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# GENERAL FACTORS IN ECONOMIC GROWTH IN THE UNITED STATES

## PROPORTION OF CAPITAL FORMATION TO NATIONAL PRODUCT

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### I. *The Average Level*

The proportion of net capital formation (which includes net additions to construction, producers' durable equipment, inventories, and claims against foreign countries) to national income (or net national product, the two terms being interchangeable here) averages, for totals in current prices, about 13 per cent for 1869-1928. If we include the following decades of depression, war, and the few postwar years through 1948, the average drops to about 12 per cent. For totals in 1929 prices, the percentages are 14 for 1869-1928 and 12 for 1869-1948.

What factors explain this secular level of the rate of national saving? Why has it averaged 12 to 14 rather than 25 or 5 per cent? In attempting to answer this question, let me first set aside the periods when the war emergency and its immediate aftermath dominated the economy and impressed upon it a pattern of expenditures and capital formation dictated largely by noneconomic factors.

In groping for an answer to the question for the economy in peacetime, my first attempt was to link it with the technologically determined ratio of capital to output and with the rate of growth in the latter. Assume that for product A, the technologically necessary ratio of reproducible capital to annual net output (the latter as measured in national income calculations; i.e., net income originating) is, say, 4 to 1. Assume further that the rate of growth in net output represented by product A is 3 per cent per year. If the ratio of capital to net output is constant, a 3 per cent rate of growth in the latter would require that 12 per cent of net output be set aside annually for the necessary increase in the capital stock. Extension of this illustration to the economy as a whole yields an equation that relates the share of capital formation in national product to the nation-wide ratio of reproducible capital to annual product and to the rate of growth in the latter. And indeed the statistical series provide a rough check. For 1869-1938, the average rate of growth in net national product in 1929 prices was about 3.6

per cent per year; the ratio of reproducible wealth to national income, also in 1929 prices, ranged from 3 to almost 4 to 1. If we set the latter at about 3.5 to 1 and multiply it by 3.6, the annual rate of growth, we get an average proportion of net capital formation to national product (in 1929 prices) of 12.6 per cent—somewhat short of the true average of 14 per cent because the calculation does not allow for the effects of the increase that occurred in the nation-wide ratio of capital to net output.

But this linking of the three variables would explain the secular proportion of capital formation to national product only if the latter were treated as the dependent and the capital-output ratio and the rate of growth in output as independent variables. It is difficult to do so. The rate of growth in national output can perhaps qualify partly as an independent variable; of the 3.6 per cent of growth per year, almost half is associated with growth in population and can be treated as partly independent of the rate of capital formation in the economy. Yet growth of national product per capita, even if viewed only as a factor in the expectations of entrepreneurs making decisions concerning capital formation, is surely not independent of the rate of capital accumulation. The growth in capital and maintenance of some ratio of capital per worker are important factors in raising output per worker, and thus per capita. Hence, if we try to explain a 14 per cent rate of real national savings by say a 1.8 per cent annual rate of increase in national product per capita, we shall only be running around in circles. The case for treating the capital-output ratio as independent of and determining the proportion of capital formation to national product is still weaker. Even for a single product, the ratio of capital stock to output is not rigidly determined by purely technological necessities. The variety of devices available for economizing capital, affecting its ratio to output, and the variety of methods, with differing capital intensity, for producing the same good, strongly suggest that even for a single product, the choice among technological possibilities involving different ratios of capital stock to annual output is influenced by availability and cost of capital funds. For the economy as a whole, in which there is a complex composite of production processes with widely different capital-output ratios, there surely is no technologically inviolable level of the ratio that is independent of the capacity of the economy to generate savings and that, in some sense, determines the national rate of saving. Indeed, one can argue, at least as a working hypothesis, that the opposite relation holds: that the rate of savings determines possible capital investment and in the long run the capital-output ratio. This hypothesis is confirmed by the impression that a large stock of potential technological change and of corresponding

capital investment has always been at hand, certainly during the last century; and that one of the limiting factors was the amount of savings which the economy was prepared to generate. Surely, there was nothing in the technological realm that could have prevented, with different conditions in the supply of savings, a ratio of reproducible capital to annual output of 5 to 1 or, for that matter, of 2 to 1.

There may have been factors on the capital-use rather than the savings side that could have kept down the past rate of capital formation. Scarcity of entrepreneurial ability may have limited the volume of capital-demanding innovations, the terms being used here in the sense in which Schumpeter's theory emphasizes them; and if so, the proportion of capital formation to national product may have been kept down by limitations on the investment rather than on the savings side. One could also argue that such scarcity of entrepreneurial ability was due, in part, to increasing difficulty of carrying innovations to the phase of mass production, requiring large capital investments, because of the widening sphere of monopolistic restrictions and of the very increase in scale of operation in many sectors of the economy. But tangible evidence to support such a conclusion is hard to come by; and the emergence and rapid growth of new industries throughout the period hardly suggest a record in which limitations of entrepreneurial drive were a long-term factor. Without denying the possibility that some factors on the capital-using side may have contributed, I am inclined to place more emphasis on the savings side—in the belief that whatever forces have limited the long-term level of the capital formation proportions, they are more likely to be found in the patterns of savings than in the drives and opportunities for capital investment.

Savings for capital investment are generated by persons, either as ultimate consumers or as entrepreneurs; by corporations, in the form of undistributed profits; and by governments when they use current revenues to pay for additions to their capital goods. The major source of savings was individuals, although we should note that for periods free from the huge government deficits associated with war and the depression of the thirties savings by individuals accounted for only about seven-tenths of total savings, two-tenths being accounted for by corporate savings, and one-tenth by government savings.<sup>1</sup> If we make rough allowances for exclusion of corporate and government savings from national product and for the difference between total income received by individuals and disposable income (i.e., direct taxes), the secular level of the savings rate for individuals approximates 10 per

<sup>1</sup> These percentages are based upon Raymond W. Goldsmith's annual estimates of savings since 1897, resulting from the detailed study which he is completing under the auspices of the Life Insurance Association of America. I am greatly indebted to Dr. Goldsmith for permission to use them.

cent; and it is this rate that we must explain.<sup>2</sup>

Clearly, any explanation is partly conjecture; but even that is important if it focuses attention on factors in capital formation that have been neglected in recent discussion. The conjecture relates to factors that set a level of "rational saving" for those groups of individuals who, since they are not at the top of the income pyramid, have to balance savings against current expenditures; and to the factors that limit the contribution to national savings of those who, because they are at the very top, are "automatic" savers. For obvious reasons, I would hesitate to draw a hard and fast line between the two groups.

In the case of the hypothetical rational saver, we have to consider that: savings materialize only through part of working life, allowance being necessary for years of unemployment, early years of training, and some years of semiretirement; the major purpose of saving is to provide security at the end of the working life, with allowance for the motive of transmitting some capital to children; the desire to save is under continuous pressure from the expenditure side, part of expenditures—in some periods substantial—being in the nature of investment (e.g., education of children, self-education, maintenance of standards conducive to assurance of income status or increase, etc.).

In order to convey orders of magnitude, let us set the savings period at twenty-five out of a total working life of forty years; assume that in the remaining fifteen years occasional savings are offset by dissavings so that the balance is zero; and further assume that a cumulated savings total sufficient to assure about 50 per cent of the level of expenditures during the savings period of twenty-five years is the goal. We can then derive savings-income ratios required under conditions of cumulation and yield associated with different interest rates. If, for simplicity, we assume that the annual income is constant during the savings lifetime of twenty-five years, at a 6 per cent rate of interest (used for both the cumulation of savings and the expected yield) the average savings for the twenty-five year period should be roughly 13 per cent of income to yield a perpetual annuity equal to half of the unit's annual consumption during its active, saving lifetime. A savings rate of 13 per cent for twenty-five years would mean a rate of only about 8 per cent for the full forty-year period if we assume a constant

<sup>2</sup>There is little difficulty in accounting for the limited capacity of corporations and governments to generate savings that would constitute a substantial proportion of national income. In an economy in which corporations are under pressure by stockholders for distribution of income, and may depend upon the latter for their access to capital markets, and in which accumulation of earned surpluses may become a basis for special taxation or pressure for wage raises, etc., large undistributed profits are unlikely—even if earning conditions permit. The capacity of government, in a truly democratic society, to use taxes and current revenue to finance capital formation is also obviously limited—however large such capacity may seem in authoritarian states, or can be even in our country in some phases of an emergency period.

average income over the full forty-year period; it would, however, be somewhat higher if we are more realistic and allow for a lower average income for the fifteen nonsaving years. At a 3 per cent rate of return under the same assumptions, the savings-income rate for the twenty-five year savings period would be somewhat over 30 per cent and for the full forty-year period of working life of about 18-20 per cent.

The reasoning is familiar, following lines pursued in the discussions of the interest rate by Cassel and Irving Fisher. The figures can of course be modified in a variety of ways. For example, we could assume that the goal involves a cumulated savings total that would permit consumption expenditures upon retirement of more than half of those made during the positive savings lifetime, but with the proviso that part of the accumulated savings total would be consumed prior to death. In this case the savings rate during the savings lifetime would be higher; but it would be offset over the total lifetime of the individual (as an independent economic unit; i.e., beginning with his separation from the economic unit represented by his parents) by dissavings after retirement. The point of these illustrative figures is that if we agree on the nature of the basic assumptions, viz., that the rational purpose of savings is security after retirement and that the positive savings lifetime is appreciably shorter than the total working lifetime, the average savings-income rate for the total working lifetime is fairly moderate—within a range of 10 to 20 per cent, these being closer to maximum than to minimum security goals. Over the total lifetime of an individual as an independent unit, the savings-income rate would be even lower; it would be reduced by absence of savings in the retirement years or by dissavings (if the latter are permitted by assumption).

Another way of lending plausibility to these limits set by a hypothetically calculated rational need for savings by nonautomatic savers is to glance briefly at the recent observations of the savings process made under the auspices of the Federal Reserve Board by the Survey Research Center at the University of Michigan. For the five years 1946-50, the ratio of net savings (a balance of savings and dissavings) to total income shown by the sample data varied from 12 to 5 per cent, averaging about 8 per cent (arithmetic mean of annual percentages). On the average, somewhat over 70 per cent of total income yielded positive savings and the savings-income rate for the positive savers averaged as high as 21 per cent. An average of about 27 per cent of all income yielded negative savings and the dissavings-income rate averaged about 25 per cent. The point of these figures is that the average net savings rate of about 8 per cent was only four-tenths of the average savings rate of 21 per cent for positive savers; that a substantial proportion of income and units that yield dissavings is a

secular characteristic of the income distribution and of the savings process; and that while the proportions of dissavings cited for 1946-50 may have been particularly high, they might have been quite substantial also over the long period since 1869. It follows that an average rate of 10 per cent of net savings to income may have meant a 20 per cent savings rate for the positive savers through their savings lifetime—a figure that is near the upper range of the illustrative example.

Little of the above discussion applies to people at the top of the income pyramid, who need not plan for retirement and who, despite high levels of consumption expenditures, can, and automatically do, save large proportions of their current income. The savings of this group obviously raised the past level of the country-wide rate of savings by individuals and rational savers did not in fact attain the 10 per cent rate. The pertinent question here is: What limited the contribution of this top group of automatic savers and the level of the national rate of savings? More precisely, what limited the income share of this top group, for it is the limitation of its income share that sets limits on its contribution to total savings by individuals?

The answer seems to me to lie largely in the dynamic character of the economy. Rapid growth in total income and shifts in its structure make it difficult for any individual and his successors to retain, let alone raise, a high relative position (i.e., a large share) in the distribution-of-wealth pyramid. The large incomes with which we are concerned here can arise only out of large holdings of property; the size and number of large incomes received in return for services are necessarily quite limited. Yet large holdings of property, even if we disregard the inheritance tax (which was not effective in this country until after World War I), can grow in relative importance only if an individual and his successors manage somehow to associate themselves with a succession of rising industries. But today's captains of industry are not the sons of yesterday's captains of industry, or the fathers of tomorrow's. The families in this country who made their money in real estate and furs are not the ones who made it in coal, iron, and railroads; and the latter are not the ones who made their money in oil, automobiles, and chemicals. This change in the identity of entrepreneurs connected with the successively emerging and growing industries and, by the same token, sources of large wealth—a characteristic not uncommon in the historical process of innovation and change in general—means that wealth does not cumulate in the same hands; and in a dynamic economy, wealth that does not grow rapidly enough, recedes in relative importance. It is this discontinuity in the accumulation of wealth, even though we need not accept the extreme popular statement of the thesis (from shirtsleeves to shirtsleeves in three generations),

that limits the inequality in distribution of wealth, the inequality in distribution of income, and the extent to which the high savings rate of the top income group can raise the nation-wide rate of savings by individuals.

The analysis here obviously does not go far enough, since it only outlines the main forces that limit the savings rate of individuals below the top income group and that limit the inequality in income distribution; i.e., the income and savings shares of the top group. Indeed, complete understanding of the savings process cannot be attained without examination of expenditures and attention to the pressures exerted on the income recipient to spend rather than save. There is no place here for such analysis. We probably have already spent too much effort upon what may be a rather obvious fact; viz., that the savings rate of individuals is limited to about 10 per cent. But the obvious is not necessarily the most easily explained; and I have attempted to answer the question because my initial impression was that the savings proportion was low. Since the rate of growth of income per capita in this country was about 20 per cent per decade (in constant prices) and the absolute level of per capita income was quite high compared with that in other countries (including the most advanced), I was puzzled by the failure of the economy to attain a much higher rate of saving. After all, our predecessors were not exactly starving, and the population of, say, 1910 could have lived on the per capita expenditures of the population of 1890. If they had, the savings rate about 1910 would have been 40 per cent (derived by comparing consumer expenditures per capita in 1884-93 with national income per capita in 1904-13, both figures in 1929 prices). It is against this background of a rapidly growing economy, with decisions on expenditures and savings largely in the hands of individuals, that it seemed necessary at least to suggest the limits that were imposed on the savings rate, on the one hand, by calculating the need for savings over the lifetime of an individual and, on the other, by stating the limitation on inequality in distribution of income which kept down the contribution of the automatic savers.

## II. *Secular Trend in the Proportion of Capital Formation*

To establish the secular trend in the share of capital formation in national product is not easy. The period covered by our estimates, long as it is, is affected in the early decades by reconstruction after the Civil War and in the recent decades by the unusually severe depression of the thirties, a major war, and its immediate aftermath. To add to the troubles, construction accounts for a major part of capital formation; and residential and related construction—a dominant part of



the construction component—is subject to long swings averaging eighteen years in duration—which complicate the task of ascertaining the underlying secular movements. We must, therefore, pick our way with care and can state our conclusions only tentatively.

Table 1 presents averages of percentage shares of capital formation in national product, calculated as arithmetic means of shares for the overlapping decades. In Panel I, we deal with the sixty years from 1869 to 1928 and with two groups of decades, covering thirty years each. In Panel II, we extend the period through 1938 and subdivide the decades into three groups, one decade being repeated from group to group. In Panel III, we extend the period further through 1948, using estimates that include durable war goods (military construction and munitions) and that involve a high depreciation rate on this war component.

TABLE 1  
PERCENTAGE SHARES OF CAPITAL FORMATION IN NATIONAL PRODUCT, GROSS AND NET,  
AVERAGES FOR GROUPS OF OVERLAPPING DECADES\*

PERIOD COVERED BY OVERLAPPING DECADES	GROSS CAPITAL FORMATION IN GROSS NATIONAL PRODUCT		NET CAPITAL FORMATION IN NET NATIONAL PRODUCT		CAPITAL CONSUMPTION, 1929 PRICES, IN GROSS GROSS CAPITAL NATIONAL FORMATION PRODUCT	
	CURRENT	1929 PRICES	CURRENT	1929 PRICES	(5)	(6)
	(1)	(2)	(3)	(4)		
I 1869-1928						
1869-1898	20.0	22.8	13.5	15.2	39.2	9.0
1899-1928	20.7	21.4	12.2	12.2	48.9	10.5
II 1869-1938						
1869-1898	20.0	22.8	13.5	15.2	39.2	9.0
1899-1918	19.4	22.6	13.1	14.1	43.5	9.8
1909-1938	18.0	18.9	9.2	8.5	62.4	11.3
III 1869-1948						
1869-1898	20.0	22.8	13.5	15.2	39.2	9.0
1894-1923	20.8	22.0	12.9	13.3	46.1	10.1
1919-1948	21.1	18.3	9.4	6.8	68.5	12.2

\* Based on estimates in *National Product Since 1869* (N.B.E.R., 1946), brought up to date and with minor revisions in the estimates of net change in foreign claims.

The general conclusions may be summarized as follows:

1. The share of gross capital formation in gross national product does not exhibit any marked trend over the period. For totals in 1929 prices, it does decline somewhat, but the declines shown are not always revealed in the share for the totals in current prices; and the changes in general are too slight to be significant, considering the crudity of the estimates.

2. There is a perceptible decline in the share of net capital formation in net national product. This decline is quite prominent for totals in

constant prices, the average dropping from 15 per cent in 1869-98 to 12 in 1899-1928, and even more as the period is extended. For totals in current prices, the share also declines—even in the comparison that ends in 1928, before the 1930 depression and the war and its aftermath.

3. The preceding conclusions are confirmed by the percentage shares for single decades. That for gross capital formation in national product rises slightly from the beginning of the period to the end of the nineteenth century and then declines—but the movements are so slight that they are virtually eliminated when averaged for Table 1. The movements are much more prominent in the share of net capital formation in national product. Thus for totals in 1929 prices, it rises from 14.0 per cent in the first decade (1869-78) to 16.3 in 1889-98 and then drops to 10.6 per cent in 1919-28; for totals in current prices, the share for the same decades is 12.4, 14.1, and 11.4 per cent respectively. We thus get the impression of a perceptible rise from 1869 to 1878 to the end of the century and a marked drop thereafter. It should be noted here too that the decline in the share of net capital formation in net national product—from a quarter to a third of the end of the nineteenth century rate—is manifest in 1919-28, *before* the impact of the 1930 depression.

4. The divergent trends in the shares of gross and of net capital formation in national product obviously mean a rising trend in the ratio of capital consumption to national product and to gross capital formation. The proportion of capital consumption to gross national product, for totals in 1929 prices, increases from about 9 per cent at the beginning of the period to well over 10 in the first three decades of the present century and to over 11 for 1909-38. Likewise, the proportion of capital consumption to gross capital formation which was about four-tenths in the nineteenth century increased to almost one-half in 1899-1928 and to over six-tenths in 1909-38.

Two implications of these conclusions deserve note. First, an increasing share of capital consumption in gross national product (and hence also in net) in and of itself might make a decreasing rate of net capital formation technologically feasible. Our estimates of capital consumption are essentially measures of capital replacement in constant prices, but they do not allow for the increasing productive efficiency per constant dollar unit. The \$100 spent in 1920 on a replacement for a tool, even though adjusted for changes in general purchasing power, will buy a more efficient tool than could be bought with the same money a decade or two earlier. Output can therefore increase with relatively less net capital formation if the capital consumption that is replaced each year forms an increasing proportion of gross and net

national product. Hence, from the standpoint of technological needs, an increasing proportion of capital consumption to national product is consistent with a declining trend in the ratio of net capital formation to national product. However, technological necessities are subordinate to constraints imposed by social and economic patterns; and the major explanation of any trend in the ratio of net capital formation to national product must lie in the expenditure and savings patterns of individuals.

The second implication bears upon the possible causes of this rise in the proportion of capital consumption to national product; if calculated as a proportion to net national product the rise would be even more striking. Such an increase can be due to one or both of the following factors: the ratio of the stock of durable depreciable capital to national product may have increased; the average life of durable depreciable capital may have decreased, resulting in a higher annual depreciation or consumption rate. The latter may in turn be due either to a shorter life for one and the same type of durable capital or to a shift in the composition of the total stock toward shorter-lived components. Brief examination of the evidence, of which only a summary is given in Table 2 (of interest in many other respects), indicates that all these factors were involved.

Table 2 shows, for totals in 1929 prices, average shares of various components of capital formation in national product. The components distinguished are construction, producers' durable equipment, and the total of net changes in inventories and in claims against foreign

TABLE 2  
PERCENTAGE SHARES OF CAPITAL FORMATION, BY THREE MAJOR CATEGORIES, IN NATIONAL PRODUCT, GROSS AND NET, AVERAGES FOR GROUPS OF OVERLAPPING DECADES\*

CATEGORIES	PERIODS COVERED BY OVERLAPPING DECADES				
	1869-98 (1)	1899-1928 (2)	1869-98 (3)	1889-1918 (4)	1909-38 (5)
<i>Gross, 1929 Prices</i> (in Gross National Product)					
Construction	15.1	12.0	15.1	14.4	9.0
Producers' durable	5.1	6.7	5.1	6.1	6.7
Inventories and foreign claims	2.6	2.7	2.6	2.1	2.3
Total	22.8	21.4	22.8	22.6	18.9
<i>Net, 1929 Prices</i> (in Net National Product)					
Construction	10.2	6.6	10.2	9.4	4.1
Producers' durable	2.2	2.6	2.2	2.3	1.8
Inventories and foreign claims	2.8	3.0	2.8	2.4	2.6
Total	15.2	12.2	15.2	14.1	8.5
Average % change for decade, population	11.7	8.5	11.7	9.6	6.6

\* For sources see note to Table 1.

countries. The latter combination was used to reduce detail and to obviate difficulties with negative entries which occur for each separately, particularly in estimates for single decades.

The first conclusion drawn from Table 2 is that the secular decline observed in the share of capital formation in national product is accounted for almost exclusively by construction. In both gross and net totals, the decline in the proportion of construction to national product is the most prominent. The shares of producers' durable equipment and of the combined net additions to inventories and to foreign claims tend to rise when the 1930 decade is omitted.

This immediately suggests that the rise in the share of capital formation, particularly net, to a peak in the mid-1890's and the marked decline since that time, even by 1919-28, are also due largely to construction. The movement of the shares for single decades fully confirms this expectation. To take the proportions that show the more marked swing, those of net capital formation to national product in 1929 prices: the total share rises from 14.0 per cent in 1869-78 to 16.3 in 1889-98, and declines to 10.6 per cent in 1919-28; the share of net construction rises from 8.1 to 12.9 per cent and declines to 5.0; the share of producers' durable equipment for the same three decades is 2.1, 1.6, and 2.3 per cent; and that of the combined net additions to inventories and foreign claims is 3.8, 1.7, and 3.3 per cent. In short, it is the swings and trends in relative importance of construction that determine the swings and trends in the share of capital formation in national product. The rise to the mid-1890's in the former significantly parallels the upward phase of the residential construction cycle whose trough was in the 1874-83 decade.<sup>3</sup>

The evidence in Table 2 supported by the estimates for single

<sup>3</sup> The residential construction cycle reached a peak in the late 1880's or early 1890's, a trough to the end of the century, and another pre-World War I peak toward the end of the first decade of the twentieth century. See Clarence D. Long, *Building Cycles and the Theory of Investment* (Princeton, 1940), Table 10, p. 135. Our estimates for the share of net or gross construction indicated a peak in the early 1890's and another in the 1904-13 decade—in clear agreement with the established dates of the cycles in residential construction.

Corroboration of our main results is provided by the census of wealth data (see *National Product since 1869*, N.B.E.R., 1946, Table IV, a, p. 194). The net change in the improvements and equipment total, as reported in the census and reduced to 1929 prices, amounted to 56.3 or 56.2 billion dollars (depending upon the price adjustment base used), or 12.7 per cent of total net national product for 1880-1900. Net change in the improvements and equipment total for 1900-22 amounted to 69.6 or 80.5 billion dollars, or 6.5 or 7.5 per cent of net national income for that period. The decline in the ratio of net capital formation to national income between 1880 and 1900 and 1900 and 1922 is thus clearly indicated also by the wealth estimates.

However, the wealth totals suggest a decline in the shares in national income of both construction and producers' durable equipment. The decline in the latter may be largely due to the exclusion from wealth figures of military equipment in the hands of government. The main shortage of net change in wealth figures on equipment compared with the flow estimates is during the war decade, 1912-22.

decades suggests why the ratio of capital consumption to national product increased. A high and rising share of capital formation in national product from the 1870's to the mid- or early 1890's meant an increasing ratio of durable depreciable capital to national product, gross and net. When the proportion of capital formation in net national product began to decline and the ratio of durable depreciable capital to national product was stabilized or also declined, the increased importance of producers' durable equipment in the total stock of durable and depreciable capital began to operate. The fact that producers' durable equipment continued to account for a stable or rising proportion of national product whereas that of construction declined meant that producers' equipment with its average life of thirteen years (assigned in our estimates) began to loom larger compared with the stock of construction with its average life of fifty years. Unfortunately, both life spans were, for lack of information, kept constant throughout the period; and the estimates do not allow for the effects of a possibly shortened life for either construction or equipment.

For the reasons just indicated, the proportion of capital consumption to gross national product (both in 1929 prices) rises from a trough of 8.2 per cent in 1879-88 to 11.2 per cent in 1919-28. Subsequently, the very retardation in the growth of gross national product, associated with the thirties' depression, raises the percentage to about 12 in 1929-38; and the further reduction of the average life span of durable capital associated with the high depreciation rate for war goods raises it further to over 15 in 1939-48.

One might argue that the observed trend in the proportion of net capital formation to national income is, according to Table 2, largely explained by the decline in the share of construction in national product. The latter in turn is associated partly with retardation in the growth of population and its effects on residential construction and partly with the slowing down of the construction program of public utilities, which contributed heavily to the level of capital formation in the last quarter of the nineteenth century. This indeed is the approach that Professor Hansen stressed so much in his writings, without emphasizing, however, that the decline in the ratio of net capital formation to national income began early in the twentieth century and was already marked by 1919-28. But this explanation seems to me to neglect the basic factors involved, because of my impression that the long-term supply of savings, not the long-term demand for capital investment, was of dominating importance. In this connection it is of especial interest to note that during the nineteenth century, at least, rises in the share of construction in national product tended to be accompanied by declines in the shares of producers' durable equipment and other

capital formation components. Thus when the share of net construction, in 1929 prices, rose from 7.9 per cent in 1874-83 to 12.9 in 1889-98, the share of producers' durable equipment declined from 2.7 to 1.6 per cent and that of net additions to inventories and foreign claims from 4.5 to 1.7 per cent. This inverse pattern of changes in shares of capital formation components strongly suggests some limit to the share of total capital formation. And in line with our earlier discussion, we may well ask why, when the share of some construction components in national product declined, the slack was not taken up by corresponding increases in the shares of other components of capital formation. The answer again seems to lie in the conditions that governed the supply of savings, largely by individuals. We must now consider the implications of the long-term changes in the proportion of capital formation to national product for savings-income ratios of individuals.

### III. *Implications for Trends in the Savings-Income Ratio for Individuals*

Here we are concerned with the totals in current prices, for periods when war did not affect the disposition of individuals' income between consumer expenditures and savings. The movements of major interest are, therefore, the rise in the share of net capital formation from 12.4 per cent of national income in 1869-78 to 14.6 per cent in 1894-1903, and the decline to 11.4 per cent in 1919-28. That the decline was sharply accelerated in the decades affected by the 1930 depression needs no explanation; nor is it surprising that there was a recovery during decades affected by the war.

In interpreting these figures in terms of savings by individuals, we should emphasize the point already noted: that except during wars and other periods of substantial government deficits, individuals' savings account for only part of capital formation. This is important because one should immediately ask whether the rise in the share of net capital formation to the end of the nineteenth century can be interpreted as a rise in the savings-income ratio for individuals.

My answer would tend to be in the negative, although unfortunately I have no data with which to make an adequate check. The share of corporations in total economic activity must have increased substantially between 1869 and 1900—both because of their expansion in such sectors as mining, manufacturing, and trade, and because of the growth in relative importance of public utilities organized in corporations from the start. It was also a period of rapid urbanization and of a rising share of local and federal governments—the sectors most likely to accumulate capital partly out of taxes. All this should have meant a rapid rise in the share of total capital formation financed either out

of undistributed profits of corporations or out of current revenues by governments. A reasonable allowance for such a trend would wipe out completely any rise in the savings-income ratio for individuals that might be suggested by the rise in the ratio of net capital formation to national income. Thus if in 1894-1903 the proportion of net capital formation financed out of corporate savings or government revenues was about one-quarter, the net savings-income ratio for individuals in that decade was  $14.6 \times 0.75$ , or 10.95, divided by income received by individuals ( $100 - 3.65$ ), or 11.4 per cent. If we assume that in 1869-78 only one-tenth of net capital formation was financed out of corporate savings and government revenue, the savings rate for individuals becomes  $12.4 \times 0.9$  divided by  $100 - 1.24$ , or 11.3 per cent. Obviously, we cannot infer any rise in the savings-income ratio for individuals between 1869-78 and 1894-1903; if there was a rise, it would have been too small to be recorded by our estimates, and for all we know, there might have even been a small decline.<sup>4</sup>

By contrast, the proportion of net capital formation to national product clearly suggests that after the 1890's the savings-income ratio for individuals must have been lower, at least for periods free from war. In 1904-13, the proportion of net capital formation to national product was down to 11.6 per cent, and it was no greater than that during the twenties. It is difficult to characterize this change as a continuous trend. During World War I and even more during World War II, the proportion increased, and, much more important, the individuals' savings rate shot up and compensated for government deficits (i.e., was used in large part to finance war expenditures and capital formation associated therewith). But we can state that: (a) the proportion of net capital formation to national income was lower in the twentieth century

<sup>4</sup>One might add that the shift in the proportions away from unincorporated business and toward corporations is much more than merely a formal change in statistical categories. If the decline in the share of unincorporated business is due to a greater growth of sectors which, by their nature, are not and cannot be organized as individual proprietorships (e.g., government or public utilities), there is no actual transfer of assets or income from individual entrepreneurs to nonindividual entities; and the increased share of the latter in financing capital formation does mean a genuine decrease in shares of capital formation financed by individuals and hence bears upon the savings-income ratios for the latter. Likewise, if an individual proprietor sells his assets to a corporation which pays for it out of undistributed profits (rather than out of savings by other individuals), there is a displacement of individuals' by corporate savings; and if the individuals' assets are purchased by the corporation using savings of other individuals, there is nevertheless a shift which spells for the future a genuine change in the area over which savings decisions by individuals as ultimate consumers can hold sway. Only in cases where an individual proprietor incorporates himself and continues to run his business for all intents and purposes as before, does the shift mean merely a change in form. But considering the limited number of business corporations in the United States relative to the huge number of individual proprietors even today—let alone in earlier days—this form and source of the shift, and to that extent of the trend, seem to me proportionately quite small.

than in the last three decades of the nineteenth; (*b*) for nonwar periods, the share of net capital formation financed out of corporate savings and government revenues must have been higher during the twentieth than during the nineteenth century; (*c*) it follows that the savings-income ratio for individuals must have been significantly lower during the nonwar periods of the twentieth century than in the last quarter of the nineteenth century. If the savings rate for individuals in the last quarter of the nineteenth century was 11 to 12 per cent, during the twentieth century it probably was less than 9 per cent ( $12 \times 0.7$  divided by  $100 - 3.6$ ). The difference and the decline might well have been greater.

Before suggesting explanations for this decline in the savings rate by individuals, let me note that a calculation for individuals' gross savings (i.e., before allowance for depreciation) would yield similar results. The proportion of capital consumption accounted for by depreciation chargeable to corporations and government is much greater than the share of the latter in financing net capital formation; and the sheer increase of the proportion of capital consumption to gross capital formation would mean an increase of the share in the latter financed by corporations and government. Hence, even though the proportion of gross capital formation to gross national product was relatively constant through the period, the share of gross savings accounted for by individuals must still have declined substantially—partly because the share of capital consumption in gross capital formation increased and partly because of the growth of corporations and government. Hence, here too, one would infer a decline between the last quarter of the nineteenth century and the nonwar periods of the twentieth century, in the ratio of gross savings to income of individuals.

A downward trend should have been expected as a result of the shifts in the composition of the population. The movement from the countryside to the cities and within the urban population to the larger centers should have, other conditions being equal, lowered the savings rate of individuals, since at the same level of monetary income per capita, the savings rate is lower in the small city than on the farm, and even lower in the metropolis. Likewise, the shift within the economically active population from individual entrepreneur to employee status should have reduced the savings-income rate—since savings incentives are much stronger for individual entrepreneurs than for employees who can invest in the future through expenditures on education and the like. Unless one argues that within each group the savings-income ratio tended to increase as per capita income rose over time, a hypothesis difficult to defend, the shift in the composition of the income earning



and saving population should have depressed the over-all savings-income rate.<sup>5</sup>

Indeed, what is to be explained is not so much that the savings-income rate for individuals in the twentieth century was lower than in the last quarter of the nineteenth, but that it failed to decline during the last three decades of the nineteenth century. What were the factors that permitted the economy to generate an increasing rate of savings for individuals from 1869-78 to the end of the century, making possible not only the maintenance but even a rise in the proportion of net capital formation to national income? Was increased inequality in distribution of income a possible reason for an increased savings-income rate for individuals? The share of property income in total income, so far as one can judge from the exceedingly crude estimates available, failed to rise from 1869-78 to the end of the century. (See *National Income, A Summary of Findings*, N.B.E.R., 1946, Table 15, page 50.) On that basis alone, there is no evidence.

However there are several items that suggest that inequality in distribution of income may well have increased during the last three decades of the nineteenth century. First, the proportion of the unemployed to the total labor force was quite high in the last decade of the century, declined thereafter, and did not reach similar levels until the thirties. If we extrapolate recent estimates of unemployment by those of Paul Douglas in his *Real Wages in the United States* (Houghton Mifflin, 1930, Tables 163 and 177), the results suggest that the unemployed were over 12 per cent of the total labor force in 1889-98 and about 10 per cent in 1894-1903, whereas they were about 5 per cent in the first decade of this century and about 8 per cent in 1919-28. Sub-

<sup>5</sup> In his stimulating analysis in *Income, Savings and the Theory of Consumer Behavior* (Harvard University Press, 1949), James Duesenberry deals with the factor of urbanization and estimates the effect of the shift from farms to cities, concluding that over a period of fifty years it "cannot have accounted for more than a 1 per cent change in saving" (p. 62). However, Mr. Duesenberry does not take account of the effects of shifts within the urban population from smaller to larger cities; nor of the changing distribution of family units by size, toward the smaller family; nor of the shift from entrepreneurial to employee status. All these shifts tended to lower the savings rate for individuals (see in this connection Table 12 in "Shares of Upper Income Groups in Income and Savings," Occasional Paper 35, N.B.E.R., 1950, p. 31). Nor is Duesenberry's analysis of the impact of new products acceptable, limited as it is to a consideration of the share of consumer durable commodities.

The contrast between the cross-section association of income-differences with proportions spent or saved and the association between secular movements in income levels and proportions devoted to expenditures or savings has been, quite unwarrantedly, treated as a puzzle. For that reason, efforts have been expended on formalistic models that would explain away the puzzle rather than on empirically grounded analysis of the factors that governed the secular movements in income, consumption, and savings. The general answer to the question as to why savings-income ratios failed to rise with the secular rise in real income per capita is quite simple: because the whole pattern of economic and social life changed. The important task is to distinguish the major components of this change and to measure their relative weight, in their impact on the consumption-savings patterns.

stantial unemployment means substantial inequality in the distribution of income.

Second, inequality between farm and urban incomes must have increased because of the greater decline of agricultural prices in the downswing from the 1870's to the 1890's. Robert F. Martin's estimates show that the share of agriculture in aggregate payments dropped from 20.5 in 1869-79 to 16.7 per cent in 1899-1908. Over the same period, the percentages of farm population in the total declined from 73.0 (average for 1870 and 1880) to 62.6 (average for 1890 and 1900). The ratio of the income share to the population share dropped from 0.281 to 0.267, indicating a worsening of the position of farm population relative to nonfarm. True, the estimates refer to income from agriculture, not total income of farm population; but it is unlikely that the supplementary incomes of farmers grew more than proportionately to their incomes from agriculture. Furthermore, whereas the proportion of farm population continues to decline after 1900, the share of agriculture in aggregate payments does not, declining substantially only in 1919-28. The relative lowering of the per capita income of the farm population suggests increased inequality in distribution of income since per capita income of farm population is, on the average, appreciably lower than that of nonfarm population.

Third, the corporation and particularly the trust and combination movement, most vigorous in the period from 1870 to 1900, resulted in substantial capital gains to the people who were already at or near the top of the income pyramid. These capital gains are not included in income and do not directly modify inequality in the size distribution. But after the capital gains took the form of say a block of securities, the gainer was entitled to draw an appreciably larger share of property income than previously. Although the share of property income in aggregate income receipts may have remained constant, the distribution of property holdings, and hence of property income, may well have become more unequal.

None of these items of evidence is, in and of itself, conclusive. But, in combination, they lend credibility to the hypothesis that the distribution of income by size became more unequal between the 1870's and the last decade of the nineteenth century. The cessation of all these processes—the reversal of the longer term price trends, the reduction in relative unemployment, and the material deceleration of the trust and combination movement—meant that in the twentieth century increasing inequality in the distribution of income by size no longer operated to offset the depressive effects on the savings-income ratio for individuals of the shifts in the social and economic structure of the population.

We must also consider the rapid growth of real income per capita. While, in general, consumption levels adjust themselves to rising incomes, an unusually rapid rate of growth in the latter might result in a lag in this secular adjustment and a higher rate of savings—temporarily until the adjustment in consumption is completed. Per capita income, in 1929 prices, increased from \$216 in 1869-78 to \$406 in 1894-1903, almost doubling in twenty-five years; the rise to \$612 in 1919-28, the next twenty-five year period, unaffected by the depression of the thirties, was only about 50 per cent. If we discard the 1869-78 level as possibly underestimated because of shortages in the 1870 censuses, the rise from \$326 per capita in 1879-88 to \$462 in 1899-1908, or about four-tenths in twenty years, is still significantly larger than the subsequent rise to \$612 in 1919-28, or about three-tenths in the next twenty years. Unfortunately, we do not know enough about the rate at which consumption adjusts itself to income increases to be able to ascribe much significance to the association suggested. The per capita figures do, however, demonstrate that the inequality in distribution of income by size increased, if it did, concurrently with a substantial rise in per capita income (and not with a decline, as is the case in cyclical depressions); and under these conditions such increased inequality would tend to raise the savings rate or prevent its being depressed by other secular shifts.

#### IV. *Summary*

The conclusions of the discussion above should be viewed as fortified suggestions rather than fully tested inferences—largely because the questions raised and particularly the answers advanced ramify into wide realms of the economic and social system of the country in its growth since the 1870's. There is much still to be studied in this wide area; and the current inquiry at the National Bureau on trends and prospects in capital formation and financing in this country, initiated in mid-1950 at the behest of the Life Insurance Association of America, involves, in addition to other tasks, a closer re-examination of the secular movements in capital formation and its components in relation to national product. In a sense, therefore, this paper is an interim report, and its conclusions are necessarily subject to amplification and partial revision.

But as far as the presently available data and analysis reach out, the following major conclusions emerge from the brief review of the decade estimates for 1869-1948:

1. The secular ratio of capital formation to national product has been moderate, judging by the proportion that would have been permitted by the rate of increase in real product per capita and the high

level of per capita income as compared with that in other countries. The explanation lies in the relatively moderate ratio of savings to income of individuals, whose savings constitute the major source of financing capital formation. This role of the savings rate by individuals as apparently limiting the secular proportion of capital formation to national product is traceable to the pressure of consumer demand upon incomes of groups below the top of the income pyramid and to the limited fraction of their incomes required for building up minimum reserves for economic security; and to the restrictions which the very dynamism of our economy imposed upon the concentration in the holdings of income yielding property, a major factor in determining the shares in total income received by the top groups whose savings are automatic and for whom the savings-income ratios are high.

2. The proportion of gross capital formation to gross national product fails to exhibit any significant trend, even though there is some indication of a secular decline in the ratios for totals in constant (1929) prices. By contrast, the proportion of net capital formation to net national product (national income) shows a perceptible secular decline, discernible against the background of long, twenty-year swings, in that proportion. Another trend, associated with the two just noted, is the increase in the proportion of capital consumption to either gross or net capital formation or to gross or net national product.

3. Of the several components of capital formation, it is construction whose proportion to national product (either gross construction to GNP, or net construction to national income) shows a distinct downward trend. The proportion of other components, particularly producers' durable equipment, rises over time.

In this connection, the long-term swings in the rate of increase of both capital formation and of other components of national product are of particular interest. Closer examination of them and a further breakdown of construction between residential and others, promises more light not only on the interrelation of investment, consumption, and total product in the process of economic growth, but also on the varying severity of business cycles.

4. Judging by the movements of the proportion of capital formation to national product, the ratio of savings to income for individuals declined, as between the last quarter of the nineteenth century and the twentieth century—even if we consider in the latter only the peacetime periods and exclude the severe depression of the thirties. Thus, with a marked secular rise in income per capita, the savings-income ratio for individuals appears to have sustained a secular decline—whether we deal with net savings and income or with savings and income gross of consumption of consumer capital (i.e., mainly residential housing).

5. The secular decline in the savings-income ratio for individuals reflects the increased pressure of consumer demand; and is clearly associated with shifts of population from countryside to the cities, from individual entrepreneur to employee status, with the impact of new consumer goods, and, in recent years, also with changes in the distribution of disposable income by size. Here, again, further examination of the components of consumer expenditures, distribution of income by size, and the changed pattern of life are called for.

These and other conclusions suggested in the course of the discussion tend to stress the importance—at least for analysis of the country's economic growth—of greater emphasis upon and attention to consumption-saving patterns of the individuals and families who comprise our society; and of the basic characteristics of our social and economic organization that seem to allow much more play to consumer sovereignty than the recent economic literature, with its emphasis on entrepreneurial decisions on investment, conveys.