \quad y_1 = a y_x + b + \epsilon_x + S_1 \)

or \( (3a) \quad y_x = \frac{\epsilon_1 + \epsilon_x + S_1}{1 - a} \).

If we take the regression of \( y \) on \( S \) we obtain an unbiased estimate of \( \frac{1}{1 - a} \). But if we take the regression of \( S \) on \( y \) there will be a bias.

The problem of observational errors also needs to be faced. If there are serious observational errors we cannot use either elementary regression. Instead we have to use a "weighted" regression which
will lie somewhere between the elementary regressions. In this case however it is probable that most of the observational errors lie on the left side of (3a). The term S equals Government Deficit plus Gross Capital Formation less Corporate Saving and Depreciation. Government Deficit is presumably perfectly measured. The sum of Corporate Saving and Depreciation should be determined with great accuracy (errors in depreciation accounting merely result in compensating errors in corporate profits and therefore in corporate saving). While Gross Capital Formation is not very accurately measured the absolute errors in this figure should be much smaller than those in the estimate of Gross National Product since the former figure is very much smaller. We are here concerned only with the absolute magnitude of the errors. Since Disposable Income equals Gross National Product less Corporate Saving, Depreciation Business Taxes, Personal Taxes plus transfers, the error in its measurement will be approximately equal to the error in measuring Gross National Product. We may therefore conclude that the term $S_1$ is measured very accurately relative to $y_\lambda$. Then the term $\epsilon_\lambda$ represents the sum of the observational errors in disposable income plus the deviations of actual consumption from theoretical consumption. Note also
that these deviations are subject to a multiplier effect in the same way as changes in offsets to saving. We may conclude then that the regression of disposable income on offsets to consumer saving gives an unbiased estimate of the marginal propensity to consume (using $\frac{1}{1-a}$ to estimate $a$).

In the argument just given it was assumed that $S_t$ is a random variable. Strictly speaking this is not so. Capital Formation, Corporate Saving and Depreciation and the Government Deficit are all determined to some extent by income and therefore by consumption. As Haavelmo has pointed out we cannot treat statistically a set of simultaneous equations as though they were independent. Suppose we have the relations

$$(1) \quad y_i = \alpha x_i + b + \varepsilon_i$$

(2) \quad $z_i = \varkappa x_i + \beta + S_t$

(3) \quad $z_i = y_i$

It is well known that if we take the regressions of $y_i$ and $z_i$ on $x_i$ separately we will get biased estimates of $\alpha$ and $\varkappa$. Haavelmo has worked out an elaborate technique for estimating all of the parameters simultaneously.

In our case, however, the bias is not very great. L. Klein has worked out a complete system of equations by the Haavelmo method. His estimate of the marginal propensity to consume out of disposable
income is .73 which compares with .76 by our single equation method and .80 from the regression of consumption on income. It appears therefore that no great error is introduced by the use of a single equation. This is very fortunate, for if one uses the simultaneous method one has to have a hypothesis about investment as well as one about consumption. If either of them is wrong the estimates of the parameters in the other relation will also be wrong. For this reason it seems safer to deal with single equations until we have hypotheses which can be used with more confidence than those now available.
APPENDIX B

CHARACTERISTICS OF LOW INCOME FAMILIES

IN 1935 - 1936

In order to know the significance of the deficits reported in 1935-36 we need to know whether families in the low income group in that year had low incomes generally or whether they had low incomes temporarily as a consequence of unemployment. Unfortunately we lack direct information on this question for the years 1935 and 1936. But the Census of 1940 contains information on the relations of family income and employment in 1939. The volume of unemployment and the level of income in 1939 were very similar to 1936 and both were years of rising incomes. We may, therefore, make use of the 1939 figures to obtain some rough estimates of the characteristics of the low income groups in 1936. For this analysis we shall confine ourselves to the urban and rural non-farm families with incomes under $1000.

The N.R.C. figures show a total of 5.5 million non relief families in this group. There were 3.4 million relief families with incomes under $1000 but of the total relief families 600,000 were farm families. If, as seems reasonable, the farm families on relief all had incomes under $1000, the urban rural non farm group
on relief under $1000 would total 2.8 million families. This gives a grand total of 8.3 million urban and rural non-farm families with incomes under $1000.

In 1939 a total of 7.0 million families all of whose workers were wage and salary workers had wage and salary income under $1000.\(^1\) To these must be added 1.4 million families whose head was a wage or salary worker or who had no other income.\(^2\) This gives a total of 8.4 million families with incomes of under $1000. Of these 1.7 million were Negro families, leaving 6.7 white families. However, the Census definition of a family differs in one respect from the N.R.C. definition. In the N.R.C. classification an individual who lives alone but maintains his own quarters is classified as a single individual. Such individuals are classified as one person families in the Census. There were 900,000 such individuals included in the total of families whose workers were wage and salary workers in the Census figures. After elimination of this group the Census total becomes 5.8 million. The N.R.C. figures, however, include about 700,000 families whose

\(^1\) Census of 1940, Sample Statistics, Family Wage or Salary Income in 1939.

\(^2\) Ibid.
heads were independent businessmen or professional men. Adding those into the census figures we reach a total of 6.5 million. The N.R.C. figures also include families whose workers were retired. The Census shows a total of 1.5 million families containing more than 1 person which had no person in the labor force. Not all of these, however, are in the income group under $1000. The Minnesota income study shows that about 2/3 of the non-relief families in Minnesota in 1936 which had no gainfully employed members had incomes under $1000. When relief families are included about 80% had incomes of under $1000. Per capita income in Minnesota is generally somewhat below U.S. per capita income. In 1929 Minnesota per capita income was $566 and $680 for the United States, in 1940 the figures were $509 and $575. However, 18% of income in Minnesota is produced by Agriculture as compared with 7.2% for the entire United States (1940). If we consider only urban and rural non-farm incomes it seems probable that the level of income in Minnesota would be fairly close to that for the United

4 Minnesota Resources Commission, The Minnesota Income Study.
5 Survey of Current Business.
6 Ibid.
States as a whole. If this is the case we may use the Minnesota data to estimate the number of retired families with incomes of under $1000. Using the Minnesota figure of 80%, we arrive at 1.2 million retired families with incomes of under $1000. Adding these to the total of 6.5 million families already accounted for by using the Census data, we arrive at a total of 7.7 million as opposed to 8.3 million shown in the N.R.C. data. The difference of 600,000 is presumably due to errors made in the assumptions used in our calculation. In any case the error does not appear to be sufficiently great to have any serious effect on the conclusions we shall reach. In order to complete our analysis of the characteristics of the non relief families with incomes under $1000 we now need to know the number of retired families on relief and the number of independent business and professional families on relief. In the 1935 tabulation of occupational characteristics of workers on relief there were 80,000 workers on relief in the classification "proprietors, managers and officials" and 82,000 workers in the classification "professional and technical workers."7 Since the first of these groups includes employed store managers and other officials as well as self employed businessmen and the

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7 Works Progress Administration, Workers on Relief in the U.S.A. in March, 1935.
second group includes teachers and other salaried professionals, it seems that the total of independent business and professional families on relief may be safely put at not more than 100,000.

For retired families we have again to use the Minnesota Income data. The Minnesota study showed that there were 17,900 families with no gainfully employed members who had incomes of under $1000 and were on relief against 18,700 similar families not on relief. These include only the urban families. We may, therefore, divide the 1,200,000 retired families equally between the relief and non relief groups. We may assume that all the urban and non rural farm families on relief had unemployed workers except those who were retired or were self employed. The 2.6 million relief families with incomes under $1000 were therefore divided as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retired</td>
<td>600,000</td>
</tr>
<tr>
<td>Independent Business and Professional</td>
<td>100,000</td>
</tr>
<tr>
<td>Unemployed Wage and Salary Workers</td>
<td>2,100,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,800,000</strong></td>
</tr>
</tbody>
</table>

Of the non relief families 600,000 were retired, 600,000 were independent business and professional families, and the remaining 4.3 million were wage and salary workers. If we can determine the total number
of families who suffered unemployment and had incomes under $1000 we can divide the 4.3 million families whose workers were wage and salary workers into those who had low incomes because of unemployment and those who normally had low incomes. The Census data show that approximately 4 million white urban or rural non farm families had workers who suffered unemployment in 1939. This figure includes only families all of whose workers were wage and salary workers. Some 1.2 million families who had no income other than wage and salary income but had some workers who were not wage and salary workers are excluded from this figure but included in the N.R.C. data. On the other hand single persons who were wage and salary workers are included. The two errors should come close to balancing out. Since we estimated that 2 million relief families suffered unemployment we must conclude that 1.9 non relief families also suffered unemployment. Our final distribution is then as follows:

White Urban and Rural Non Farm Families Income Under $1000 - 1935-36

<table>
<thead>
<tr>
<th></th>
<th>Relief</th>
<th>Non Relief</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retired</td>
<td>600,000</td>
<td>600,000</td>
</tr>
<tr>
<td>Independent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business and</td>
<td>100,000</td>
<td>600,000</td>
</tr>
<tr>
<td>Professional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>2,100,000</td>
<td>1,900,000</td>
</tr>
<tr>
<td>Employed</td>
<td></td>
<td>2,400,000</td>
</tr>
<tr>
<td>Total</td>
<td>2,800,000</td>
<td>5,500,000</td>
</tr>
</tbody>
</table>
These estimates are of course subject to a considerable range of error. However some of the errors will cancel and in view of the fact that the totals check to within about 10\% it seems safe to say that it is unlikely that the figure for non relief unemployed families is off by more than .5 million.

This being the case we are safe in saying that from 1/3 to 1/2 of the families who showed deficits during 1935-36 were unemployed during at least part of the year.
CHAPTER III
THE THEORY OF CONSUMER BEHAVIOR

I

Ever since the time of Jevons there has been a fairly well developed theory of the relations between consumer expenditures, prices and income. Whether in the form of marginal utility analysis or preference function analysis, this theory has made possible the deduction of conclusions as to the type of consumer behavior which may be expected to result from changes in prices or incomes. But, the conclusions which have been reached have been largely restricted to problems of the relations between prices, incomes and purchases of particular commodities or groups of related commodities. No conclusions about the relation of income to saving have been reached by the preference method, which can be said to have any general validity. The conclusions reached by Keynes on the relations of income and consumption are not explicitly deduced from considerations of preference theory. He says, "The fundamental psychological law upon which we are entitled to depend with great confidence both a priori from our knowledge of human nature and from the
detailed facts of experience, is that men are disposed as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income."¹ After some discussion of short run relationships he continues, "But apart from short period changes in the level of income, it is also obvious that a higher absolute income will tend as a rule to widen the gap between income and consumption. For the satisfaction of the immediate primary needs of a man and his family is usually a stronger motive than the motives toward accumulation, which only acquire effective sway when a margin of comfort has been attained. These reasons will lead as a rule to a greater proportion of income being saved as real income increases."

Still later Keynes gives a list of motives for saving and remarks that their strength will vary with a number of institutional factors, but that these factors are to be taken as given.²

Thus, Keynes based his conclusions primarily on general observation and common sense, and did not try to deduce his conclusions either from formal preference theory or any other psychological propositions. For his purposes this was a satisfactory

¹ Keynes, loc. cit.
procedure since he was only concerned with showing that an increase in income would result in an increase in consumption absolutely less than the increase in income. It will be noted, however, that Keynes' statements involve two unverified and rather dubious preconceptions. First, he tacitly assumes that the absolute level of consumption is the primary factor in determining whether the motives for accumulation or the desire for increased consumption will be more effective in the decision as to how increased income will be allocated between saving and consumption. Second, it is tacitly assumed that each family's decisions about consumption are independent of those made by other families.

When we go beyond Keynes and seek a more exact relation between income and consumption the validity of the tacit assumptions made by Keynes becomes more important. To some extent these same presumptions underly the work of more recent writers who have tried to find precise income-consumption relationships by empirical methods. This is certainly true of writers like the Stones who have tried to check aggregate income-consumption relationships against expectations derived from budget study data. On the

3 R. and W. Stone, op. cit.
other hand, Hansen, Smithies, and Samuelson all introduce the "rising standard of living" as a factor modifying the tendency of savings to rise with income. Unfortunately, none of them says very precisely what he means by the standard of living or why it rises. One may mean that living standards are determined by factors not directly connected with income, e.g., the development of new goods. On the other hand one may mean that consumers mutually influence one another in such way that consumption tends to rise more or less in proportion to income.

The distinction is of critical importance, since the question of the reasons for the long run constancy in the proportion of income saved depends upon it. It will be noted that, like Keynes, none of the writers cited have given any reasons for their propositions about saving and income in terms of either preference systems or other psychological propositions.


5 A. Smithies, op. cit.


7 In conversation, Prof. Samuelson has indicated that he includes under the phrase "a rising standard of living" the tendency for consumption to increase both as a consequence of emulation and of objective factors such as new products.
In view of the methodological considerations given in Chapter I it is necessary to establish income consumption relationships on a foundation of social and psychic premises. This involves first, a description of consumer behavior as it actually occurs; second, an analysis of the motivations leading to increased consumption and those leading to increased saving, and finally a theory of the resolution of the conflict between the desire to consume more, and the desire to save more. The last step is necessary simply because the saving and spending which actually occur are the outcome of a struggle between conflicting desires. No matter how much we know about reasons for saving or how much we know about reasons for consuming, we cannot know anything about the proportion of income saved until the two factors are considered together.

II

The only systematic analyses of consumer behavior used in economics are those based on marginal utility theory or the theory of consumer preferences as expressed in the indifference map analysis. Both of these theories assume tacitly that every individual faced with given prices, and a given income decides his purchases while simultaneously taking into account all of the alternatives offered him by the price-
income situation. No one supposes that this is true, but if anyone wished to defend the use of preference systems he would say that after some experience an individual will somehow manage an adjustment of his expenditures in such a way that the result is the same as would have occurred in the simultaneous solution. I have very serious doubts about the validity of this proposition, but the preference system analysis has more serious inadequacies in any case. First, to get any concrete results it is necessary to make specific assumptions about the shape of the preference surface. Except in the simplest cases it is very difficult to construct such assumptions. If any reader doubts this, let him try to make assumptions about his own preference surface such that his consumption behavior will be implied. This is, I think, the difficulty which has prevented anyone from using the preference analysis to deduce the savings income relationship.

A second limitation of the preference analysis is that it is entirely static. Preferences are taken for granted, and may be used to show how sales of some good will change when price or income changes but nothing is said about the origin of preferences or the factors which might lead them to change. Now, if it is really true that the origin of consumer pre-
ferences is entirely non-economic in character, that each consumer's behavior is independent of the behavior of all others (except as reflected in prices and incomes) and that the preferences themselves are independent of aggregate income, then it would be legitimate to analyze the effects of changes in prices and incomes by means of preference functions. But, if consumers do mutually determine each others' preferences, and if the preference function itself is changed by changes in income, then the preference analysis becomes completely useless for any but very short run price problems. We shall show that consumer tastes actually are interdependent, and therefore, it is necessary to begin by constructing a more realistic theory of consumer behavior.

8 Few economists would deny the proposition that consumer preferences are socially determined. Cf. Smith, Wealth of Nations, pp. 163-164; Marshall, Principles of Economics, p. 87; Veblen, The Theory of the Leisure Class. But after having admitted that consumers mutually influence one another, they have then (tacitly) continued to work on the basis of individually given preference systems. If it is granted that consumers influence one another's preference systems, then a general change in prices and incomes will first cause an adjustment to the new situation in terms of existing preference systems and then the adjustments of each individual will cause changes in the preference systems of others. It is, therefore, an error to construct an income consumption curve for each individual, and then add together all of these curves to get one for the whole community. This may not be very important in the short run, but it is certainly important in the long run.
Every economic theory contains implicitly or explicitly a description of a behavior mechanism. The problem of making such a description may be put in the following way. We can observe certain aspects of the behavior of individuals as groups of individuals, e.g. their actual purchases of goods and services. We wish to establish some "laws" governing this behavior so that we can predict what will occur under given conditions in the future. But the behavior which we observe is so varied and irregular that it is impossible to establish such laws by direct observation. We therefore attempt to "explain" behavior by assigning certain properties to individuals or families. From these properties we infer the behavior of an individual placed in a given set of circumstances. For example we suppose (1) that every individual is characterized by a preference function of a certain general kind and (2) that every individual gets onto the highest indifference surface possible in view of his income and the prices with which he is faced. Given these propositions (including the necessary specifications about preferences, e.g. diminishing marginal rate of substitution) we can predict the response of an individual to changes in income or prices. From this standpoint it does not make any difference whether an individual "really" has
a preference system provided that the predictions always agree with the observations. If the predictions are not fulfilled, we simply have to revise our description. Correctness of prediction is a minimum criterion for the acceptability of a set of constructs of this type. There are, however, some additional criteria. Efficiency is one of these. It is often the case that a construct erected to explain a certain set of phenomena breaks down in the face of a new set of observations. By making special cases or elaborating the construct we may be able to save it but only by making the construct so complicated that it becomes a hindrance rather than an aid to analysis. A second criterion is generality. It is always desirable to explain as many phenomena as possible by means of the same principle.

These criteria may be said to have governed the choice between Ptolemaic and Copernican astronomy. Observationally Ptolemaic astronomy covered all the phenomena of the solar system known at the time of Copernicus. The great advantage of the Copernican astronomy lay in its elimination of the extremely clumsy epicycles required to explain the solar system on the hypothesis of Ptolemy. Moreover, when interpreted in terms of Newton's laws the Copernican hypothesis explained astronomical and terrestrial phenomena by means of the same hypothesis. The superiority
of the Copernican hypothesis thus lay not in its "correctness" but in its efficiency and generality.

Preference analysis in its simple static form is not in accord with observation. For it can be shown empirically that one individual's preferences are affected by the actual behavior of other individuals. Independence of individual preferences is necessary if aggregate demand schedules are to be obtained by adding individual demand schedules. If demand analysis is to be based on the preference system concept, that concept will have to be complicated to take account of the influence of one man's action on another's preferences. This has been done for simple cases but the argument loses all its generality and becomes extremely difficult to apply to specific cases. That is the preference system concept loses its efficiency.

As for generality, preference analysis has always had an odd position. It is based on psychological postulates which have no relation whatever to any other psychological concepts. Thus the explanation of consumer behavior is quite different from that applied to other types of behavior. In a way preference analysis is a survival from the period when the psychology of consciousness held the interest of social scientists of all types. But few people today would wish to maintain that consumer behavior can be
explained entirely on the basis of rational adap-
tation of available means to given ends. Again,
preference analysis is static while nearly all
modern psychologies are genetic in character. Thus
any approach which explains consumption in the same
way as other behavior will be superior on grounds
of generality to preference analysis.

There are, of course, very great difficulties
in the way of one who attempts to develop such an
approach. The disagreements among psychologists are
even greater than those among economists. But the
importance of the consumption problem is so great that
it seems worthwhile to take the risk of becoming a
target for the missiles of psychologists and
economists alike. The remainder of this chapter is
devoted to the presentation of a complete new theory
of consumer behavior. The problems involved are of
two kinds. First, it is necessary to have a general
picture of the way in which consumer choices take
place. This gives a general framework but does not
tell us much about the kind of choices which actually
will be made. A theory of consumer motivation is
required to put any real content into a theory of
consumer behavior. Finally, motivations leading to
saving and the resolution of the conflict between
the two kinds of desires are considered.
III

A real understanding of the problem of consumer behavior must begin with a full recognition of the social character of consumption patterns. From the viewpoint of preference theory or marginal utility theory, human desires are desires for specific goods. But nothing is said about how these desires arise or how they are changed. That, however, is the essence of the consumption problem when preferences are interdependent.

If we ask why consumers desire the things they buy, we raise a problem which has to be dealt with on several different levels. We know of course that certain goods are purchased to maintain physical existence or physical comfort. We also know that certain activities are an essential part of our culture or at least of parts of it. Some of these activities, e.g. travelling to work, are accessory to acquisition of goods used for other purposes. Others are required to maintain some social status. Still others are undertaken merely for pleasure. But in every case the kind of activities in which people engage are culturally determined and constitute only a small subset of the possible actions in which people might participate. Nearly all purchases of goods are made, ostensibly at least, either to provide physical
comfort or to implement the activities which make up the life of our culture. Frequently, of course, both kinds of requirement are satisfied by the same goods.

All this is so obvious that it hardly seems worthwhile to dwell on it. Yet it is vitally important for our theory. For we can now argue that people do not, for the most part, desire specific goods but desire goods which will serve certain purposes.

But, of course, people are not indifferent as between the goods which will serve the same purpose. People who want transportation care whether they walk or ride a subway or a taxi. Almost any activity can be carried out in a variety of ways and a variety of goods can be used to implement it. Sometimes the goods which can be substituted for one another for a single purpose go by different names as in the transportation case, sometimes they are different brands or varieties of the same kind of good. But the important point is that they are qualitatively different ways of doing the same thing. Even more important they are not just different but some are better than others.

The superiority of one good over another for a specific purpose may be a technical superiority as in
the case of automobiles or refrigerators. In other cases it may be an aesthetic superiority or superiority with respect to some criterion such as newness of design. But whatever the basis of the comparison, there is likely to be, at one time, a high degree of agreement about the best means of satisfying any particular need. This agreement will be particularly strong in the fields of food, housing, household operation, clothing and transportation which absorb the largest part of most family budgets. Whether the agreement arises because of the objective differences in the goods in question or because of advertising or the prestige of fashion leaders need not concern us particularly at the moment. There will, of course, be plenty of disagreements about the merits of specific items. But if a large number of people were asked to rank in order of preference, a number of different types of automobiles, houses, or cuts of meat, the rank correlation would be high. This would be particularly true if the whole range of substitutes from the cheapest to the most expensive were included. Of course, the correlation obtained in this kind of test would be higher the more homogenous the group involved. Age differences, regional differences and differences in social class will reduce the correlation. But the
correlation would still be quite high even if a random sample of the whole population were used. The lowest correlation would presumably result from a test of agreement on aesthetic or recreational activities; but these items account for a small part of most budgets, even in high income groups.

So far all our emphasis has been upon qualitative differences. But, of course, quantitative variations are also important. Variation in the quantities of goods consumed has a number of different aspects. In some cases quantitative variation is variation in the proportion of times in which one or another of a set of substitutes is used for a given purpose. A man may eat dinner every night, sometimes in an expensive restaurant, sometimes in a cheap one. If he increases the proportion of times in which he eats in the expensive one then he is in a sense improving the average quality of his meals.

In a second group of situations quantity differences are essentially differences in variety. The quality of a library depends on the number of books not because more books fill up more space but because the books are different. Quantity is also associated with specialization. A woman wants a large stock of dresses not only for variety but because
some are evening dresses and some afternoon dresses, etc. If she owns only a few she is doomed to wear the same dress for different purposes. When goods are looked at as the means of carrying out activities, their quality clearly varies with the degree to which they are specialized to suit specific purposes.

There are, of course, cases in which quantity variations are directly important. It is presumably better to have a large stock than a small one. But for our purposes there is no difficulty in looking at this as a special case of quality variation.

On the whole it appears safe to build a theory of consumption around the four propositions; (1) physical needs and the activities required by the culture require the consumption of certain kinds of goods, and (2) each of the needs whether physically or socially generated can be satisfied by any of a number of qualitatively different types of goods; (3) these different types of goods or in the broader sense ways of doing things are regarded as superior or inferior to one another; (4) there is a generally agreed upon scale of ranks for the goods which can be used for any specific purpose.

Nothing that has been said so far is formally inconsistent with the use of preference theory or
utility theory. These approaches emphasize changes in the quantities consumed of a limited set of goods. Formally these approaches are more general but they lead one to think of differences in consumption patterns in terms of differences in the amounts of the same specific goods consumed rather than in terms of the qualities of goods consumed. But it seems clear that psychologically an improvement in the living standard consists in satisfying one's needs in a better way. This may sometimes involve consuming more of something but it very often consists in consuming something different. In what follows we shall find the quality approach to consumption a useful tool.

IV

The level of saving actually achieved by anyone represents the outcome of the conflict between his desire to improve his standard of living and his desire to obtain security by saving. To understand the way in which the outcome of the struggle is determined we need to know something about the motivations leading toward increased expenditure and those which make saving desirable. To begin with however we need a picture of the consumer in action. For this purpose we need only the most general ideas about motivation.
On the one hand we can simply assume for the moment that people wish to save for some reason. The motivations behind saving are discussed in detail in section VI. On the consumption side it may be assumed that in choosing consumption goods everyone will always prefer higher quality goods to lower quality goods. But usually superior goods will be more expensive (quality here being regarded as a subjective not as an objective matter). For inferior goods which are expensive will not be sold and can be eliminated from consideration. This means that with a given income one can improve the quality of one's living standard only by reducing saving.

In preference theory and marginal utility theory the consumer is supposed to consider a sort of menu showing all of the available goods and services and their prices. He then decides how much to consume of each. No one believes that this actually happens. But it can be argued that consumers make the same decisions as they would if they went through a systematic budgetting procedure. This is possible, though extremely doubtful. In any case it will be worthwhile to see if any new elements appear when we make a more realistic description of the way in which consumer decisions are actually made.

We have already concluded that people use goods and services in order to satisfy certain needs or to
carry out certain activities. The physical needs are a given datum and for our purposes most of the activities carried on by an individual can be predicted if we know his age, occupation, social status and marital status. (Specific recreational activities are an exception here but not a very important one.) On the whole then, the consumer has only one degree of freedom in making choices about consumption. He can vary the quality of the goods and services he uses for any purpose.

Whenever it is necessary to acquire goods or services, for any of the purposes we have discussed, a decision has to be made as to the quality of goods to be purchased. These decisions are not made simultaneously but individually as the necessity for individual purchases arises. This might seem to imply that the decisions are made independently of one another but that is only partly true. The decisions have to be related because of the budget constraint and the desire to save. But the mechanism which connects consumption decisions is not that of rational planning but of learning and habit formation.

The process of habit formation is difficult to describe in a short space because it is a genetic process which begins in childhood. At any one moment a consumer already has a well established set of consumption habits. However, the central elements in the
process can be brought out by a hypothetical example of a forced change in habits.

Suppose a man suffers a 50% reduction in his income and expects this reduction to be permanent. Immediately after the change he will tend to act in the same way as before. When the stimuli which led him to make expenditures before arise, he will continue to respond by making the same expenditures. But if he does this for a time he will find that his assets are being reduced; or if he had none he will find that late in the income period he has to forego purchases which seem more important than those made earlier. In retrospect he will regret some of his expenditures. In the ensuing periods the same stimuli as before will arise but eventually he will learn to reject some expenditures and respond by buying cheap substitutes for the goods formerly purchased. Eventually he will reach a new consumption pattern such that he will not, in retrospect, regret any of his expenditures. This pattern is likely to become habitual in the same way as the original pattern.

This is, of course, a very oversimplified description of what must be an extremely complicated process. An economist will note at once that the behavior just described did not involve any rational planning. Actually, of course, a man faced with a
reduction in income may decide in advance to change his consumption pattern. But this does not change any essential elements in the process. Such planning results from the ability of men to imagine that an action will have undesirable results. Instead of discovering the unfortunate results of some kind of behavior by an actual experiment we do so by a mental experiment. From a learning theory standpoint this is the central difference between mice and men.

The elements in the consumption habit formation process are (1) the basic physical or social needs which can be satisfied by the acquisition of goods or services; (2) experimental behavior (real or imaginary); (3) the results of this behavior i.e. in some cases regret that certain expenditures were made; (4) learning that a certain pattern is successful in the sense that no expenditures are regretted to a sufficient extent to cause a change in the pattern.

We can now consider the factors which may bring about changes in consumer habit patterns. It is obvious that changes in income or prices will bring about changes in habits. But at this stage we need to consider the events which will change an individual's consumption when his income and the prices
facing him are constant. This can be done most easily by means of another simple example.

Suppose that a man lives in a community in which no one owns an automobile. His transportation requirements can be satisfied by walking or taking streetcars and he is likely to be habituated to this state of affairs. He may know about the existence of automobiles and even occasionally consider buying one. But if his income is not high he will not find it difficult to reject these impulses to increase his transportation expenditures. Now suppose that for some reason the number of automobiles in his community begins to grow rapidly. The superiority of automobiles is demonstrated to our subject with much greater frequency than before. The idea of getting an automobile is likely to occur to him with greater frequency than before. Moreover, the impulse to buy one becomes more difficult to reject than before. The more often he comes into contact with the superior mode of transportation the more his old habit pattern is threatened. Ultimately he may buy a car at the expense of reducing his saving or the quality of his consumption of some other kind of goods.

In general we can say that impulses to improve the quality of goods habitually consumed for some
purpose arise out of contact with superior goods. But the existence of such impulses does not necessarily break the habit pattern. For the habit was formed as a compromise adjustment of the conflict arising out of the fact that one cannot have the best of everything and still balance one's budget. A particular habit can be broken by raising the frequency and strength of impulses to buy better quality goods to a higher level than that which ruled at the period in which the habit was formed.

We have argued that the frequency and strength of impulses to buy better quality goods depends upon the frequency of contact with these goods. A high proportion of one's contacts with superior goods results from the use of these goods by other persons. Moreover, the amount of display and advertising space given to particular brands of goods is closely correlated with their volume of sale. Thus there will be a relation between the number of users of a given item and the frequency with which any individual comes into contact with it.

We have already argued that the ranking of a good in the accepted scale of qualities will correspond approximately to its rank in the scale of prices. The frequency with which an individual comes into contact with superior substitutes for the goods he uses for any purpose, will therefore depend on the
ratio of his expenditures for that purpose to those of others with whom he associates. (But ratios above 1 will not have appreciable influence according to the theory just given.)

If this is true for expenditures for single purposes it is also true for total expenditures. We may, therefore, conclude that the strength of impulses which will lead to an increase in total expenditures will depend, for any individual, on the ratio of his expenditures to those of persons with whom he comes into contact. The contacts in question are not necessarily personal contacts but may be any sort of contact which results in a comparison of two kinds of goods serving the same purpose. However, as we shall show in the next section contacts of a social character will be of greater importance than casual ones.

V

So far it has been assumed that impulses to increase expenditure arise only out of a belief in the superiority of certain goods for fulfilling some need. But there is another aspect of consumption which is perhaps equally important. Ours is a society in which one of the principal social goals is a higher standard of living. Economics could hardly come into existence if this were not the case. Now the fact,
that the attainment of a higher standard of living as an end in itself is a major social goal, has
great significance for the theory of consumption.
For this means that the desire to get superior goods takes on, so to speak, a life of its own. It pro-
vides a drive to higher expenditure which may be even stronger than that arising out of the needs which are supposed to be satisfied by the expendi-
ture. The mechanism may be described in the follow-
ing way. When the attainment of any end becomes a generally recognized social goal, the importance of attainment of this goal is instilled in every indi-
vidual's mind by the socialization process. In psychoanalytic terms the goal is incorporated into the ego-ideal. When this occurs the achievement of a certain degree of success in reaching the goal be-
comes essential to the maintenance of self esteem.
The maintenance of self esteem is a basic drive in every individual. 9 Indeed, many psychological prob-

9 Cf. K. Horney, The Neurotic Personality of Our Time (New York, W. W. Norton, 1937). The view that a great deal of human behavior can be explained on the basis of considerations of prestige or main-
tenance of self esteem, is also supported by re-
cent experimental work on levels of aspirations. It has been shown, for example, that in intelligence tests the level of performance desired by a sub-
ject as well as his actual performance is in-
fluenced by comparing his performance on past tests favorably or unfavorably with groups when the sub-
[cont.]
lems involve conflict between the requirements of self esteem, e.g. the attainment of some goal or the maintenance of some prohibition, on the one hand, and the requirements of some other drive on the other. We do not have to question the existence of the drive to maintain self esteem, but only the kind of activity which it requires. It seems fairly obvious that improvement in the standard of living is identical with improvement in the quality of goods consumed. In a society in which improvement in the living standard is a social goal, the drive for maintenance of self esteem will become a drive to get higher quality goods which can operate quite independently of the desirability of these goods from any other standpoint.

It is well known that there are societies in which prestige is gained by the acquisition of some sort of good which is completely useless in fulfilling any need whatever. In spite of the complete uselessness of the things in question their acquisition may be vital to the acquisition of prestige or maintenance of self esteem and a great deal of effort

may be expended in acquiring these useless items. In our society people may think that they expend all sorts of effort, to get a Buick instead of a Chevrolet because the Buick is more comfortable, or goes faster. But this does not in the least prove that part of the basis for the purchase is not the maintenance of self esteem.

The force of the drive toward higher living standards, that is, toward the purchase of superior goods, is greatly strengthened in our society by the characteristics of our social structure. Ours is a society, which is formally classless, but which is nevertheless, characterized by a system of differentiated social status.

There are a number of criteria for attainment of relatively high status of which the most important appear to be occupational success (which in most cases means, or at least is accompanied by, high income), membership in occupational groups of relatively high prestige, and family connections. The last factor is probably of importance only in small communities or among individuals of extremely high status. Attainment of a given status also requires an ability to meet the behavioral standards.

10 Cora Dubois, The People of Alor (Minneapolis, University of Minnesota Press, 1944), p. 23.
of other members of high status groups. Thus, it is possible for some individuals with low incomes to maintain a very high status while others with very high incomes may fail to achieve the highest positions. In general, however, it appears that income is one of the principal status criteria. This is the case for two reasons. First, prestige goes to successful people and success in our society is closely correlated with income. Once a group of high income people are recognized as a group of superior status, their consumption standard itself becomes one of the criteria for judging success. Since almost any consumption theory is consistent with the view that high income families will spend more on consumption than low income families, high standards of consumption become established as criteria for high status. Once this has occurred, it becomes difficult for any one to attain a high status position unless he can maintain a high consumption standard, regardless of any other qualifications he may have.\(^\text{11}\)

Further force is given to the drive toward high consumption standards by the high degree of

social mobility possible in our society. In a society in which the criteria for status are in terms of birth it is impossible for an individual to raise his status. Therefore, the drive to attain a high standard of consumption as a means to attaining high status is blunted.¹²

Moreover, our society is not stratified, that is, it does not maintain any strong barriers against association among individuals of different status. This means that the frequency with which an individual can make invidious comparisons between the quality of his living standard, and that of others is greatly increased. Of course, almost by definition, the existence of social status means that every individual tends to associate with other individuals of nearly the same status. But since social status rankings in our society form a continuous series¹³ rather than a set of clearly defined group rankings every individual must associate with some people with higher or lower status than his own. Of necessity then, in view of our social goals, every individual makes invidious comparisons between his own living standard and those of his as-

¹² Lunt, loc. cit.
¹³ Lunt, loc. cit.
societies in higher or lower status positions.

Every unfavorable comparison of this sort leads to an impulse to buy goods which will raise the quality of the living standard, and eliminate the unfavorable comparison.14

14 The interconnections between self esteem and the social status system are most clearly set forth by Kardiner. He says, "Despite political equality, a hierarchy of social prestige values exists in the status-class-prestige system which is so pervasive that no one can ignore it. Social mobility theoretically permits the individual to move from one class to another. This produces a background against which the self esteem of the individual is always reflected. A high degree of competition exists, therefore, about status-class-prestige values, though no such rivalry appears with regard to subsistence." — "The comparative liquidity of status class causes the greatest instability because the life goals of the individual must be polarized toward the goal of success as form of self-validation." A. Kardiner, Psychological Frontiers of Society, (New York, Columbia University Press, 1945), p. 361.

"The anxieties of Western man are, therefore, concerned with success as a form of self-realization in the same way that salvation was in the middle ages. But in comparison with individuals who merely sought salvation, the psychological task for modern man is much more arduous. It is a responsibility, and failure brings with it less social censure and contempt than it does self contempt, a feeling of inferiority and helplessness. Success is a goal without satiation point, and desire for it instead of abating increases with achievement. The use made of success is largely power over others, since the advantage in the form of luxurious types of subsistence, "conspicuous waste," are easily exhausted. Those who have power or wealth set the fashion, for others to imitate, and social mobility interpreted largely as the achievement of more success, to improve the standard of living, to ape the manners of those who are rich, and to have the gratification of some power too." (p. 445)
Our social goal of a high standard of living then converts the drive for self esteem into a drive to get high quality goods. The possibility of social mobility and recognition of upward mobility as a social goal converts the drive for self esteem into a desire for high social status. But since high social status requires the maintenance of a high consumption standard the drive is again converted into a drive to obtain high quality goods. In both cases the drive operates through inferiority feelings aroused by unfavorable comparisons between living standards. The strength of such feelings suffered by one individual varies with the frequency with which he has to make an unfavorable comparison between the quality of the goods he uses with those used by others. This frequency will depend, as we have already shown, on the ratio of his expenditures to those of others with whom he comes into contact.

In view of these considerations it seems quite possible that after some minimum income is reached the frequency, and strength, of impulses to increase expenditures for one individual depends entirely on the ratio of his expenditures to the expenditures of those with whom he associates. It will not be possible to give a conclusive proof of this hypothesis, but it will be possible to show that it provides a very plausible working hypothesis. For this reason
it seems desirable to work out the full implications of the hypothesis. To do this it will be necessary to find a basis by means of which the forces leading to impulses to spend can be compared with those leading to the rejection of these impulses.

The analysis of the forces causing impulses to consume shows that these arise when an individual makes an unfavorable comparison of his living standard with that of someone else. If these impulses must be rejected the individual is dissatisfied with his position. It will be shown that reduction in the percentage of income saved also leads to dissatisfaction. For purposes of comparison then, it will be useful to compare the dissatisfaction arising from the rejection of impulses to consume with that arising from decreasing the proportion of income saved. The number and strength of impulses to consume more depends on the ratio of expenditures to the level of expenditure by other individuals. If the existing level of expenditure is maintained impulses to spend more must be rejected. Since dissatisfaction arises from the rejection of impulses to consume, the dissatisfaction with his consumption standard which an individual must undergo, is a function of the ratio of his expenditures to those of people with whom he associates.
Thus, if \( C \) is the consumption expenditure of any one individual \( i = (1, 2, \ldots, n) \) and the individual \( j \) is considered we may write \( Dc_j = \frac{c_i}{\sum_{j=1}^{n} \alpha_{ij}} \) where \( Dc_j \) is an index of dissatisfaction of the \( j \)th individual and \( \alpha_{ij} \) is the weight applied to the consumption of the \( i \)th individual by the \( j \)th individual. The weights \( \alpha_{ij} \) are, of course, determined by the frequency and character of the contacts which the individuals \( i \) and \( j \) have with one another.

It may be asked why dissatisfaction is used rather than satisfaction. This terminology was not adopted merely to satisfy a gloomy point of view. Suppose that one individual's income remains the same while other peoples' incomes are increased. Then, in our terminology, the individual's dissatisfaction is increased since he has to reject more impulses to consume than before. While it would be possible to say that the individual's satisfaction is decreased this seems a poor terminology since he is consuming exactly the same things as before.

This completes our analysis of the factors leading to higher consumption. The actual propensity to consume represents the outcome of a conflict between the forces leading to increased consumption and those leading to increased saving. The next
step, therefore, is to consider the way in which the strength of the desire to save is determined.

VI

Practically everyone who has ever written about the theory of saving has begun by putting down a list of the reasons for saving. The items usually included are as follows:

a. Provision for retirement
b. Provision for dependents in case of death or loss of earning power by the principal earner
c. Provision for short run contingencies such as illness
d. Provision against reduction of income by unemployment business losses, etc.
e. To leave an inheritance for purposes other than the temporary care of dependents
f. To provide increased income in the future by investments
g. To provide for later purchase of durable goods

Of these motives (g) will result only in temporary saving followed by dissaving within a very short time and can be important, therefore, only in very short run problems. (It will, however, lead to some net saving as long as population and income per capita are increasing.) Though it was much emphasized by the neo classicists it seems to be generally agreed now that, except in the case of farmers, the investment motive is not very important.
Similarly, the leaving of inheritances, for purposes other than the support of dependents during the life of a widow and period of dependency of children, is not very important as a motive for saving in this country because of the absence of a leisure class tradition. This does not mean that large family accumulations do not occur. But these accumulations are made by families whose incomes are so high that there is no question of a savings income conflict. In effect, we consider the first four motives to be of primary importance.

15 This assumption is more or less gratuitous. However, I do not think that the conclusions reached here would be seriously modified, if the inheritance motive should turn out to be important.

16 I have emphasized the "rational" motives for accumulation because the available evidence indicates that savers do have definite objects for saving of the sort discussed here. When asked their purpose in saving, about three out of five spending units mentioned motives which can be classified under the general head of 'security.' Old age, ill-health, unemployment, and general protection against a 'rainy day' come under this head. Old age and ill-health together were specifically mentioned far more frequently than unemployment, perhaps indicating that people expect little unemployment or that they no longer consider protection against unemployment an individual responsibility. A further one out of five save to make investments (mainly to purchase a home but including some business investment as well), and one out of six to provide benefits for children (mainly [cont.])
It will be noted that all four of these motives come into play because of the uncertainty and insecurity of income. The primary desire behind saving is the fear of loss of income in the future. It will be argued that the significance from an insecurity standpoint of a given probability of a given reduction of income is a function not of the absolute size of the loss of income, but of the amount of the reduction relative to current expenditures for consumption. In the short run the absolute loss

16 [cont.] education). Only one out of ten indicated that they were saving to purchase consumer durable goods, or to make other consumption expenditures, while one in twelve mentioned miscellaneous reasons or had no specific purpose. "A National Survey of Liquid Assets," Federal Reserve Bulletin, July 1946, p. 720.

In this section we have assumed that people save for some fairly definite objectives. However, our argument is not much affected if we suppose that some people save because of a belief in the moral desirability of saving. The central point of this section is the proposition that the dissatisfaction arising from inadequate saving depends on the proportion of income saved and not on the absolute amount saved. When saving is intended to provide security of existing consumption standards this seems clear enough. If moral considerations or tradition are set up as basic motivations for saving the situation is substantially unchanged. Neither of these motivations runs in terms of absolute amounts of saving. Regardless of motivation it seems clear that most judgments as to whether a given rate of saving is large or small, or more or less adequate are based on comparisons with magnitudes which vary either with the income of [cont.]
may play a significant role, but the longer the period under consideration the less important will the absolute amount be. That is, a loss of $1000.00 per year to a man whose consumption is ordinarily $2000.00 per year is just as important as the loss of $5000.00 per year to one man whose consumption is $10,000.00 per year. This proposition will cease to be true when the loss involved is so high or so long sustained that expenditures are forced below the subsistence level. (However, it must be noted

16 [cont.] the individual or the income of other persons. So long as this is the case it does not make any difference to our argument whether saving is done for a purpose or is an end in itself.

Another irrational or non purposive element in the determination of saving is habit. A habitual element in saving can arise in two ways. A man may have a habit of saving a certain amount per month by (say) putting a certain amount into a bank and spending the remainder of his income. In this case his saving would fail to decline according to our expectation if his income fell and he did not adjust his habits. (It seems probable that if the habit was formed for some reason he would increase his saving appropriately if his income rose.) On the other hand a man may have rigid consumption habits. In this case his consumption will not expand with his income and his saving will rise automatically. This case is probably of real importance in the case of people whose income remains fixed for a long time and then rises late in life.

Clearly this type of saving pattern will lead to changes in saving which are not proportional to income. However, it must be recognized that it can only cause a temporary effect. The saving habits of one generation are continually eliminated and replaced by those of another generation. If therefore income rises fairly steadily over time habitual saving can only cause moderate aberrations in the savings ratio. I do not think they can form the basis of any serious modifications of the theory presented in this book.
that the concept of subsistence level is itself a relative one. Thus if we are considering long run developments, the significance of a possible reduction to a position below any specific level is proportional to the general level of income in the community.) The modification in the postulate is less important than appears for the following reason. The fear of loss of income is not, in this country, the fear of absolute starvation, but the fear of (a) being reduced to the living standard provided by relief agencies and (b) the fear of being forced to accept charity. With respect to (a) the significance of being reduced to the relief standard is clearly dependent on one's current standard. The only modification of our postulate, therefore, arises from the fear of being forced to take charity.

Saving is essentially a means of allaying the fear caused by the uncertainty of income. For an individual with a given consumption standard subject to a given degree of insecurity (as measured by a schedule of probabilities of loss of any given fraction of income for any length of time) the larger the ratio of his assets to his consumption expenditures per unit of time, the more he will have overcome the insecurity feelings arising from the uncertainty of his income. It will be understood, of course, that when
we speak of a probability schedule for loss of income, we do not refer to the objective probabilities, but to the individual's subjective valuation of these probabilities which will not even take an explicit form. The individual's subjective valuation of his insecurity will presumably bear some relation to the objective situation though there may be some systematic bias by income or occupational groups. Moreover, the valuations of different sorts of risk will have different degrees of importance as an individual's age and responsibilities change. Among young unmarried men only unemployment and illness are likely to be of any consequence. Young married men will be more concerned with insurance of their dependents while as age increases retirement will become important. Thus, the insecurity feelings to which an individual is subject will be dependent not only on the objective chances of loss of income, but also on his age, marital status, and the size of the assets which he has already accumulated.

Consider, now, two groups with different incomes, but whose assets are the same multiple of income, and who have the same characteristics with respect to age, marital status, probable growth rate of income and probability of loss of any given pro-
portion of income for any length of time. The higher income group has larger assets, but according to our hypothesis the significance of the insecurity to which they are subject is just as great to them as the group with smaller income and smaller assets. How can the higher income group get a higher degree of security than the lower. Clearly, only by increasing the ratio of assets to income.

So far it has been argued that the degree of insecurity and, therefore, of dissatisfaction will depend upon the ratio of assets to consumption expenditures. However, the rate of accumulation of assets relative to consumption i.e. the ratio of saving to consumption will also be important. Indeed the rate of saving may in some cases be more important than the amount of assets. When saving is done for the protection of dependents against the death of the earner and this is done in the form of insurance, the rate of saving is the only thing that counts. For the amount of protection provided depends on the amount of the premium payment regardless of the total amount which has been sunk into the policy. This is a factor of great importance, since over 25% of saving for all but the highest income groups is in the form of insurance. For the very low income groups insurance is practically the only form of saving. The insecurity from the necessity of
providing for retirement will vary with age, and the rate of saving as well as with assets actually accumulated. Young people will not be much worried about inadequate provision for retirement if they save a good percentage of income. For, regardless of how small their assets are at the moment, they feel that by the time of retirement, they will have accumulated a sufficient amount. Since provision of protection of dependents and for retirement are probably the strongest motives for saving, the current rate of saving will in itself be an important determinant of the degree of dissatisfaction with its security position, which a family must undergo. Let us restrict ourselves in what follows to families of given size and age composition. Then it may be argued that, whatever factors determine the rate of saving, these factors will have resulted in the accumulation of some determinate average amount of assets for families in each age-size class at each income level. But we cannot know the relation of asset accumulation to income until we know the relation of current saving to income. In what follows, therefore, we shall neglect the asset factor until we have found the relation of current saving to income and then re-introduce the asset factor. With this qualification, we may say that for any class of families of given age and size, the dissatis-
faction with the saving position is a function of the ratio of current saving to current consumption. But this may be reduced to a function of the ratio of current consumption to current income. We may then write \( Ds_j = F_j \left( \frac{c_j}{y_j} \right) \) where \(Ds_j\) is an index of dissatisfaction of the \(j\)th individual, and \(c_j\) and \(y_j\) are \(j\)th individual's consumption and income respectively.

We now have to bring together our analysis of dissatisfaction with consumption and with saving. For consumption dissatisfaction we had \( Dc_j = \) \[ \phi_j \left( \frac{c_j}{y_j} \right) \] Since we use separate functions for each individual family we may suppose that age and family size are taken into account by these functions. Can we now select some units of measurement so that \(Ds_j\) and \(Dc_j\) will be comparable? Dissatisfaction from the two causes considered here will be qualitatively different. But it is known that people do resist some unsatisfied consumption impulses in order to save. This amounts to saying that people do prefer one set of values of \( \frac{c_j}{y_j} \) and \( \frac{c_j'}{y_j'} \) to another. We may, therefore, choose index functions which meet the condition that if the sum of \( F_j \left( \frac{c_j}{y_j} \right) + \phi_j \left( \frac{c_j}{y_j} \right) \) is less than \( F_j \left( \frac{c_j'}{y_j'} \right) + \phi_j \left( \frac{c_j'}{y_j'} \right) \) the individual will consume \(c_j\) rather than \(c_j'\). We may then proceed in the usual way to find the conditions for
minimizing the sum $D_c j + D_s j = D_j$. For the minimization condition we have

$$\frac{d D_j}{d c_j} = \phi_j \left[ \frac{c_j}{\sum a_j c_i} \right] \frac{L}{\sum a_j c_i} + F_{c_j} \left( \frac{c_j}{d_j} \right) \frac{L}{d_j} = 0$$

$$\phi_j \left[ \frac{c_j}{\sum a_j c_i} \right] < 0 \quad F_{c_j} \left[ \frac{c_j}{d_j} \right] > 0$$

$$\frac{d^2 D_j}{d c_j^2} = \phi'' \left[ \frac{c_j}{\sum a_j c_i} \right] \frac{L}{\sum a_j c_i} + F'' \left( \frac{c_j}{d_j} \right) \frac{L}{d_j}$$

Now let $\Psi(P_j)$ be the derivative of the Lorenze curve (where $P_j$ is the percentile position in the income distribution of the $j$th individual). Then we have

$$y_j = \Psi_j(P_j) \cdot \bar{y}$$

where $\bar{y}$ is the average income. Let the Lorenze curve be permanently fixed so that all changes in income are proportional and let $P_j$ be constant. Then we set $\Psi(P_j) = K_j$ and using (1) and (3) we have

$$\frac{d D_j}{d c_j} = \phi_j \left[ \frac{c_j}{\sum a_j c_i} \right] \frac{L}{\sum a_j c_i} + F_{c_j} \left( \frac{c_j}{d_j} \right) \frac{L}{d_j} y_j$$

There is a similar equation for every family or individual in the community. Therefore, if we know $P_j$ for every individual and we know $\bar{y}$ we have $n$ equations and $n$ unknown $c$s. The terms $x_{ij}$ are assumed given and constant. The equations are independent. The number of solutions is, therefore, equivalent to the degree of the equations. We are not so much interested in finding the exact solution...
in terms of the parameters as in finding the sort of change in consumption which will occur if there is a general change in $\bar{y}$ with the Lorenz curve constant. Suppose that at one time every individual is in equilibrium in the sense that the C's all satisfy the equations of the form (4). Then we may write

$$\phi c_j \left[ \frac{c_j}{1 - c_j \beta} \right] \frac{1}{2 \alpha c_j \beta c_j} = - F_{c_j}' \left( \frac{c_j}{k_j \gamma} \right) k_j \gamma$$

Suppose that $\bar{y}$ increases by a factor $\mathcal{N}$ while the Lorenz curve remains constant. Then suppose that every individual increases his consumption proportionately.

Then we shall have on the right side of (4a)

$$\phi c_j \left[ \frac{\mathcal{N} c_j}{2 \alpha c_j \beta c_j} \right] \frac{1}{2 \alpha c_j \beta c_j}$$

and on the left

$$- F_{c_j}' \left( \frac{\mathcal{N} c_j}{k_j \gamma} \right) \frac{1}{\mathcal{N} k_j \gamma}$$

so that each side is simply divided by $\mathcal{N}$. If the values of the C's in (4a) were solutions of the old equations then, when $\bar{y}$ is increased to $\mathcal{N} \bar{y}$, values of the old C's multiplied by $\mathcal{N}$ are solutions of the new equations resulting from the increase in $\bar{y}$. It follows that if the Lorenz curve remains unchanged when income changes one of the new equilibriums positions will be that resulting from a change in everyone's consumption proportional to the change in income.
But, since there may be more than one possible equilibrium position, we have to analyze the steps in the process of movement to a new equilibrium in order to know whether a proportional increase in consumption will actually result. We shall use a verbal argument to show the process of development.

First, however, let us consider the case of an individual family which has an increase in income while all other incomes remain constant. When any one has an increase in income, he is able to reduce either his unsatisfied desires for consumption or his unsatisfied desires for saving or both. For very low incomes the pressure of unsatisfied consumption desires may be so great that all of the increase in income is absorbed by increased consumption. But as an individual's consumption is increased relative to that of the other members of the community, his unsatisfied consumption desires will grow weaker so that eventually he will begin to save something. Now, consider a family which has reached the point where it can do some saving. If it gets an increase in income, it will still have some unsatisfied consumption desires, but it will also wish to improve its security position. But, we have shown that it can only improve its security position by increasing the proportion of income saved. This means that it
must increase its consumption less than in proportion to income. Actually at first it will increase expenditures only up to what we previously called the consumption horizon. As time passes, however, its saving will be sufficiently great that some items of consumption previously rejected unconsciously will now be purchased. In addition, the change in the circumstances of the family may bring it into association with a higher-income social group so that a different (and more expensive) set of consumption goods will be brought to its attention. In terms of the equation for dissatisfaction from inadequate consumption we might say that the weights $\alpha_{ij}$ are now such as to give greater weight to individuals having high consumption expenditures than before. The family's consumption will, therefore, expand beyond the consumption horizon which it had before, but because of the pressure for increased saving its consumption will not increase proportionately to the rise in income. All this may take some time of course. This amounts to a deduction of Keynes' "psychological law" in its stronger version and is completely in accord with the facts indicated by the budget studies as we shall show in the empirical section of the next chapter.

Let us now return to the problem of general proportional changes in income. If everyone's income
is increased by some percentage, every family will increase its expenditures, but less than proportionately to the increase in its income. But in the case of the single family, the increase in expenditures actually improved its position, in the sense that the number of consumption impulses which had to be rejected was reduced. But this is not the case when all incomes are increased. For as we have shown the force of unsatisfied impulses to consume for one individual depends upon the ratio of his expenditures to those of other members of the community. When every one's income is increased simultaneously, dissatisfaction with the consumption situation for any one family will not be reduced as much as in the case in which only one family got an increase in income. There will, therefore, be a second rise in expenditures and the process will continue until the proportion of income saved is reduced to its old level. The process will not go beyond this point because as we have shown the final position will leave dissatisfaction with the consumption position just where it was before the increase in income and the same will be true of dissatisfaction with the saving position. If the proportion of income saved before the increase in income was consistent with the equilibrium conditions, it will still be consistent with them after the increase in income.
We may now return to the question of the role of accumulated assets in the saving-consumption picture. Since assets are accumulated by saving it seems clear that, if we can explain current saving by a function of a family's relative income, then accumulated assets will also be a function of relative income, provided we can make one assumption. The necessary assumption is, that for families of a given age, there should be a relation between their position in the income distribution in the past and their position now. This will not be true, of course, for particular families, but it will certainly be true statistically of large groups of families. We may, therefore, leave unmodified our conclusion that individual saving is a function of position in the income distribution (provided the Lorenz curve is unchanged) or of income relative to incomes of other families in the community. This leads to our second conclusion that the aggregate percentage of income saved is not changed by a slowly rising average income with unchanged distribution.

VII

Before proceeding to make empirical tests of the hypothesis just developed let us consider how the type of analysis used in this chapter relates to the real world. Our argument belongs to the class called
comparative statics. The general procedure in this type of analysis is as follows: We first set forth the relations between a set of variables. These relations are either based on empirical observations or are the consequences of some hypothesis. Moreover, some of the relations may be simplified by supposing some magnitudes to be constant. Finally if the analysis is a static one the relations are built up on the assumption that everyone acts as though the existing values of the variables would persist indefinitely. Once these relations are established consistent values of the variables are found (i.e. values which simultaneously satisfy all of the specified relations) in terms of the parameters in the relations. The resulting values of the variables are called the equilibrium values. The next step is to determine the effect of changes in the parameters on the equilibrium values of the variables. This amounts to comparing one static position with another.

In our case we take aggregate Personal Income as a parameter. Having found a set of relations which when solved give us the savings ratio as a function of income and some other parameters, we ask how the equilibrium value of the savings ratio varies with the income parameter. That is we ask what is the value of and we find it to be
zero. On the other hand our argument indicates that the equilibrium savings ratio will vary with income distribution parameters, with the age distribution and with the social goals and social structure, e.g. degree of social mobility of the community.

This means that whatever happens to income we cannot say anything about the actual movement of the savings ratio unless we are prepared to say something about actual movements of the other parameters. Actually we are saying that variation in income does not contribute anything to the explanation of any variance in the savings ratio which may be observed. The "explanation" of variance in the savings ratio runs in terms of changes in the non-income parameters. If we wished to explain the variation in the savings ratio over a certain time period we should have to follow through all of the changes in the parameters during a period and show that their joint influence was sufficient to imply the actual movement of the saving ratio. However, our interest is centered on the connection between income and the savings ratio and we wish to consider the other factors only incidentally.

We propose to consider empirical data not in order to explain them but to see whether they contradict our income-saving hypothesis. If it can be
shown that the hypothesis is contradicted by the data it must be scrapped or at least reformulated. If on the other hand no facts can be found which contradict the hypothesis we cannot assert that it is proven. Should no other hypothesis meet this test, those who do not choose to accept the hypothesis in question must content themselves with an agnostic position. If two hypotheses are consistent with all known facts the choice between them will usually rest on judgment as to the course of movement of some variables on which we lack data.

In the present case the savings ratio appears to have been constant for a long time while income has risen. If our hypothesis is true and if the net of effect of changes in the other parameters was small then our hypothesis is consistent with the data. If on the other hand it can be shown that the net effect of changes in the other parameters was such as to make the savings ratio fall our hypothesis is *overthrown* by the facts. For in the latter case the savings ratio could only remain constant if the rise in income offset the effect of the other factors and this could be so only if our hypothesis *is false.*

A large part of the next chapter is devoted to consideration of changes over time in the non-income parameters entering the determination of saving.
CHAPTER IV

EMPIRICAL TEST OF THE LONG RUN INCOME CONSUMPTION RELATION

In Chapter III we set forth a number of hypotheses which, taken together, lead to a theory of the long run relationship between aggregate income and consumption and also to a theory of the static relation between individual income and consumption. In this Chapter we shall submit these hypotheses to tests against the available data. An empirical test of a hypothesis consists of two parts. First it must be shown that if the hypothesis under consideration is true, the probability of the occurrence of the observed data is not too small. Second, the hypothesis must be tested against any other hypotheses which also meet the first test. In the case of a composite hypothesis such as is used here each element of the hypothesis should be subjected to the first test if this is possible. For, if individual elements fail to meet the first test, the whole hypothesis must be rejected. We shall begin here by testing some of the individual elements in our hypothesis against the available data. Second we shall test the conclusions reached at the end of the last chapter and finally consider some alternative hypotheses.
In the last chapter it was argued that the extent to which an individual is dissatisfied with his consumption position is a function of the ratio of his consumption expenditures to those of other persons with whom he has associations. In fact, it was argued that this factor alone determines dissatisfaction with consumption expenditures and it is this proposition which is the key to our long run explanation of variations in consumption. It will first be shown that relative consumption expenditure is at least one of the factors determining the degree of dissatisfaction. To say that we have proved that dissatisfaction is generated when an individual makes unfavorable comparisons between his living standard and that of others is of course only to say that we have found some data such that, (a) if our hypotheses were true the observations we have made would be not unlikely to occur, and (b) that no other available hypothesis seems to meet this criterion. We are able to find two such sets of data.

First suppose there is a group whose social status is higher than its income status. That is, a group of people who habitually associate on terms of social equality with other people whose income is higher than their own. On our hypotheses we should
expect to find that the degree of dissatisfaction of such a group is higher than that of others with equal income whose social status is not out of line with income status. We have one set of observations on such a group with precisely the expected result.

In a study made by the Office of Public Opinion Research, a sample of persons supposed to be representative were asked to give their weekly income and to answer the following question. "About how much more money than that (i.e. the stated weekly income) do you think your family would need to have the things that might make your family happier or more comfortable than it is now?" Since a large number reported themselves satisfied with their present income the results were also tabulated on the criterion of satisfaction or dissatisfaction. The results are summarized in Table IV.

The number of persons who reported themselves satisfied with their present incomes and the very moderate increases wanted by those dissatisfied is very striking. The moderate size of the amounts—

### TABLE IV

**Income and Income Aspiration**

<table>
<thead>
<tr>
<th>Weekly Income</th>
<th>Cases</th>
<th>Dissatisfied</th>
<th>Satisfied</th>
<th>No Opinion</th>
<th>No. Specifying Amount More Wanted</th>
<th>Increased Income Wanted in Percentage</th>
<th>Income Wanted in Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>1,155</td>
<td>56</td>
<td>32</td>
<td>12</td>
<td>581</td>
<td>86%</td>
<td>$ --</td>
</tr>
<tr>
<td>Under $20</td>
<td>163</td>
<td>68</td>
<td>15</td>
<td>16</td>
<td>100</td>
<td>162%</td>
<td>$ 16.20</td>
</tr>
<tr>
<td>$20-29.99</td>
<td>170</td>
<td>72</td>
<td>19</td>
<td>9</td>
<td>116</td>
<td>97%</td>
<td>$ 24.25</td>
</tr>
<tr>
<td>$30-39.99</td>
<td>207</td>
<td>67</td>
<td>20</td>
<td>13</td>
<td>129</td>
<td>66%</td>
<td>$ 23.10</td>
</tr>
<tr>
<td>$40-59.99</td>
<td>310</td>
<td>54</td>
<td>35</td>
<td>11</td>
<td>147</td>
<td>59%</td>
<td>$ 29.50</td>
</tr>
<tr>
<td>$60-99.99</td>
<td>191</td>
<td>43</td>
<td>49</td>
<td>8</td>
<td>73</td>
<td>52%</td>
<td>$ 41.60</td>
</tr>
<tr>
<td>Over $100</td>
<td>124</td>
<td>20</td>
<td>66</td>
<td>14</td>
<td>16</td>
<td>100%</td>
<td>$ 100.00</td>
</tr>
</tbody>
</table>

of increase wanted together with the fact that the absolute amounts wanted do not fall is exactly what would be expected on the basis of the horizon concept introduced in the last chapter.

It will be noted that the percentage increase wanted falls steadily as income increases until the highest group is reached. This phenomenon is explained by the authors of the study by the fact that the dissatisfied members of the over $100 group have a higher social status than is indicated by their incomes. "A closer examination of the cases in this category reveals, however, that this large increase is due to the presence in this group of a considerable proportion of professional people and that it is they who want the relatively large increases. Our data do not provide any direct evidence as to why this is so but they suggest that it is because at this level, physicians, lawyers and college professors are competing for social status with persons far above them in income, so that the relatively large increases desired represent a wish to strengthen an already high social status with a relatively high income status. In a previous study on the social and economic class identifications of various occupational groups by Wallace, Williams and Cantril it was found that there existed a large dis-
crepancy between the two identifications for professional people. In their study, while 11% of professional people identified themselves as upper class socially only 5% so classed themselves economically. Another pertinent finding is that of Smith who reports that inferiority feelings are more prevalent among the children of professional people than among those of any other group.\(^2\)

The results of the Princeton study as well as the interpretation given by the authors of the study are exactly those predicted by our hypothesis.

The differences between consumption expenditures of Negroes and Whites at the same income level should also provide a test for the validity of our hypotheses. For, since the Negroes of large cities generally live in neighborhoods separate from those in which Whites live and do not compete for social status with Whites or have any very close social contacts with them, we have in effect two separate communities. At the same time these two communities are subjected to the same ways of doing things. Moreover, the ranking of goods is about the same in the two communities. If impulses to consume arise principally out of the fact that goods fulfill some sort of objective need then Negroes might be expected

\(^2\) Ibid.
to save about the same amount at a given level of income as Whites. But if the theory set out in the last chapter is correct then Negroes should save more at every level of money income (since the group as a whole is poorer). We should in fact expect that Negroes in a given percentile position in the Negro income distribution would save as much as Whites in the same percentile position. Since, however, the Negro group is somewhat affected by comparisons with Whites we should expect Negro savings to be somewhat less than white savings at a given percentile position. The data of the Consumer Purchases Study of 1935-36 bear out this prediction.

A comparison of the savings of Negroes and Whites in New York and Columbus made by Menderhausen yields the following result.

<table>
<thead>
<tr>
<th>City</th>
<th>Break Even Point</th>
<th>Standardized Savings per cent</th>
<th>Average Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whites</td>
<td>$2290</td>
<td>-2.2</td>
<td>$ --</td>
</tr>
<tr>
<td>Negroes</td>
<td>1530</td>
<td>6.7</td>
<td>$1379</td>
</tr>
<tr>
<td>Columbus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whites</td>
<td>1310</td>
<td>7.9</td>
<td>$2080</td>
</tr>
<tr>
<td>Negroes</td>
<td>910</td>
<td>20.8</td>
<td>$1141</td>
</tr>
</tbody>
</table>

CHART II

SAVING PERCENTAGES
vs. POSITION IN INCOME DISTRIBUTION

NEW YORK WHITE
NEW YORK NEGRO
COLUMBUS WHITE
COLUMBUS NEGRO
The Standardized Savings Percent is obtained by weighting savings and income for each money income level by the proportion of national population receiving that income in 1935-36. The results are thus independent of the local income distribution. Both New York and Columbus Negroes saved about 3 times as much on the average of Whites at the corresponding income levels. It can, of course, be argued that at lower levels of income Negroes run smaller deficits either because they cannot obtain credit or because the temporarily unemployed form a smaller proportion of the low income group among Negroes than among Whites. But these factors cannot be used to explain the fact that at higher levels of income Negroes have much larger savings than Whites. We must conclude that at a given income level Negroes actually do save more than Whites. It is difficult to explain this by saying simply that Negroes are more thrifty or farseeing than Whites and I know of no evidence whatever for such a proposition. But the higher rate of saving of Negroes is easily explained by the hypothesis given in the last chapter. We may test this by comparing the savings of Negroes and Whites at the same percentile position in their own income distribution. Chart I shows the percentage of income spent on Consumption plotted against
percentile position in the income distribution for Negroes and Whites in Columbus and New York. It will be seen that a very good agreement is obtained. This means that our hypotheses does explain the differences between Negro and White saving.

These two pieces of evidence provide a fairly critical test for the proposition that at least a very considerable part of the explanation of impulses to increase expenditures is the consequence of the making of invidious comparisons between consumption standards. The next step is to try to see whether the available observed data correspond to the implications of our hypothesis taken as a whole.

II

In the last chapter we argued on the basis of general sociological and psychological considerations that, at a given moment in time, a family's rate of saving taken as a percentage of income would be a function of the family's percentile position in the income distribution. The relevant income distribution is the local one. The results of the hypothesis may, therefore, be tested by fitting a regression between the percentage of income saved and percentile position in the income distribution for families in any city.
Data for the test are supplied by the reports of the Study of Consumer Purchases made in 1935-36. In making the test we have left out the lower part of the distribution because families in the range reported serious unemployment. No income classes have been included for which an average of less than 48 full weeks of employment was reported. This was done on the ground that the unemployed are likely to spend an especially high proportion of their income since they try, to some extent, to maintain the living standard they had when fully employed. This point is discussed in detail in the chapter on short run variations in saving.

It should be noted that the income distribution as given in the Consumer Purchase Study reports are incomplete. The distributions are restricted to Native White unbroken families who were not on relief at any time during the reporting year. The families left out would for the most part have appeared at the bottom of the income distribution. This means that if (say) 20% of the families were left out, the percentile position of a family


5 Elizabeth Gilboy, Applicants for Work Relief, Cambridge, Harvard University Press, 1940.
in the reported distribution would differ from its percentile position in the total distribution by a multiplier factor of 1.2. Since we propose to relate the percentage of income saved to the logarithm of the percentile position this results in the addition of a constant factor to the independent variable and will not, therefore, affect our results seriously.

The relation \( y = a \log X + b \) (where \( y \) is percentage of income spent on consumption and \( X \) is percentile position in the local income distribution) was fitted to the data for a number of cities. The results are shown in Table V.

### TABLE V

<table>
<thead>
<tr>
<th>City</th>
<th>( a )</th>
<th>( \sigma_a )</th>
<th>( \lambda )</th>
<th>( \beta )</th>
<th>( \tilde{y} )</th>
<th>( \tilde{y}_{100} )</th>
<th>( \tilde{y}_{1000} )</th>
<th>( \tilde{y}_{10000} )</th>
<th>( \lambda \beta )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbus</td>
<td>16.06</td>
<td>1.38</td>
<td>65.15</td>
<td>1.06</td>
<td>82.67</td>
<td>1.03</td>
<td>101.27</td>
<td>2.25</td>
<td>.972</td>
</tr>
<tr>
<td>Providence</td>
<td>15.05</td>
<td>2.21</td>
<td>74.98</td>
<td>2.31</td>
<td>89.62</td>
<td>.65</td>
<td>105.10</td>
<td>2.43</td>
<td>.948</td>
</tr>
<tr>
<td>Denver</td>
<td>14.12</td>
<td>2.30</td>
<td>72.35</td>
<td>2.55</td>
<td>86.71</td>
<td>1.03</td>
<td>100.59</td>
<td>2.48</td>
<td>.936</td>
</tr>
<tr>
<td>Chicago</td>
<td>12.96</td>
<td>.97</td>
<td>75.43</td>
<td>1.08</td>
<td>87.81</td>
<td>.55</td>
<td>101.35</td>
<td>1.16</td>
<td>.989</td>
</tr>
<tr>
<td>Omaha</td>
<td>8.85</td>
<td>1.67</td>
<td>78.54</td>
<td>1.75</td>
<td>86.54</td>
<td>.90</td>
<td>96.24</td>
<td>2.03</td>
<td>.909</td>
</tr>
<tr>
<td>Middle Size West Central</td>
<td>19.21</td>
<td>4.64</td>
<td>76.92</td>
<td>5.14</td>
<td>85.94</td>
<td>2.5</td>
<td>95.34</td>
<td>5.34</td>
<td>.951</td>
</tr>
<tr>
<td>Middle Size Middle Size</td>
<td>16.01</td>
<td>2.78</td>
<td>74.38</td>
<td>3.20</td>
<td>91.17</td>
<td>1.3</td>
<td>106.40</td>
<td>2.95</td>
<td>.909</td>
</tr>
<tr>
<td>Rocky Mts.</td>
<td>20.20</td>
<td>2.92</td>
<td>63.91</td>
<td>3.37</td>
<td>85.56</td>
<td>1.3</td>
<td>104.31</td>
<td>2.99</td>
<td>.933</td>
</tr>
<tr>
<td>Middle Size E. Central</td>
<td>19.17</td>
<td>3.36</td>
<td>65.60</td>
<td>4.75</td>
<td>92.00</td>
<td>1.03</td>
<td>103.94</td>
<td>2.11</td>
<td>.932</td>
</tr>
<tr>
<td>Small East Central</td>
<td>23.52</td>
<td>.89</td>
<td>52.97</td>
<td>1.17</td>
<td>86.91</td>
<td>.30</td>
<td>100.01</td>
<td>.71</td>
<td>.997</td>
</tr>
<tr>
<td>Small North Central</td>
<td>17.76</td>
<td>3.47</td>
<td>67.56</td>
<td>4.94</td>
<td>92.32</td>
<td>1.07</td>
<td>103.18</td>
<td>2.12</td>
<td>.918</td>
</tr>
<tr>
<td>Small Plains</td>
<td>15.21</td>
<td>.82</td>
<td>71.54</td>
<td>.93</td>
<td>87.77</td>
<td>.19</td>
<td>101.98</td>
<td>.92</td>
<td>.897</td>
</tr>
<tr>
<td>All Cities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The figures in the column headed $y_{100}$ indicate the expected expenditures of families at the 100th percentile from the top of the income distribution, that is, the very poorest families. It will be noted that no data on families near this range were included in the calculation. For the expenditure patterns of very low income families shown in the Consumer Purchases Study data were seriously affected by unemployment. In a period of full employment, however, we would expect the poorest families in any community to spend all of their income and perhaps run slight deficits. The fact that our regressions when projected to the 100th percentile show expected expenditures of just over 100% is, therefore, a confirmation of the reasonableness of the regressions. In view of the fact that the correlations are uniformly high and the regression coefficients of the same order of magnitude, it seems clear that the data are entirely consistent with our hypothesis.

However, the results shown above do not provide a critical test of our hypotheses as against the view that the percentage of income spent is a function of absolute money or real income. For, when the percentage of income spent is fitted to money income it is found that just as good results are ob-
tained. The reason for this is that in a given city, the logarithm of money income is linearly related to the logarithm of percentile position in the income distribution. This is, of course, only a slight variation on Pareto's law. Thus, if we write

1) \[ y = a \log x + b \] (where \( y \) = percent of income spent, \( x \) = percentile of income distribution);

2) \[ y = A \log z + B \] (where \( z \) = money income);

3) \[ \log x = \alpha \log z + \beta \], then, provided that the errors are small, relations (1) and (3) taken together will produce (2); or, alternatively, relations (2) and (3) will produce (1). Thus if either hypothesis is true, the data will be consistent with the other. Table VI shows the values of \( a, \alpha \), and \( A \) for three cities for two income ranges in each.

<table>
<thead>
<tr>
<th>City</th>
<th>Income Range</th>
<th>( a )</th>
<th>( \alpha )</th>
<th>( A )</th>
<th>( \gamma_1 )</th>
<th>( \gamma_2 )</th>
<th>( \gamma_3 )</th>
<th>( N )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providence</td>
<td>1000-1500</td>
<td>11.6675</td>
<td>-2.7227</td>
<td>-33.53</td>
<td>.969</td>
<td>-.937</td>
<td>-.957</td>
<td>10</td>
</tr>
<tr>
<td>Providence</td>
<td>750-1000</td>
<td>12.6065</td>
<td>-2.2811</td>
<td>-30.06</td>
<td>.963</td>
<td>-.943</td>
<td>-.948</td>
<td>750</td>
</tr>
<tr>
<td>Columbus</td>
<td>750-1250</td>
<td>17.628</td>
<td>-3.0870</td>
<td>-55.23</td>
<td>.971</td>
<td>-.999</td>
<td>-.994</td>
<td>1750</td>
</tr>
<tr>
<td>Columbus</td>
<td>1250-1500</td>
<td>18.1508</td>
<td>-2.392</td>
<td>-44.12</td>
<td>.977</td>
<td>-.972</td>
<td>-.972</td>
<td>750</td>
</tr>
<tr>
<td>Chicago</td>
<td>1000-1500</td>
<td>13.6982</td>
<td>-2.6302</td>
<td>-37.10</td>
<td>.963</td>
<td>-.98</td>
<td>-.973</td>
<td>1000</td>
</tr>
</tbody>
</table>

It will be seen at once that the value of \( A \) is very close to that of \( \alpha \) as would be expected from the propositions just made. Two income ranges were
used in each case to test whether the Pareto relationship would break up when data from income ranges below the mode were included. For the Pareto law is only supposed to hold for incomes above the mode. If this were the case then, if the hypotheses indicated by equation (1) were true, the value of \( (a) \) would be independent of the range. The value of \( \alpha \) would change as a result of the breakdown of the Pareto law and the value of \( A \) would change proportionately. Conversely if the hypothesis indicated by equation (2) were true \( A \) would be independent of the range and \( (a) \) would change in proportion to the change in \( \alpha \). In the cases of Chicago and Providence, the values of all three parameters remain much the same for the two ranges. This is partly due to the fact that the mode in the income distribution is not very well defined. That is, there is a sort of plateau rather than a sharp peak in the frequency distribution so that the Pareto law gives a good approximation for data below the mode so long as extremely low incomes are excluded. In the case of Columbus there is a substantial change in \( A \) while \( \alpha \) appears to remain about the same. However, when the regression for the four observations from $750 to $1750 is calculated separately the values found for \( a, \alpha \) and \( A \) are 48.80, .55 and 26.91 respectively.
With only two degrees of freedom, the standard error of the regression coefficients is so great that no significant results can be obtained by this method.

When data for all cities are used together it might be expected that, since there is some variation in income between cities, the problem of the interrelation between absolute and relative income could be avoided. When the relation (1) is fitted to data for the eleven cities listed above the regression obtained is \( y = 15.21 \log x + 71.54, \)
\( r_{xy} = 0.897. \) However, the relations (2) and (3) also fit almost as well as in the individual cities. The regressions are

\[
\begin{align*}
y &= -34.29 \log z + 207.20 \quad r_{yz} = -0.673 \\
10\log x &= 2.25 \log z + 8.90 \quad r_{xz} = -0.975
\end{align*}
\]

If a multiple relation of the form \( y = K_1 \log x + K_2 \log z + R \) is fitted it is clear that the coefficients will be unstable because of the interrelation of \( y \) and \( z. \)

Let us now consider the following hypothesis \( H_1. \) The percentage of income spent on consumption depends jointly on money income and position in the income distribution. That is \( y = K_1 \log x + K_2 \log z + R. \) Further \( \log z \) is linearly related to \( \log x \) so that \( \log z = \alpha \log x + \beta. \) This hypothesis is
CHART III

I
$5900

II
$4400

III
$3700

IV
$8200

LOG X

Y

LOG X
represented by the lines marked I, II, III etc. in diagram III. The axes are log x and \( y \). The slope of each line is \( k_1 \). The \( y \) intercept of each line is \( k_2 \log z + R \). If the hypothesis were true and if there were no restrictions on the combinations of values of \( z \) and \( x \) which could occur we should observe values of \( y \) and \( \log x \) lying along a series of parallel lines like those in the diagram. But the income distributions of our cities are all somewhat similar. The consequence is that only certain combinations of \( z \) and \( x \) can be observed. Thus if the relation \( y = k_1 \log x + k_2 \log z + R \) and the relation \( \log z = \alpha \log x + \beta \) were exactly fulfilled for all cities all the observed combinations of \( y \) and \( \log x \) would lie on the line \( y = k_1 \log x + k_2 \times (\log x + \beta) + R \) or

\[
y = (k_1 + k_2) \log x + k_2 \beta + R.
\]

This is shown as the line \( R \) in the diagram. This explains how it would be possible to get a good fit for the regression of \( y \) on \( \log x \) even if the hypothesis just discussed is true.

Alternately we can set up the hypothesis \( H_2 \) that \( y \) depends only on percentile position in the income distribution. That is \( y = A \log x + B \).

If \( \log z = \alpha \log x + \beta \) as before then in the relation
We wish to determine which of these two hypotheses is true. Suppose that the relation \( \log z = \alpha \log x + \beta \) holds approximately but not exactly. Then if we have a number of observations on a given value of \( z \) the corresponding values of \( x \) will spread over a range. This is shown by the vertical divisions marked I, II etc. in the diagram. The line marked I corresponds to money income \( z \) of \$5900. The values of \( \log x \) which correspond to an income of \$5900 (in various cities) are those included in the sector of the \( \log x \) axis marked I. Similarly line II corresponds to \( z = \$4400 \) and the values of \( \log x \) corresponding to this value of \( z \) all lie in the range marked II.

Now if the hypothesis \( H_1 \) is true the observed values of \( \gamma \) and \( \log x \) should lie along the lines marked I, II, etc. but the values of \( \log x \) on line I can vary only in the range I, the values of \( \log x \) on line II can vary only in range II and so on. The points determined by values of \( \gamma \) and \( \log x \) will therefore lie along the sectors of lines I, II, etc. marked in red and forming a step pattern.

Now let us take the values of \( \gamma \) and \( \log x \) corresponding to an income of \$5900 for each of the
ll cities and compute the regression of $\mathbf{y}$ on log $x$. If the hypothesis $H_1$ is true the regression coefficient should equal the slope of line I. But if hypothesis $H_2$ is true the regression coefficient should equal the slope of line R (greater than that of I). Similarly we can compute regression of $\mathbf{y}$ on log $x$ from values of the variates corresponding to income of $4400$. This regression coefficient should equal the slope of R if $H_2$ is true and should equal the slope of line II if $H_2'$ is true. The same computation can be made for all the other income brackets. According to the hypothesis $H_1$ the slopes of the lines I, II etc. are all equal, to $K_1$. Moreover if $H_1$ is true the slope of line R will equal $K_1 + K_2$. Let the value of the regression of $\frac{c}{y}$ on log $x$ for the first income bracket be $K_1'$, for the second bracket be $2K_1'$ etc. and let the average of these values be $\bar{K}_1'$. Then if $H_2$ is true $\bar{K}_1'$ should equal the slope of line R. But if $H_1$ is true $\bar{K}_1'$ is less than the slope of R by an amount $K_2$ $(K_2$ and $\alpha$ are both negative).

The slope of line R can be estimated by taking the regression of $\mathbf{y}$ on log $x$ using the data for all income ranges. Computation of this regression gives 15.21 for the slope of R.
In the eleven cities for which data have been used the average money income in each income bracket is the same to within a few dollars. From these data a regression was computed for each income bracket. Since the cities have different income ranges not all of the cities are represented in each bracket. The results of the computation are given in Table VII.

**TABLE VII**

<table>
<thead>
<tr>
<th>Average Income</th>
<th>$1600</th>
<th>$1850</th>
<th>$2100</th>
<th>$2350</th>
<th>$2700</th>
<th>$3200</th>
<th>$3700</th>
<th>$4400</th>
<th>$5900</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
<td>16.96</td>
<td>43.48</td>
<td>26.92</td>
<td>16.65</td>
<td>-1.29</td>
<td>18.46</td>
<td>15.88</td>
<td>12.89</td>
<td>4.99</td>
<td>17.22</td>
</tr>
<tr>
<td>( \sigma_{K1} )</td>
<td>10.38</td>
<td>14.69</td>
<td>11.30</td>
<td>5.37</td>
<td>5.80</td>
<td>11.31</td>
<td>8.21</td>
<td>8.28</td>
<td>20.46</td>
<td>67.52</td>
</tr>
<tr>
<td>( \mu )</td>
<td>68.46</td>
<td>27.16</td>
<td>55.68</td>
<td>68.86</td>
<td>92.40</td>
<td>69.48</td>
<td>71.81</td>
<td>74.12</td>
<td>79.79</td>
<td></td>
</tr>
<tr>
<td>( T )</td>
<td>17.37</td>
<td>22.98</td>
<td>15.98</td>
<td>7.33</td>
<td>7.05</td>
<td>10.15</td>
<td>6.90</td>
<td>5.79</td>
<td>10.27</td>
<td></td>
</tr>
<tr>
<td>( \gamma )</td>
<td>.633</td>
<td>.822</td>
<td>.760</td>
<td>.713</td>
<td>.073</td>
<td>.553</td>
<td>.635</td>
<td>.50</td>
<td>.191</td>
<td></td>
</tr>
</tbody>
</table>

The value of \( K_1 \) is 17.22 which is to be compared with 15.21 for the slope of \( R \). If we accept the hypothesis \( H_1 \) then we have \( K_1 + K_2 \alpha = 15.21 \) and \( K_1 = 17.22 \) therefore \( K_2 = -\frac{1}{\alpha} \). But since \( \alpha \) is negative this would make \( K_2 \) positive which is contrary to all the usual arguments about consump-
tion (the marginal propensity to consume when position in the income distribution is given).

A somewhat more refined estimate of $K_1$ can be made by taking into account the fact that there is some connection between the income consumption relations for individual cities and the level of income of these cities. The results of a computation taking this factor into account are given in Table VII. The value of $K$ falls to 16.87. This decrease is not very important but a comparison of Table VII with Table VIII will show that the addition of another variable has eliminated some of the extreme variations in the individual estimates of $K_1$.

### TABLE VIII

<table>
<thead>
<tr>
<th>Average Income</th>
<th>$K_1</th>
<th>\frac{T_k}{n}</th>
<th>C</th>
<th>\frac{n_1}{n}</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1600$</td>
<td>21.95</td>
<td>3.49</td>
<td>62.22</td>
<td>97</td>
</tr>
<tr>
<td>1850</td>
<td>31.69</td>
<td>10.66</td>
<td>48.31</td>
<td>854</td>
</tr>
<tr>
<td>2100</td>
<td>31.74</td>
<td>14.93</td>
<td>46.16</td>
<td>886</td>
</tr>
<tr>
<td>2350</td>
<td>16.76</td>
<td>5.80</td>
<td>67.99</td>
<td>715</td>
</tr>
<tr>
<td>2700</td>
<td>1.36</td>
<td>5.78</td>
<td>96.30</td>
<td>363</td>
</tr>
<tr>
<td>3200</td>
<td>9.26</td>
<td>7.14</td>
<td>81.47</td>
<td>57</td>
</tr>
<tr>
<td>3700</td>
<td>18.12</td>
<td>8.75</td>
<td>86.92</td>
<td>679</td>
</tr>
<tr>
<td>4400</td>
<td>14.47</td>
<td>8.84</td>
<td>77.33</td>
<td>567</td>
</tr>
<tr>
<td>5900</td>
<td>9.24</td>
<td>15.66</td>
<td>88.20</td>
<td>827</td>
</tr>
<tr>
<td>Average</td>
<td>16.87</td>
<td>1.96</td>
<td>72.77</td>
<td></td>
</tr>
</tbody>
</table>
We therefore obtain a more reliable basis of comparison with the estimate of \( K_1 \) obtained from using all the data. The same adjustment was made in the regression using all the data with the result that our estimate of \( K_1 \) from this method rises to 16.90. The standard deviation of \( \tilde{K}_1 \) is 1.96, that of \( K_1 \) estimated from all the data is negligible.

The value of \( K_2 \) can be estimated by computing \( K_1 + K_2 \alpha = 15.90 \) (\( K_1 = 16.87 \)). The best estimate of \( K_2 \) is therefore \( \frac{-0.97}{\alpha} = -2.25 \), therefore \( K_2 = \frac{-0.97}{-2.25} = 0.43 \). The confidence limits on \( K_1 \) for a fiducial probability of 0.95 are 13.03 < \( K \) < 20.71. The upper limit is of no significance since it would give \( K_2 \) the wrong sign.

Taking the lower limit we can estimate the greatest value of \( K_2 \) at \( \frac{2.87}{-2.25} = 1.3 \). In the equation

\[
\tilde{f} = K_1 \log x + K_2 \log z + R
\]

we have values of \( K_1 \) from 16.87 to 13.03 and for \( K_2 \) from 0 to -1.3.

It can be seen that (1) the data are entirely consistent with the hypothesis that the variations in saving found in the budget study data can be entirely explained by variations in percentile position in the income distribution, (2) that even when \( K_2 \) is given its greatest possible value, money income as such cannot explain much of the variance. The
amount of variance explained by the two factors depend not only on the size of the coefficients but on the variability of the independent variables. The range of values of $\log x$ is from $-\infty$ (or any way a very high negative figure) for the richest family to +2 for a family at the 100th percentile. The range of values of $\log z$ for incomes from $100 to $100,000 is only from 2 to 5.

The budget study data therefore support the hypothesis that the propensity to consume depends essentially upon relative rather than absolute income.

III

So far we have only discussed static situations. We have shown that relative income is an important variable in the determination of the extent to which an individual is dissatisfied with his income position. We have also shown that nearly all the systematic variance in the expenditures of families with different incomes at the same time is explained by the variation in position in the income distribution. Money income contributes very little to the explanation. We have now to consider the variation in the aggregate percentage of income saved over long periods of time.
Kuznets has given data on Capital Formation and National Income by decades for the period 1879-1938. The figures are shown in the table below.

### TABLE IX

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1879-1888</td>
<td>10,310</td>
<td>1073</td>
<td>10.4</td>
<td>15,175</td>
<td>1766</td>
<td>11.6</td>
</tr>
<tr>
<td>1884-1893</td>
<td>11,527</td>
<td>1348</td>
<td>11.7</td>
<td>18,087</td>
<td>2524</td>
<td>14.0</td>
</tr>
<tr>
<td>1889-1898</td>
<td>12,425</td>
<td>1489</td>
<td>12.0</td>
<td>21,189</td>
<td>3145</td>
<td>14.8</td>
</tr>
<tr>
<td>1894-1903</td>
<td>15,084</td>
<td>1747</td>
<td>11.6</td>
<td>25,126</td>
<td>3509</td>
<td>13.4</td>
</tr>
<tr>
<td>1899-1908</td>
<td>20,615</td>
<td>2329</td>
<td>11.3</td>
<td>32,402</td>
<td>4110</td>
<td>12.7</td>
</tr>
<tr>
<td>1904-1913</td>
<td>26,640</td>
<td>2918</td>
<td>11.0</td>
<td>38,744</td>
<td>4808</td>
<td>12.4</td>
</tr>
<tr>
<td>1909-1918</td>
<td>36,934</td>
<td>4158</td>
<td>11.3</td>
<td>45,034</td>
<td>5817</td>
<td>12.9</td>
</tr>
<tr>
<td>1914-1923</td>
<td>55,949</td>
<td>6489</td>
<td>11.6</td>
<td>53,826</td>
<td>6250</td>
<td>11.6</td>
</tr>
<tr>
<td>1919-1928</td>
<td>71,387</td>
<td>7792</td>
<td>10.8</td>
<td>68,598</td>
<td>6905</td>
<td>10.1</td>
</tr>
<tr>
<td>1924-1933</td>
<td>70,064</td>
<td>4652</td>
<td>6.6</td>
<td>73,316</td>
<td>4247</td>
<td>5.8</td>
</tr>
<tr>
<td>1929-1938</td>
<td>61,274</td>
<td>1930</td>
<td>3.1</td>
<td>71,110</td>
<td>1610</td>
<td>2.3</td>
</tr>
</tbody>
</table>

The figures include corporate as well as individual saving.

For our purposes the series in current prices is the relevant one. For we are concerned with variations in the proportion of income that consumers are willing to save. The percentages saved calculated in 1929 prices differ from those in current prices only because the prices of capital goods did not change in proportion to the prices of con-

6 Kuznets, op. cit., p. 30.
sumers goods. But we are not interested in what
investors got for their money but only in what
level of income was required to get consumers (and
corporations) to save as much in money terms as was
invested. If consumer saving is a function of real
consumer income then the price of capital goods is
irrelevant to the savers.

The savings in the last two decades were
abnormally low, because of the depression of the
thirties. Since this period was to be discussed in
detail in chapter II we shall consider here only the
data for the decades up to 1929.

A glance at column (3) of Table IX will show
that there is no appreciable trend in the percen-
tage of national income saved in the period 1879-
1928. The whole range of variation is very small
and in view of the errors of observation which must
have entered into the production of these data no
particular significance can be attached to small
variations in the percentages. As far as available
evidence goes then we have no reason to suppose that
there was any systematic change in the proportion of
income saved during this 50 year period.

The hypothesis set forth in the last chapter
implies that the aggregate proportion of income
saved will be constant in the long run even when in-
come is rising. The observed results are thus entirely consistent with our theory. However, there is an alternative hypothesis which explains the long run stability of the proportion of income saved on an entirely different basis. Briefly, the hypothesis may be stated as follows:

(1) If no other factors are operating consumer saving is a linear function of real disposable income per capita.

\[ S = ay + b \quad a > 0, b < 0 \]

and therefore, if income rises over time the percentage of income saved will rise. If income is given by \( y = k \cdot e^t \) then \( s/y = a + \frac{1}{k} e^t \) so that \( s/y \) approaches a \textit{asymptotically} over time.

(2) In the period 1879-1928 income per capita was rising but other factors operated to depress the percentage of income saved.

A number of factors have been suggested as basis for proposition (2). Kuznets\(^7\) suggests that historically consumption has risen in proportion to income because the increase in income results from technical development and the same factors which lead to technical development in manufacturing lead

\(^7\) Kuznets, \textit{op. cit.}, pp. 9-15.
to the development of new consumers goods. He assumes that the development of new consumer goods will lead to a higher propensity to consume. He also argues that industrial development leads to urbanization and that this will increase the propensity to consume. He argues that the reduction in the number of independent proprietors means that fewer people wish to save to expand their own businesses. Finally, Kuznets suggests that the age distribution of the population has shifted in a way favorable to increased consumption.

Smithies mentions a similar set of factors emphasizing urbanization and new products. Samuelson states that "there is a long run tendency for the consumption function to shift upward so that commodities that once were luxuries become necessities." That, of course, is the position taken here, but Samuelson's reasons for the upward shift are different from ours. For he does not regard the tendency for consumption to rise in proportion to income as a consequence of the basic characteristics of our society. Thus, he says, "But this is not to imply that there is any guaranty that the upward shifts of the consumption schedule will be at a rate rapid enough to keep up with our production potential."

8 Smithies, loc. cit.
9 Samuelson, loc. cit.
Thus his position is opposed to ours, since we maintain that the rise in consumption in the last half century is not merely the consequence of a fortuitous concatenation of circumstances.\(^{10}\)

Let us consider in more detail the factors suggested by Kuznets. The factor of new consumers goods is given great emphasis both by those who think that the future is dark because of the uncertainty that sufficient new consumers goods will appear and by those who see rosy visions of a high consumption future based on the emergence of a high rate of development of new consumers goods. But is there any way to test the importance of new consumers goods? In discussing this factor Kuznets\(^{11}\) says, "Even a hasty glance at the make-up of consumers outlay in recent decades will indicate how large a portion of it is commodities and services that are distinctly results of modern technology and relatively recent technical innovations. Among the perishables are certain drugs and toilet preparations and gasoline; among the semi-durable, tires and tubes

---

10 In conversation Prof. Samuelson has agreed to the importance of the factors discussed in Chapter II but is inclined to give more support to the factors suggested by Kuznets than is the present writer.

11 Kuznets, *loc. cit.*
and certain types of house furnishings; among consumers durable, electrical household appliances and supplies, radios, passenger cars, etc.; among services not embodied in commodities services of professional practitioners vastly superior to those in the past, repair services in connection with the new types of consumers durable goods and the like."

The data on which Kuznets based his statement are those given by Shaw. These figures show that the proportion of output devoted to the lines mentioned above has increased sharply over the last fifty years while the proportion going into other lines, particularly food, has decreased. The proportion of output of commodities going into Perishable items fell from 57.52% in 1879-1889 to 50.04% in 1929-1939. This movement included a drop from 47.76% to 37.49% for food and kindred products while Drug, Toilet and Household proportions rose from 1.43% to 2.68% and Fuel and Lighting Products from 2.72% to 4.34%. Meanwhile, Consumers Durables rose from 9.43% to 16.39%. The principal elements in the increase were the rise of Electrical Household Appliances, Radios, Motor Vehicles and Motor Vehicles Accessories.

from zero to .73%, .80%, 6.18% and 1.41% respectively while horse-drawn vehicles fell from 1.05% to zero. The consumers semi-durable group as a whole fell in importance from 23.01% to 19.14%.

Within the group Dry Goods and notions fell from 6.39% to 2.20% and Shoes from 4.81% to 2.67%, while Tires and Tubes rose from zero to 1.02%. All other movements in proportion were comparatively minor. It can easily be seen that the principal element in shift of output is the automobile. Undoubtedly there were new product developments in other fields but short of tabulating Sears Roebuck catalogues it would be difficult to find them. In any case it seems apparent that the major developments in new goods were in the field of consumer durables. But the rate of introduction of new durables was not even throughout the period nor was it proportional to the growth rate of income per capita or per consuming unit. We may make use of this fact to test the efficacy of durables as a factor which offsets the tendency for saving to rise with rising income.

If it is the case that the proportion of income saved tends to rise with income but is offset by introduction of new durables, then during periods when this is taking place the proportion of income spent on durables should rise. The table below shows data
for income per consuming unit, proportion of income saved and proportion of consumers outlay spent on durables.

<table>
<thead>
<tr>
<th>Decade</th>
<th>Income per Consuming Unit</th>
<th>% Saved</th>
<th>% Spent on Durables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1879-1888</td>
<td>406</td>
<td>10.4</td>
<td>6.2</td>
</tr>
<tr>
<td>1884-1893</td>
<td>428</td>
<td>11.7</td>
<td>6.7</td>
</tr>
<tr>
<td>1889-1898</td>
<td>450</td>
<td>12.0</td>
<td>6.5</td>
</tr>
<tr>
<td>1894-1903</td>
<td>502</td>
<td>11.6</td>
<td>6.2</td>
</tr>
<tr>
<td>1899-1908</td>
<td>562</td>
<td>11.3</td>
<td>6.1</td>
</tr>
<tr>
<td>1904-1913</td>
<td>610</td>
<td>11.0</td>
<td>6.5</td>
</tr>
<tr>
<td>1909-1918</td>
<td>652</td>
<td>11.3</td>
<td>7.9</td>
</tr>
<tr>
<td>1914-1923</td>
<td>723</td>
<td>11.6</td>
<td>9.9</td>
</tr>
<tr>
<td>1919-1928</td>
<td>851</td>
<td>10.8</td>
<td>12.0</td>
</tr>
</tbody>
</table>

A study of the table indicates that up to the decade 1909-1918 the percentage of consumers outlay spent on durables remained virtually constant. During this period real income per consuming unit increased by 50%, while the percentage of income saved remained practically constant. Thus, unless some set of important new goods in the non-durable classes can be shown to have influenced saving before 1909 we must conclude that the introduction of new goods does not provide an explanation of the stability of the percentage of income saved in the

13 Based on Kuznets, op. cit.
period before 1909. New durable goods did become important after 1909 but if savings were constant in the face of rising income before that date, they presumably would have continued to be so afterward even if new goods had not been introduced. If the automobile had not been invented people would have bought pianos and large houses as they did before when they got higher incomes.

If it is contended that the introduction of new goods does have a depressing influence on saving, then either (a) some factor tending to depress saving before 1909 must have ceased to operate afterward or (b) the influence of new goods should be reflected in a decline in saving after 1909. I cannot find any factor of the first sort. On the other hand the percentage of income saved shows a very slight drop in the 20's from the levels of preceding years. There may also have been some increase in corporate saving though this could not have been very large since corporate saving in the 20's was only 1½ to 2½% of national income. The long term data then appear to show first, that the introduction of new goods is not required to maintain stability in the percentage of income saved and second that when new goods are introduced that they
may tend to reduce the percentage saved even in the face of rising income.

The second major offset to a rising propensity to save is the process of urbanization. Actually there are two aspects to the effects of urbanization on consumption. First, there is what we may call a weighting effect. It is known that farmers tend to save more at a given income than do city families. Then if the proportion of city families in the population increases the savings corresponding to any given income ought to decrease. Secondly, purely aside from the weighting factor the growth of large cities together with the closer communication of small cities with large may lead to development of new habits among city dwellers which will tend to increase their expenditures. Let us consider first the weighting factors.

First there does not seem to be any question that increasing the proportion of families with a high marginal propensity to consume will result in a decrease in the average percentage saved. This may be shown in the following way. If we assume linear consumption functions we may write

\[ S_1 = a_1 \bar{y} N + N \times b \]

and \[ S_2 = a_2 \bar{y}_2 N_2 + N_2 \times b_2 \]

where \( S \) is saving, \( \bar{y} \) average income, \( N \) the number of
families and the subscripts 1 and 2 indicate city data and farm data respectively. The process of urbanization has involved the maintenance of an approximately constant farm population with a growing city population. If we assume, for simplicity, a linear growth rate we may write \( N_1 = at + b \). Then if average income remains constant in cities and farms we may write

\[
y = A \gamma, S \left[ a_1(1 + b) + a_2(1 + k) \right] - A_\gamma, S \left[ m_1 + (1 + b) \right] = \frac{S}{y} = \frac{a_1(1 + b) + a_2(1 + k)}{m_1 + (1 + b)}
\]

\[
\frac{dS}{dy} = \frac{(a_1 A \gamma + a_2 A \gamma)}{m_1 A \gamma + (1 + b) A \gamma} \frac{A \gamma, S}{m_1 A \gamma + (1 + b) A \gamma}
\]

and \( \frac{dA}{d\gamma} < 0 \) if \( a_1 \gamma \left( a_2 M_2 + A \gamma, S \left[ m_2 + b \right] > A \gamma, S \left[ m_1 + b \right] \right) \), since \( a_1 < a_2 \) and \( b_1 k \) is probably less than \( b_2 \). the inequality will be fulfilled. Moreover, even if \( b_1 k \) the inequality will be fulfilled ultimately if average income is growing in both farms and cities. For the terms involving \( a_1 \) and \( a_2 \) are multiplied by \( \gamma^{-2} \) while the others only involve \( y \).

But although it may be granted that the movement from farms to cities has some tendency to reduce the percentage of income saved the magnitude of this effect cannot have been very great. Average
farm savings now appear to bear about the same proportion to farm income as city savings to city income. The Study of Consumer Purchases indicates that in 1935-36 non relief farm families saved 12.5% of their aggregate incomes while urban non-relief families saved 10.7% of income and rural non-farm families saved 12.3% of income. These figures are not of course strictly accurate nor are they directly applicable to long period problems since they represent a year of depression. Agricultural income in 1935-36, however, formed about the same proportion of national income as it had for some years past. The period was not therefore particularly one of relative depression in agriculture. But since it is believed that the marginal propensity to save of farmers is higher than for city families an upward movement of income would raise the percentage of income saved by farmers more than for city families. If, therefore, we suppose that in a year of about average employment farm savings (as a percentage of income) would bear a ratio of 3 to 2 to city savings we should not be far wrong. Since average savings through the last two decades were about 10% of income except in the

worst years and since farm income was about 10% of total income we may use 9.5% for city savings and 14.2% for farm savings. Weighted by a factor of 9 for city families and a factor of 1 for farm families, this will give average savings of 10%. But 50 years ago farm income was about 1/3 of national income. Therefore, if the trend in income had continued and the other trends tending to reduce savings had also continued the current average percentage saved would be \[ \frac{14.2 + 2 \times 9.5}{3} = 11\% \]. Thus the weighting factor cannot have accounted for more than a 1% change in saving or about a 10% reduction below the amount which would otherwise have been saved. Most of the offsets to the tendency for saving to rise with income must, therefore, have come from other factors.15

15 This can be seen clearly if we consider changes in savings of non-farm families alone. The overall percentage saved 50 years ago was about 10% and farm families had about 1/3 of the total income. We do not, of course, know the distribution of savings as between farm and city families. But if city families saved as little as 5%, farm families would have had to save 20% to bring the average to 10%. Since this would require a very considerable reduction in farm saving (as a percentage of income) over the period in the face of rising income it would seem unreasonable to put average farm saving at higher than 20%. Moreover, in view of the very considerable accumulation of industrial capital to which farmers probably did not con-
We have now to consider the other aspect of the effect of urbanization. That is the effect of urbanization on valuations of saving and spending through the changes in the social structure and psychological changes which are the consequence of increasing the proportion of families living in cities. Some of these effects will influence only the attitudes of city people and will be essentially consequences of the growth in the size of cities. Others will affect even those who continue to live in small towns or on farms. This will occur because an increase in the proportion of people living in cities will give an increasingly urban tone to the national system of values. The improvements in transportation and communication which have taken place over the last 50 years make this "urbanization of values" all the more important.

Influences of the first type may be studied by a comparison of saving patterns in large and small cities. It has been suggested that the percentage of income saved is reduced in large cities because of the high cost of transport, high rentals due to [note 15 cont.] tribute much, saving of 5% income seems a very low amount to attribute to non-farm saving. But non-farm income per consuming unit has increased by 70% in the intervening period. Then to arrive at the current figure of 9.5% for urban average savings the marginal propensity to consume would have been .157 unless trend factors offset [cont.]
crowding and a greater need for expenditures to overcome the dissatisfactions resulting from crowded conditions. This appears plausible, but the facts do not seem to confirm the idea. Table II shows the average percentage of income spent in a number of cities and groups of cities. The whole range of incomes is not included but about the same percentage of income receivers is included in each case. The percentage of income spent in six middle sized and small cities is 89% as against 86.7% for five large cities. Thus, there is no evidence in favor of the idea that expenditures in the large cities tend to be a larger proportion of income than in small cities. New York of course, would show a noticeably lower percentage of saving but this is due to its metropolitan character rather than to its size as such. I do not propose to make anything out of the higher savings shown for the bigger cities as the differences are not significant statistically. But at least, there is no evidence that large cities save less on the average than small cities.

[Note 15 cont.] The greater rise which would have resulted from a higher value. If average savings 50 years ago in cities had been 7% of income the marginal propensity to save needed to raise the average to 9.5% would be only .13. Thus we must either find some trend factors other than those discussed or accept the proposition that the marginal propensity to save is very much lower than appears from cyclical data or from aggregating budget study data.

16 Menderhausen, op. cit. Kuznets, loc. cit.
One difficulty arises here. The larger cities have on the whole somewhat higher incomes than the small cities so that they might be expected to save more even if their savings income schedule were lower. This argument cannot be used here, however, because we have already shown that in the static analysis of savings, money income does not contribute anything to the variance of the percent of income saved. Whatever the validity of the analogy between static comparisons of cities and comparisons between years, the analysis holds here because the comparison between average savings in cities of different sizes is a static one. Thus there appears to be no support for the idea that increases in city size as such reduce the percentage of income saved.

The process of urbanization may have had a further effect on the propensity to save by changing basic attitudes toward saving and spending in rural areas and small cities as well as in larger cities. Whether the general changes in attitudes which have occurred over the last 50 years are attributed to urbanization or whether they have merely accompanied it, does not make much difference so long as they have occurred.

The attitude of farmers toward saving is probably substantially different from that of urban
families. The higher savings of farmers attest to this proposition, and there are strong sociological grounds for the difference. For in rural regions prestige accrues to those farmers who are successful as farmers, and success is evidenced at least partly by the value of farm property. This means that the social drive toward higher consumption is somewhat weakened among farmers by the social importance of saving. One might expect that the improvement of communication between farms and cities resulting from automobiles, paved highways, the radio and the movies would tend to undermine the old social goals of farmers and bring them closer to those of cities. This may have been the case since we cannot tell what the propensity to save was for farmers in the past. This factor is not however quantitatively very important since as we pointed out above the farm propensity to save cannot have fallen by more than 5% of income over the past 50 years. Since farmers account only for about 10% of national income, the difference in the aggregate percentage saved resulting from the factor cannot be more than .5.

The process of idealogical change over the last 50 years is not confined to farmers. It has been suggested that the importance of saving as a social goal has declined over the past 50 years so
that the propensity to save might be expected to fall over all parts of the country. This proposition may be tested by somewhat the same procedure used in testing the importance of new products. For, I think it will be agreed that if any important changes in attitudes have taken place in the past 50 years the rate of change since the first World War must have been very much greater than before the war. Indeed one would be inclined to say that changes in attitude toward saving in the period 1879-1914 were almost negligible by comparison with those which took place after 1914. I am unable to give any evidence for this proposition except that of a general impression obtained from reading about both periods. But if the rate of change in attitudes toward saving was comparatively low in the decades preceding the first World War then, in view of the increase in income during that period and the absence of other offsetting factors the propensity to save should have risen in that period. But we have already shown in connection with the discussion of new products that the propensity to save did not rise between 1879 and 1914. But if it did not rise before the first war then there cannot have been any tendency for the propensity to save to rise with income. It does not appear, therefore, that change in attitudes can
have exercised any serious influence. For if it had the propensity to save would have fallen after 1914. The slight fall which did take place appears to be accounted for by new products and, therefore, the influence of ideological change seems to have been negligible.

Probably the change in attitude toward saving had little influence among the non farm population simply because saving is not motivated so much by a Puritanical attitude toward saving as by feelings of insecurity and uncertainty about future income. A high percentage of saving takes the form of insurance and older families save a great deal more at a given income than younger ones which probably indicates the great importance of the retirement motive in determining the level of saving. If saving is primarily motivated by the desire for security rather than by a feeling that saving is a good in itself then the elimination of beliefs about the virtue of saving can not have much effect on the saving which is actually done. For few people are able to save enough to be reasonably secure let alone save just for the sake of saving.

The final factor mentioned as offsetting the tendency for the percentage of income saved to rise with income is the changing age distribution of the
population. A number of elements are involved here. First children under 15 form a decreasing proportion of the population. Thus in 1910, 32.1% of the population were under 15. In 1940 only 25.1% were under 15. Since children under 15 are in general not earners a reduction in their numbers tends to make greater saving a possibility. On the other hand the proportion of persons in the retirement age group is increasing. In 1910, 6.7% of the population were over 60 while in 1940 this percentage had risen to 10.4%. Since retired persons either spend previously accumulated assets or live on their relatives, an increasing proportion of old people tends to reduce aggregate savings. If the two groups are aggregated then the two classes formed 38.8% of the population in 1910 and 35.5% in 1940. It would be a mistake, however, to weight the two groups exactly equally. No data are available on the dissavings of retired persons but it seems probable that an increase in the number of retired persons causes a greater reduction in savings than an equal increase in the number of children. If this is the case, then a reweighting of the two groups would result in almost complete cancellation of the effects of de-

creasing the number of children and increasing the number of old persons. It seems, therefore, that the net effect of these two aspects of population change is negligible.

There is, however, another aspect to change in the age distribution. It has already been pointed out that persons who are in the age groups just before sixty save substantially more than those in younger groups. Thus a general increase in the age of the population within the group of working age will lead to an increase in saving. In 1910, 17.2% of the population between 15 and 60 were in the age group 40-49, while 11.7% were in the age 50-59 group. By 1940 these percentages had increased to 20.0 and 15.3. 18

Thus the net effect of the change in the age distribution of the population seems to be to increase the propensity to save rather than to decrease it.

This factor tends to offset the decrease in savings resulting from the relative decrease in farm population and the urbanization of attitudes of the remaining farmers.

A final element in the savings picture is the growth of organized saving. It is well known that sales of insurance have grown enormously in the past

fifty years. According to Hansen\textsuperscript{19} assets of
life insurance companies have grown from 5 billion
dollars in 1880 to over 30 billions in 1940. Insurance
premiums now take up from 25 to 35\% of all in-
dividual savings. In the case in which an in-
dividual's day to day impulse control is not suf-
ficiently strong to provide the amount of saving he
feels he ought to do a fixed contract will strengthen
impulse control greatly. This is the case because
failure to meet the contract involves the loss of
previous savings. It may be the case that life in-
surance has provided a more or less direct offset to
the idealogical changes which were discussed above.
In any case it certainly provides a strong offset
to any other factors which tend to depress savings.

On balance then we must conclude that all the
developments of the past fifty years cannot have pro-
vided any very substantial offset to the tendency for
saving to rise more than proportionally to income.
For we have shown that new durables could not have
had any serious effect before the 20's while their
importance during the 20's slightly cut the percen-
tage of income saved. If these developments had not
occurred the percentage saved in the 20's would have
been about the same as in the earlier period. The

\textsuperscript{19} Hansen, \textit{op. cit.}, p. 239.
relative decrease in the farm population and the urbanization of attitudes of farmers can have accounted for a reduction of only 1.5 in the percent of income saved. The growth of insurance and the changing age distribution of the population are factors which tended to increase savings and thus offset the other factors. General changes in attitudes either were not important at all or were offset by other factors.

Thus, if the percentage of income saved tends to rise with income the tendency should have been reflected in the data for the period 1879-1928. The data do not reflect any such tendency so we must conclude that the tendency does not exist.

IV

Thus far we have shown that on a number of tests the hypotheses developed in Chapter II are consistent with observational data. It was shown that the degree of dissatisfaction with one's expenditure does depend on the level of expenditure in relation to the expenditures of those with whom one has social contact. Secondly it was shown that the fact that Negro savings at a given income are higher than those
of Whites at the same income can be explained by the hypotheses and can be explained only with difficulty on the hypothesis that savings depends essentially on real income. Thirdly, it was shown that the hypothesis that saving depends on relative income is completely consistent with the static data obtained from the Consumer Purchases Study. Moreover, it was shown that variations in real income contribute very little if anything to the explanation of intercity differences in saving. By analogy this supports the view that real income does not contribute to the explanation of inter-temporal differences in saving.

Turning to the long run data it was shown first that in accordance with our hypotheses the average percentage saved was constant in the period 1879-1928. Since this result is inconsistent with the view that the percentage of income saved is a rising function of real income we then considered the trend factors which could have offset the tendency for the average propensity to consume to rise.

It was shown that the percentage saved remained constant in periods when income was rising and there was evidence that neither new goods or changes in attitudes could have had much influence. In the 20's when these factors were operative the percentage
saved fell somewhat. We conclude, therefore, that in accordance with our hypotheses the percentage saved tends to constant while income rises even if introduction of new goods or changes in attitude are not taking place. When these factors are operative they tend somewhat to depress savings.

It was also shown that the relative decline in farm population and the growth of large cities can have resulted only in very small reductions in savings. At the same time the development of systematic saving through insurance and the changes in the age distribution of the population tended to raise savings.

The net result is that there is no evidence that any trend factors were operating to affect the tendency of the percentage saved to rise with income. But since income did rise over the period 1879-1928, and the percentage of income saved did not rise in that period it must be concluded that there is no tendency for the percentage saved to rise with income. This is in accordance with the hypotheses set out in Chapter II. The hypotheses developed here seems to be consistent with all the empirical evidence considered thus far while the alternative hypotheses seem to be inconsistent with observation at a number of points.
The evidence presented here seems to show that the hypothesis of Chapter III is not contradicted by the facts. So far as I am aware no major measurable factors have been left out of account here. However, we have not considered in any detail the possibility that cultural changes may have had a significant effect on saving during the past 50 - 75 years. Such changes are not easily measured but that is no reason for leaving them out of account.

The type of change in which we are interested should be apparent from the type of argument used in Chapter III. Our analysis of the relations between income and consumption was based on a description of certain characteristics of our culture. From our standpoint the significant features of the culture are not legal and political but social in character.

The argument that saving has been significantly affected by cultural changes in the period since (say) 1870 would, I think, about as follows:¹

(1) During the past seventy-five years the spread of education and the growth of mass produced cultural media have largely eliminated class differences in culture. Further a significant decline in

social class consciousness (as distinguished from economic class consciousness as represented by say trade unionism) has taken place. That is there is little feeling that a certain standard of living (or any components of a standard of living) are appropriate or good enough for (say) a manual laborer.

(2) These tendencies have been reenforced and exploited by advertisers and movies and popular magazines.

(3) The result is an increase in pressure, particularly on those in the relatively low income groups, to maintain high consumption standards in order to validate the claims to social equality based on possession of education and culture similar to those of people in the higher income groups.

(4) On the other side of the picture there has been a decline in the traditional mores about thrift. Along with this a decline in opportunity for small businesses reduces the incentive to save in order to become a Smilesian self-made man.

In a general way all these propositions seem acceptable but they are not really very relevant to our problem. The increase in pressure to raise consumption standards applies primarily to the relatively low income groups. The changes apply primarily to the relations between those in the lowest 90% of the income distribution and those in the upper 10%.
Changes in the social structure of the upper 10% have been much smaller.

The social changes just described can be represented by an upward shift in the function
\[ D_{ij} = F \left( \frac{c_i}{\xi x_{ij} c_*} \right) \] described in Chapter III. The shift, however, was much greater for low values of the variable than for high ones. With regard to the other function \( D_{ij} = f \left( \frac{c_i}{\gamma_i} \right) \) it is apparent that there is a discontinuity at \( \frac{c_i}{\gamma_i} = 1 \)

For the dissatisfaction from not saving enough increases sharply when saving becomes negative. The discontinuity explains why saving reaches 0 at moderate income levels and then remains approximately 0 for incomes below that.

Granting the existence of the discontinuity we have the following situation. If a certain group spends its whole income in one period then according to our theory the equilibrium position occurs at the discontinuity on \( f \left( \frac{c_i}{\gamma_i} \right) \). Suppose now that the function \( F \left( \frac{c_i}{\xi x_{ij} c_*} \right) \) is shifted upward.

In the case of continuous functions this might be expected to lead to an increase in the proportion of income spent. But if the old equilibrium occurred at the discontinuity the shift will not result in any change in the savings ratio. Since we know that people in the lowest 90% or so of the income dis-
tribution were already spending their whole income a long time ago an increase in the function $P(\frac{c}{\frac{1}{i}})$ would not result in any change. This conclusion would not hold for people in the upper part of the income distribution since their equilibrium position occurs before the discontinuity.

It follows that, if our hypothesis is correct, increases in social competition confined to the lower income groups would not produce any tendency for the savings ratio to decrease. Thus the facts remain consistent with the hypothesis.

It is difficult to say whether similar changes have affected the higher income groups. Only impressionistic evidence is available. But such as it is this evidence does not give much support to the idea that there has been a great intensification of social competition in the upper income groups. A reader of Veblen's descriptions of life in the 1890's cannot fail to get the impression that social competition in the high income groups has declined since that time. The houses built in the late nineteenth century are a monument to the degree of conspicuous consumption existing in that period. There are, of course, points on the other side, but it is certainly not obvious that such changes as have occurred in the cultures of the upper income groups have tended to reduce saving. In view of these considerations I think the burden of proof lies on anyone who wishes to disprove the hypothesis of Chapter III.
CHAPTER V
SUMMARY AND CONCLUSIONS

I

In the last three chapters a number of hypotheses have been developed and submitted to empirical tests. It now remains to summarize the conclusions reached and work out some of their implications. The conclusions reached may be summarized as follows:

(1) The percentage of income consumed by a family is a function of the position of the family in question in the income distribution of the community in which the family lives. This function is \( y = a \log x + b \) where \( y \) is the percentage of income saved and \( x \) is the family's percentile position in the local income distribution. The parameters \( a \) and \( b \) will be partly dependent on the parameters of the income distribution.

(2) Ceteris paribus, changes in aggregate income do not affect the ratio of consumer saving to disposable income. This proposition applies only in the long run. The factors included under the ceteris paribus clause are (a) the distribution of income (b) the social structure and the value system of the community, (c) the age distribution of the population, (d) the ratio of consumer assets to income. A number of other factors could be cited but these
seem to be the ones of the greatest importance.

(3) During the period 1879-1928 savings were on the average 11.3\% of National Income. Since this figure includes corporate saving the percentage of disposable income saved was 9-10\% and this may be taken as the long run expected value for future savings subject to modifications resulting from the factors mentioned under (2).

(4) Over the course of the trade cycle savings will be a function of the ratio of current real disposable income per capita to the highest previously attained level of real disposable income. The function is $P = .166 \cdot R - .066$ where $P$ is the percentage of disposable income saved and $R$ is the ratio of current income to the previous high income. It will be noted that this function is independent of the current level of income. (This relationship cannot be pressed too far in the case of a very long depression but it will be satisfactory for one as long sustained as that of the 30's.)

(5) In the event that $R$ becomes very much greater than 1 the relationship given in (4) will break down and savings will be above the value expected from that equation. This occurs because time is required to adjust living standards to a level much above that previously attained. The value of $R$ can greatly exceed 1 only after a very long depression. For the annual increase in potential income can only be 2 or 3\%. But in a long depression potential increases in income are not fully utilized so that if full employment is suddenly achieved income may reach levels much above those previously attained.

(6) An increase in the ratio of assets to income will result in some decline in saving but I am unable to estimate the magnitude of the reduction.

Chart 12 shows the relationship between long and short run saving, except that the adjustments for durable purchases are not shown in the diagram.
The line $0B$ is the long run consumption function shown with a slope of $.9$. The curves $I$, $II$, $III$, $IV$ are the short run functions discussed in (4) above. The curves marked $1$, $2$, $3$, show the values of consumption in periods when $R$ is substantially above $1$. The variations in consumption through a typical business cycle may be described with the aid of the diagram in the following way:

Suppose that full employment is reached at a certain time with income and consumption at the point $(a)$. Full employment is approximately maintained for some years and during this time income and consumption rise approximately proportionately to the point $(b)$. When this income is reached a decline in investment occurs so that income is reduced. Consumption now declines but instead of declining proportionately, consumption at any income is found at the point corresponding to that income on the curve $I$. Consumption and income at first fall, then as recovery sets in they advance again. If the recovery is a gradual one consumption advances along the curve $I$ until the point $(b)$ is reached once more. After this consumption continues to advance but along the curve $0B$ again until another depression starts.

If, however, the recovery is very rapid then when income passes the level corresponding to $(b)$ consump-
CHART IV

REAL CONSUMPTION PER CAPITA

REAL INCOME PER CAPITA
tion will increase but along one of the curves A1, 2 or 3 depending on the speed of the increase in income. Income cannot continue, however, to rise at a very rapid rate for as soon as full employment is reached only increases in productivity will raise income. Eventually then a full adjustment to the new living standard will take place and consumption may once more be found by using the line 0B.

It may be of some interest also to compute the marginal propensity to save at various points of the cycle from our short run equation. We have 
\[ s/y^* = 0.166 \frac{Y}{Y^*} - 0.066 \]
where \( Y^* \) is the highest previous income. Differentiating we obtain 
\[ \frac{ds}{dy} = 0.332 \frac{\frac{Y}{Y^*}}{Y^*} - 0.066. \]
Thus the marginal propensity to save varies from a value of about 0.27 for income levels near the peak previously reached down to about 0.16 when income is as low as 70% of the previous high. It is because of this change that Woytinski found such radically different regressions when he fitted straight lines to income and consumption data for prosperous and depressed years. It must be noted, of course, that the short run marginal propensity to save is very much higher than the long run figure. This is because the increases in income do not have a cumulative effect on the short run equation once full employment is reached. A steady

rise in income with full employment would never cause the value of \( r \) to rise much above 1.02 or 1.03.

II

So far consideration has been given to the positive aspects of the conclusions. But we have not only made a case for a new set of hypotheses about saving and consumption, we have also shown what appear to be irreparable weaknesses in a widely accepted alternative hypothesis. This hypothesis may be stated in the following way.

(1) Real Consumer Saving per capita is a linear function of real disposable income per capita and time. The equation expressing this relationship is

\[ s = ay + b. \]

The parameters are estimated from the annual data on aggregate income and consumption but appear to be approximately consistent with the budget study dates. The trend brings the results into approximate consistency with the long period data.

(2) The trend term is supposed to arise because of the action of such inter-temporal developments as

(a) the introduction of new goods, (b) the relative decrease in the farm population, (c) the higher cost of living and the changes in attitudes resulting from the growth of large cities, (d) the changing age distribution of the population.

With respect to the propositions just set forth it has been shown:

(1) That the annual data on consumer income and consumption for the period 1919-1940 are seriously affected by a number of cyclical factors which cannot be supposed to influence the long run propensity to consume. The most important of these factors are: the tendency to try to maintain previously
It was also shown that the relative decline in the farm population could have had only a very small effect on the percentage saved while there is no evidence that the growth of large cities had any effect. Finally it was shown that the changes in the age distribution of the population were such as to lead to an increase rather than a reduction in saving and that the tremendous growth in systematic saving through insurance would tend to cause an in-

attained living standards in a depression. This means that a cyclical fall in income from a previously attained high level and the corresponding rise in income when full employment is again reached result in a much greater change in savings than would result from an equal rise in income as result of comparatively slow increases in productivity. The large deficits reported by unemployed families show clearly that this factor is operative.

The operation of this factor must certainly have raised the marginal propensity to save during the period 1919-1940 and since it is not influential in the long run it seems clear that application of the parameters estimated from short run data to long period problems will lead to erroneous results.

(2) Unless the existence of trend factors such as those discussed in (2) above can be substantiated the equation fitted to annual data will lead to results inconsistent with the long period data on income and consumption. With respect to the supposed influence of the introduction of new goods it was shown that the percentage of income saved remained constant even in periods when not many important new goods were being introduced although income was increasing in the period in question. This implies that either new goods have no effect or if they do have an effect it is not to offset a tendency for the percentage saved to rise with income but to make the percentage fall below its long term (constant) level.

It was also shown that the relative decline in the farm population could have had only a very small effect on the percentage saved while there is no evidence that the growth of large cities had any effect. Finally it was shown that the changes in the age distribution of the population were such as to lead to an increase rather than a reduction in saving and that the tremendous growth in systematic saving through insurance would tend to cause an in-
crease in saving. Thus the hypothesis that saving is a linear function of income and time is inconsistent with both short and long run observational data. The hypotheses developed here, on the other hand, are consistent with all the observational data and are in addition strongly supported on a priori grounds. I think, therefore, that the hypotheses set forth here must be accepted until some further alternative is developed.

III

The conclusions just listed have been stated in a somewhat bald way without any discussion of possible weaknesses in the argument on which they are based. The long run consumption theory depends essentially upon a single proposition, viz. that the frequency and strength of one individual's impulses to increase expenditures are dependent solely on the ratio of his expenditures to those of others with whom he associates.

In Chapter III some reasons for the truth of the proposition just stated were given. But these arguments do not in any sense constitute a proof of the statement. The data presented in Chapter IX show that (1) the dissatisfaction with the consumption standard is at least partly dependent on relative
income (2) that the theory of Chapter III implies the results which did occur in the static budget studies (3) that if no trend factors were operative in the period 1879-1929 the observed savings were consistent with the implications of our hypotheses and (4) that there is fairly strong evidence that trend factors (such as would offset a tendency for saving to rise) were not operative during at least part of the period.

The fourth proposition is the weakest point in the whole structure. For it may be possible that a more detailed investigation would show the existence of important trend factors left out of account in the analysis presented here. A certain degree of skepticism toward the theory presented here is, therefore, justified. But such skepticism applies to all hypotheses. For a complete proof of any hypotheses requires that all other possibilities should have been weighed and found wanting and this is impossible. The burden of finding specific trend factors which will explain what did happen is upon those who would deny the theory presented here.

Alternative theories must do more than show the existence of trend factors which reconcile the long and short period aggregate data. They must also reconcile the budget study data with the annual ag-
aggregate data. The inconsistency here is of a peculiar character.

If the 1941 budget study is used to estimate aggregate savings at various levels of national income (on the assumption of a constant Lorenz curve) the results are very close to the observed aggregate savings. At first sight this appears to be a very satisfactory result. (The curvature of the budget study income-consumption relation is sufficiently slight that the linear income consumption regression may be regarded as a linear approximation to the true relationship). But the deficits shown in the 1935-36 study are clear cut proof that the annual aggregate data are affected by cyclical factors not reflected in the budget study income-consumption relationship. This means that the intertemporal changes in saving are not consistent with the hypothesis that they result from changes in income alone. As a matter of fact if we corrected the annual data for cyclical factors the aggregate marginal propensity to save would fall to level somewhere around .1 and the constant term would become very small. (This can be seen by applying Woytenski's suggestion of dropping out the most depressed years in calculating an income consumption relationship.) This is just what would be expected on our theory. But whoever wishes to support an alternative theory must show
why the aggregate data do not jibe with the results expected from aggregating budget study data. (A trend can hardly be used for this purpose since the period is only about 20 years.)

It is, of course, quite possible that the necessary reconciliation can be made but for the moment the hypotheses presented here seem to provide a working basis for projections. At a minimum we may say that enough evidence has been given here to make it necessary for national income "projectors" to shy away from dire predictions of high levels of unemployment resulting from a high propensity to save.

In any case a fairly critical test of the theory outlined here is likely to be provided by the events of the next few years. If after, say, five years of transition, savings out of disposable income rise much above 10% then our theory may be considered disproved. If on the hand consumer savings do not rise to much above 10% of disposable income the theory may be considered verified unless some rather spectacular structural changes occur at the same time.

When we turn to consider the theory of cyclical variation in saving we must admit a considerable number of inadequacies in the theory presented here. First the relation of saving to the ratio of current income to highest previous income is only an ap-
proximation. Assuming that past high levels of consumption do affect saving in years of depression the true relation is probably much more complicated than the one given here. Probably saving should be a function of the ratio of current income to some rather complicated weighted average of previous incomes. With so few observations we cannot exactly specify this function.

A number of influences on saving not considered here have recently been suggested. Klein¹ suggests that relative prices may have some influence. Tobin² suggests that the homogeneity postulate which is used to justify simple deflation of the variates by a price level is invalid. Since both absolute and relative prices are strongly correlated with measures of position in the trade cycle the problem of testing these theories is a difficult one and has not been attempted here. We must, therefore, admit the fairly strong possibility that factors other than those considered here are influential in determining the cyclical propensity to save.

Aside from the question of the adequacy of our theory of saving there are some difficulties in the estimation of the parameters in the equation relating savings to income. The parameters are subject to bias

² Unpublished manuscript.
for two reasons. First the regression equation
\[ p = 16.6 \frac{y}{y_0} - 6.6 \ (P = \text{percent of income saved} \ y = \text{current income}, \ Y = \text{highest previous income}) \]
was obtained by a method which involved the assumption of zero observational errors in the variable \( y/y_0 \). This assumption is of course not perfectly fulfilled but we cannot estimate, with any degree of accuracy, the observational errors in \( y/y_0 \). Whatever the magnitude of the bias its effect is to reduce the value of the coefficient of \( y/y_0 \) below its true value and increase the (algebraic) value of the constant.

The parameters of the regression equation are also subject to the bias resulting from the interrelation between income and investment (in the case of savings from disposable income read gross capital formation + government deficit minus corporate gross saving for investment.) The importance of this bias has been pointed out by Haavelmo. I am inclined to think that variations in the investment factor are not very strongly connected with income but in any case the extent of the bias cannot be evaluated until a satisfactory theory of investment is available.

We are, therefore, left in the position that

3 Haavelmo, op. cit.
the percentage of income saved at low levels of income can be estimated only approximately even if the theory on which our regression is based is completely correct. The error due to the biases will not be very great, however.

IV

The implications of the long run consumption theory proposed here are fairly obvious. The long run increases in saving will be very much smaller than would be expected from the income - savings relation currently in use. Thus Smithies estimated that 167 billion dollars would be saved out of a disposable income of 135 billion dollars in the post-war period. Before taking account of the temporary excess demand for durables resulting from the war the formula derived here would yield about 13.5 billion dollars of consumer saving for the first stable post-war year. The difference of 3.2 billion dollars between the two estimates amounts to 19% of the Smithies estimate. On the assumption that income taxes are reduced to the 1941 level Smithies estimated a disposable income of $150.6 billion corresponding to a $200 billion G.N.P. His estimate of consumer saving for this situation is 20.3 billions while the formula

4 Smithies, op. cit.
used here would yield an estimate of 15.1 billions. It may be noted that Smithies' estimates of private investment are sufficiently low that a government deficit would be required to maintain full employment with the tax rates assumed. With the savings function suggested here a surplus would be possible.

If any public policy is to be adopted on the basis of estimates of private expenditures it is absolutely essential that correct estimates of consumer expenditure be made. The differences of 3 to 5 billion dollars in estimates of consumer saving are sufficient to change a prediction that a government deficit will be required to maintain full employment to a prediction that a surplus will be required to avoid inflation.

The difference between the two consumption functions becomes even more important when we consider longer range problems. For, if we accept the view that the marginal propensity to save is .25 then as income increases over time consumer savings must approach 25% of disposable income unless some trend factors offset this tendency. Since it is patently impossible for investment to grow at the rate which would be required if so high a proportion of income were invested (investment and income would have to grow at compound interest rate of .25 —
per year where $\sigma$ is the average ratio of the increase in income to rate of investment,) the whole future of the economy will have to depend on the continued existence of trend factors favorable to consumption. Since there is no guarantee that such trend factors will continue the future of capitalism is rendered extremely dubious by the view that the marginal propensity to save is as high as .25. To say this is not, of course, to give an argument against the high estimate of the marginal propensity to save but it does indicate the importance of making a correct estimate. I think it has been demonstrated that the estimates currently in use are too high.

On the other hand the fact that the sensitivity of consumption to the development of new consumer goods has been shown to be rather slight indicates that we cannot expect a flood of post-war gadgets to do much in the way of reducing the propensity to consume so that the estimate of 10% for the long run average may be expected to hold good unless there are sharp changes in the distribution of income, the age distribution of the population, the basic social structure and social goals of the country, or the degree of security of income.

The underlying theory of consumption developed in Chapter II implies that the current view of the effects of changes in the distribution of income is somewhat in error. It has been generally supposed that a redistribution of income in favor of the poor would result in a reduction in the aggregate propensity to save. This proposition is based on the assumption that each individual's consumption function is independent of the consumption of others. A redistribution of income is then simply a reweighting of individual propensities to consume.

But if each individual's propensity to consume is dependent on the expenditures of others the problem is not so simple. Suppose that today a ceiling of $5000 were placed on incomes and all income in excess of $5000 were taken in taxes and distributed among the low income groups. The immediate effect would of course be a reduction in aggregate saving since those whose incomes were cut would certainly not cut their consumption by the whole amount of the loss in income while the low income groups would presumably spend all or nearly all of the increase in their income. But consider the group whose incomes before the new policy were just $5000. The redistribution will certainly not lower their savings
and may increase them since their desire to spend on consumption was previously affected by the high expenditures of those with higher incomes. For simplicity suppose that their savings remain just the same. In 1935-36 the average family with a $5000 income saved from 20% to 30% of its income. As time passes the national income will increase and as it does so more and more incomes will reach the $5000 ceiling. There is a presumption that the savings of those whose incomes have just reached the $5000 level, will be as high as those of older members of this income group. Therefore, when aggregate income has advanced to the point at which the average income is $5000 savings will be over 20% of income. But it has been shown that in the absence of changes in the age distribution of the population, the degree of security of income or the social structure and social goals of the community, the present distribution of income would result in savings of only 10% of income. Therefore, in the long run income redistribution considered by itself would result in an increase rather than a decrease in saving.

Of course it would be impossible to make such a drastic change in income distribution without affecting the degree of security of income and the social structure. But if more moderate changes of the
same sort were made, the direction of change of saving might be upward, instead of downward. It is not intended to argue that a policy designed to redistribute income would not be desirable since a redistribution would certainly result in an immediate decline in savings. But although the tendency for savings to rise with a more equal distribution of income operates slowly it does reduce the fall in savings which can be expected from a redistribution when the expectation is based entirely on a weighting calculation. I have not made any attempt to calculate the effects of a redistribution since there are not satisfactory American data for this purpose. It is possible that a study of English data might be useful since high income and estate taxes have ruled there for a longer time than in the U.S.

VI

The theory of choice presented in Chapter II has some important implications for the theory of welfare. The study of welfare economics has always been a study of the problem of finding criteria for the optimum allocation of resources among alternative uses and the optimum distribution of the output among individuals. The community whose allocation problems are under discussion is supposed to be faced with a
set of transformation ratios which determine the amount of one good which must be given up to get more of another. The resources of the community are given and each member of the community has a preference system which determines how much of one good he is willing to give up to get more of another. If the distribution of income is arbitrarily given the solution to the welfare problem is to so allocate resources that the transformation ratio for any two goods equals the marginal rate of substitution between the goods for every individual. If every individual has free choice as to the way in which he will spend his income the solution is achieved by setting all prices equal to marginal costs. The problem of the optimum distribution of income is more difficult but if some sort of assumption about interpersonal comparisons is made it has a solution.

But if the theory of choice developed in Chapter III is accepted what happens to the theory of welfare? If preferences are changed by the very act of consumption then the community is no longer faced with the problem of adapting its use of limited resources to the given relative cost situation on the one hand and the given preference systems on the other.

To see the implications of the impulse theory of choice presented in Chapter III we need to consider
what modifications the theory forces us to make in our theory of the choice between leisure and goods in general and secondly the modifications required in our theory of the choice between pairs of goods.

The choice between leisure and goods is directly influenced by the existing distribution of income. Thus in a society which distributes income on a productivity basis but in which everyone has nearly the same productivity the incentive to increase income by working longer or harder will be much weaker than in a society in which incomes are less equally distributed. This means that a state which wishes to distribute income equally can do so with less loss of satisfaction than would be expected from observing the strength of the incentive provided by differential incomes in a society which already has a very unequal distribution of income. For it is usually supposed that if a Socialist state wished to distribute incomes equally it could only do so at the cost of restricting freedom of choice between leisure and goods by refusing to pay a higher income for harder work. But this cost would become very small if not actually zero if sufficient time is allowed for complete adjustment to the equal income distribution. As a matter of fact it can be argued that there are clear cut gains to be had from an equal income dis-
tribution. For the average man in a society with unequal income distribution probably works harder than he would if he lived in isolation but could trade income for leisure on the same terms. Thus a society with unequal income distribution puts people in the position where they have to work hard not to get direct satisfaction from the goods their work produces but to avoid the dissatisfaction resulting from not having the goods which others do have. Even worse is the fact that no matter how hard people work or how much their income increases, this dissatisfaction is never overcome for the great majority. Our society is a sort of dog race in which no one ever catches the rabbit. The consequence of all this is that an equalization of income would cost us something in terms of physical comfort (through the reduction of dissatisfaction produced by inequality of income. In addition there would, of course, be a gain resulting from the traditional propositions about diminishing marginal utility. It may be remarked that those who have proposed that a Socialist state could have the benefits of an equal income distribution (i.e. the benefits which accrue because of diminishing marginal utility), while still providing incentives equivalent to those provided by differential incomes by giving out medals or ranks are in
error. For the dissatisfactions and frustrations generated by a success and prestige oriented society would continue with the same strength regardless of the devices used for denoting prestige as long as differential success is the criterion for prestige.

Relative preferences for different goods will also be affected by changes in the income distribution though to a lesser extent than in the case of preferences between goods and leisure. It seems probable that regardless of the distribution of income people would continue to want the highest ranked goods of any particular type. To the extent that rankings are based on objective quality considerations they would not be affected by changes in the income distribution. However, preferences for certain types of goods, e.g. automobiles and clothes, may be relatively stronger with an unequal distribution of income than with an equal one. This is the case because some goods play a particularly strong role in determining prestige and these are the goods which are more or less publicly consumed. If consumption ceased to be a criterion of social status the distribution of expenditures between different types of goods might change radically.

Moreover, in a less competitive society certain types of psychic needs might be drastically reduced.
The consumption of phantasies of success and uninhibited aggression in the form of movies and cheap magazines might be considerably reduced in a less frustrating society than ours. Similarly the sale of those cosmetics whose appeal is based on feelings of personal inferiority might be considerably reduced.

In general the theory presented in Chapter III leads to the conclusion that while a redistribution of income might cause some reduction in output of goods the psychic gains from such a redistribution would far outweigh the direct economic losses. This means that those economists who discuss the problems of pricing in a Socialist state ought, if they are not just playing games, to make use of a sounder psychological base for their conclusions than that provided by the traditional preference system analysis.

VII

As a last word it should be pointed out that the implications of the theory of consumer choice presented here extend a long way beyond the problem determining the propensity to save. The apparatus developed in Chapter III makes it possible to use a genetic approach to problems of demand in any field. Since economic life is essentially a process of
of growth and development rather than a mechanical system genetic approaches should be just as fruitful in economic life as in biology.

A fairly obvious example of the advantages of this approach is the problem of the growth of a new industry. On the usual analysis there is at each moment of time a demand schedule for the industry's product. If the industry is growing then we say that the demand schedule shifts upward. Why does it shift upward? For this question our theory of choice has no answer unless income or the prices of other goods change. On the theory of choice developed here the demand schedule at one moment is partly a function of the level of sales. If costs are reduced there is first a movement along the existing schedule. The increased sales increase the general public's frequency of contact with the good which gives it a better chance to be favorably compared with other goods. This will lead to an upward shift in demand and if there are advantages of scale in the industry there will be further cost reductions and a repetition of the whole process of growth can continue in this fashion until (a) the advantages of scale are exhausted, (b) sales have reached a level such that the impulses to buy generated by the last increments in sales are too weak to produce any further sales.
In a specific case, of course, autonomous growth factors such as technical development and increases in income will also play a part. The point is that adjustments along given demand schedules are only one of the elements involved in the growth of an industry.

The kind of choice theory developed here does not lead to elegant mathematical results but there is no advantage in such results unless actual values can be attached to the constants in the mathematical conclusions. A descriptive analysis of a process may be more valuable than formal analysis of a mathematical result if it helps us to understand the process more completely.
ADDENDUM

THE NEW NATIONAL INCOME DATA

The Department of Commerce has published a complete revision of its national income statistics for the period 1929-1946. The revision involves conceptual changes as well as changes in estimates of the data. With respect to accuracy the new data are supposed to be superior to the old. The Gross National Product is estimated from two essentially independent sets of data and the two figures check to within one or two percent in every peacetime year. The components do not have the same degree of accuracy, of course, but there is little doubt that they are superior to the old figures. Conceptual changes aside the new estimates of Personal Savings are very much smaller than the old ones for the same period. In addition the conceptual changes are such as to still further reduce the Personal Savings figure. Of these changes the principal one is the inclusion of rent and depreciation of owner occupied houses. The rent of owner occupied houses is included in Personal Income and Consumer Expenditures. This does not affect the amount of savings though it causes a very slight decrease in the savings ratio. However, depreciation on owner occupied houses is taken out
of Personal Savings which reduces that figure substantially. In fact this item accounts for most of the negative Personal Saving reported for the depression years.

There is some doubt whether depreciation of owner occupied houses ought to be treated on the same footing with cash items in the consumers budget (at least for purposes of analysis) but we do not have enough information on variation in the ratio of depreciation to income to determine this question. In what follows we shall therefore deal with Personal Saving as reported without any distinction between cash and non cash items.

What effect do these changes in data have on the test of our hypothesis?

The short run part of our hypothesis seems to hold up very well. The arguments based on budget study data are not affected by the new data so that we should expect our equation \( \frac{j}{\gamma} = a + b \) to fit the new data (with appropriate adjustments in the parameters \( a \) and \( b \)). When we take the regression of \( \frac{j}{\gamma} \) on \( \frac{\gamma}{\gamma} \) we obtain \( \frac{j}{\gamma} = 0.249 \frac{\gamma}{\gamma} - 17.6 \) \( r = .93 \). The fit is just as satisfactory as before. However, we can no longer test our relation by trying to estimate past levels of savings. We can, however, make a forward prediction. The parameters of the
equation were estimated for the period 1929-1940. Since 1940 income has risen very considerably so that our relation is given a fairly severe test if we use it to predict the current level of saving. Taking $\frac{2}{7}$ for the second quarter of 1947 our equations predict a savings ratio of 0.065. The actual ratio was 0.05. The current experience therefore does not contradict our hypothesis. Of course, there are a number of peculiarities in the current situation so that our prediction may have come right only by luck. A more satisfactory test can come only with the passage of time.

Since the Kuznets data are not comparable with the new Commerce data (Kuznets Personal Savings figures for 1929-1938 are higher than the Commerce ones so that presumably his sources give a general upwards basis to the savings estimate) we cannot say very much more about our long run hypothesis. The estimate of current savings just given provides somewhat of a test but not a very adequate one. However in spite of the lack of data something can be said about past movements in the savings ratio. The savings ratio on the Commerce concept was 4.5% in 1929. From what we know about capital formation in the past in a very general way it seems most unlikely that personal saving has ever been appreciably less than 4.5% of personal
income in the last 50 or 60 years. Moreover, the Kuznets figures are supposed to overestimate personal saving. The Kuznets estimate remains at about 10% for the whole period since 1870. Allowing for the overestimate we have to conclude (1) The Personal Savings ratio must have been between (say) 4% and 7% for the whole period since 1870, (2) If there was any trend in the ratio it must have been downward. This is consistent with our theory, but it is hardly consistent with the view that the savings ratio tends to rise with income.

Since our formula fits the data for the period 1929-1941 as well as any other, since it predicts the current rate of saving and since it is consistent with what we know of the past, there seems to be no reason to revise the theory except to make the changes in parameters indicated above.
BIBLIOGRAPHY

BOOKS

Bakke, E. W., The Unemployed Worker, New Haven, Yale University Press, 1940.


Bureau of Home Economics, Miscellaneous Publications.


Bureau of the Census, Sixteenth Census, Family Wage or Salary Income in 1939.

Bureau of the Census, Sixteenth Census, Wage or Salary Income in 1939.

Clague, Ewin, and Couper, W. J., After the Shutdown, New Haven, Institute of Human Relations, Yale University, 1934.


Dubois, Cora, *The People of Alor*, Minneapolis, University of Minnesota Press, 1944.


Smith, Adam, The Wealth of Nations


Works Progress Administration, Workers on Relief in the United States, March 1935.
ARTICLES


Centers and Cantril, "Income Satisfaction and Income Aspiration," Journal of Abnormal and Social Psychology.


Klein, Lawrence, "Forecasting National Product," delivered at the 1947 Meeting of the Econometric Society.


Marschak, J., "Income Inequality and Demand Studies," *Econometrica*, April, 1943.


