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CHAPTER 3 / THE ANALYTICAL MODEL: RECENT AND PROSPECTIVE EXPERIENCE

The foregoing analysis of immigration waves suggests that, typically, demographic swings are induced by changes in economic conditions but, in turn, have important feedback effects on the economy. This chapter builds on this to develop a fuller analytical conception of economic-demographic relations during long swings. It also considers whether recent experience is consistent with this viewpoint and discusses implications for the future. To start with, however, attention is focussed on a methodological issue.

ARE KUZNETS CYCLES A STATISTICAL ILLUSION?

Two arguments in the affirmative should be distinguished. The first is that long swings may be artificially produced by certain defects in the raw data. For example, if the population is underenumerated at one census date, but correctly counted at the preceding and following dates, this single error will bias the growth rate in the second period upward relative to that in the first period. However, while such bias is possible with regard to any single series, it seems highly implausible that a large number of series from widely differing sources would share a common bias creating the illusion of long swings with similar timing. To the variety of series and sources relating to output, capital, and demographic variables already covered in Chapter 2, one may, if necessary, add still more that show roughly conforming long swings: patents [140], land sales and prices [17, 33, 131], financial series [102], transportation and other public utilities [76, 168], incorporations [60], and international trade and payments [216].

The second argument is that long swings may be an artifact due to the particular statistical method used in smoothing the raw data.
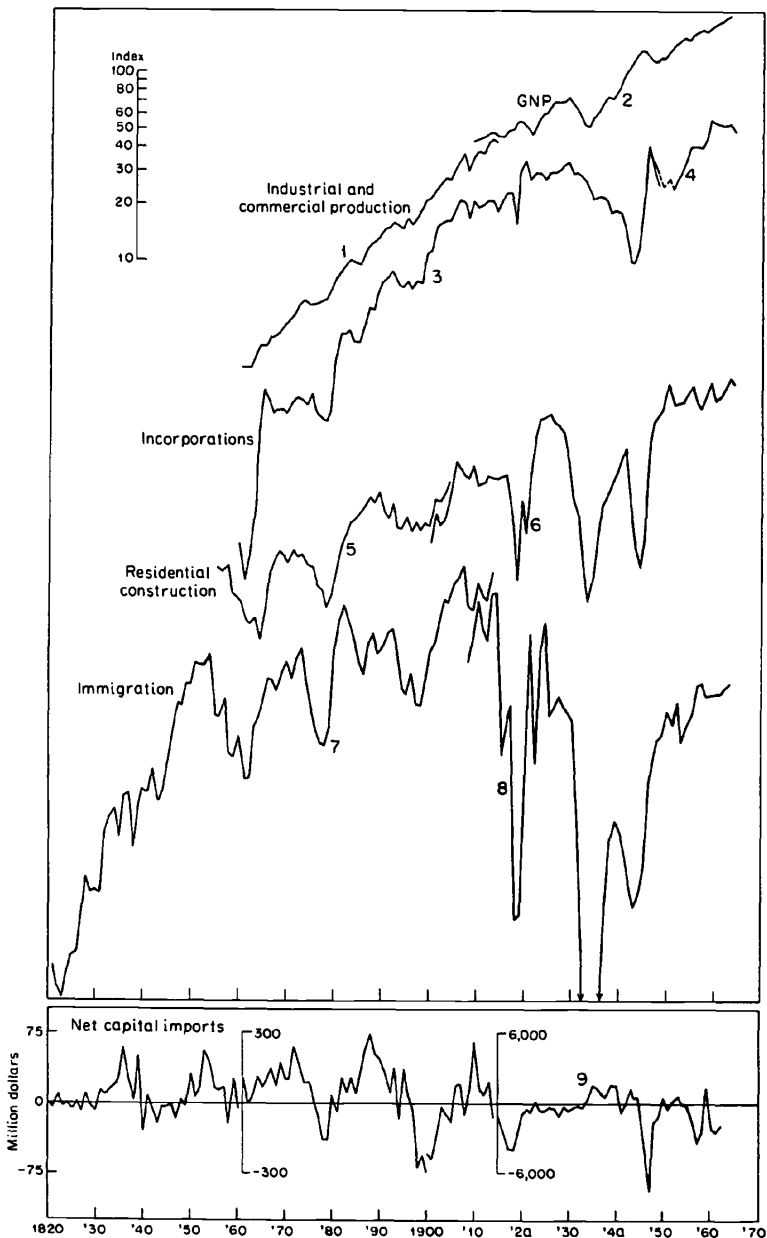
Bird and others have shown that a moving average technique, especially of the type employed by Kuznets may "create" long cycles where only short cycles exist [18]. Adelman, using the new technique of spectral analysis, finds, for the series she analyzes, "no evidence for the existence of a long-cycle component in the business fluctuations of the U.S. economy since 1890," and suggests "it is likely that the long swings which have been observed in the U.S. economy since 1890 are due in part to the introduction of spurious long cycles by the smoothing process, and in part to the necessity for averaging over a statistically small number of random shocks" [10, p. 459].

Such arguments obviously do not apply to those series in which long swings are observed in the raw data. Several of these are assembled in Figure 13—residential construction, incorporations, immigration, and capital imports. The large fluctuations in these series are so manifest, particularly prior to World War I, that they impressed themselves on analysts who were not looking for long swings and who were often not even aware of the idea. Moreover, the series show similar, though not identical, timing. Clearly there is no statistical illusion here. It is true that long swings are not readily apparent in the raw data on aggregate output in Figure 13; indeed, most output series, in which processes of inventory change play an important role, exhibit such high annual variability that the longer term movement, if it exists, is far from obvious. However, since swings in the raw data are shown by one group of series, and since these series relate to important aspects of resource growth, the question naturally arises whether processing other series so as to reduce short-term variability may reveal corresponding long-term movements in them too. Leaving aside for the moment the Adelman results, the answer to this question is yes, the movements appear in a number of other series, although differences in statistical method yield varying conclusions on more demanding issues such as frequency, timing, and amplitude. It seems reasonable to conclude that since roughly synchronous fluctuations are observed in the raw data for series reflecting capital formation and growth of the labor supply, that similar movements obtained in processed data for other series have a basis in reality also.[1]

[1] Clearly, this statement does not mean that these fluctuations are necessarily self-generating—a matter taken up in the next section. The issue at stake here is simply the reality of the fluctuations.

FIGURE 13

UNPROCESSED ANNUAL DATA ON OUTPUT, INCORPORATIONS, RESIDENTIAL CON-
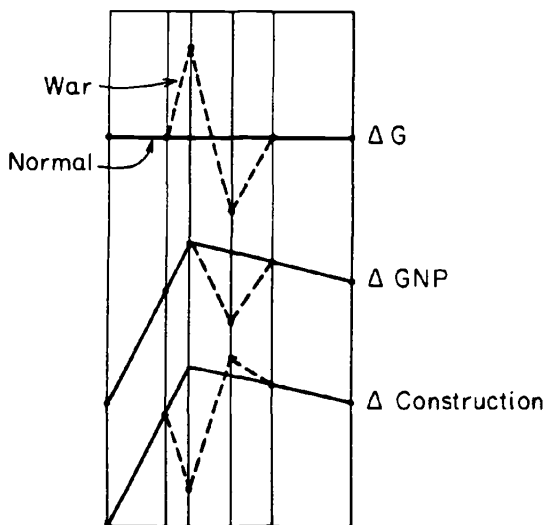STRUCTION, IMMIGRATION, AND NET CAPITAL IMPORTS, 1820–1964

On first glance, the Adelman analysis is disturbing, since here is a method that appears to yield negative results. True, spectral analysis is a new technique, and there is as yet so little experience with it in the analysis of annual economic time series that it is hard to judge how much the results may depend on the particular assumptions made in applying it. But a closer look at the study suggests more concrete reasons for reservations about the findings. First, construction was omitted from her analysis because its spectrum "showed an unusually large amount of distortion at the higher frequencies due to the filtering process" [10, p. 459]. The need to omit this series is especially troubling because, if there is any economic sector on which some professional consensus exists as to the reality of fluctuations of the Kuznets cycle variety, it is this one. Second, only one demographic series was included, total population, and it too was omitted in arriving at her final conclusion because its spectrum "suggests that any genuine cyclical phenomena which may exist in population are longer in duration than 15 years. More work is required on this series before any more detailed conclusions can be drawn" [10, p. 459]. Again, the analysis excludes a series important for the long-swings hypothesis. Not that it much matters in this case; in the population series used, which is not the annual series used by Kuznets or me, the estimates for about two-thirds of the years, 1790–1957, are obtained by linear interpolation between decennial census figures [187, p. 1]. Finally, those series on which the results of the study actually rest start only in 1890, and thus relate chiefly to a period in which statistical analysis of time series for evidence of long swings is seriously handicapped by the occurrence of two world wars. The immense expansion and sub-

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Legend for Figure 13

1. Index of industrial and commercial production, 1899 weights (Frickey).
2. Gross national product, billions of 1954 dollars (Commerce).
3. Aggregate index of incorporations (Evans).
4. Number of incorporations (Dun and Bradstreet).
5. Production of nonfarm housekeeping dwelling units (Gottlieb).
6. Number of nonfarm dwelling units started (Blank).
7. Gross alien immigration per thousand total population per year.
8. Net alien immigration per thousand total population per year.
9. Net capital imports, millions of current dollars.

SOURCE: Table B-1.

sequent contraction of government expenditure associated with the wars resulted in a major departure from the historical long-swing pattern.[2] A central feature of this pattern (one reason for this is suggested in the next section) was concurrent swings in the growth rates of GNP and aggregate construction. However, the two wars, with their attendant restrictions on construction, forced a break in the pattern, with GNP moving in positive conformity to the expansion and subsequent contraction of government expenditure, and construction in inverse conformity. The result is to interject an additional fluctuation into the usual long-swing relation, differing in timing between the two series, as illustrated by the broken line in idealized fashion below.

This additional fluctuation appears, of course, not only in these two series but in others as well. While it is eliminated by a statistical procedure averaging the intervals both of expansion and contraction in government expenditure, such as Kuznets' decade averages, it would clearly influence the results of spectral analysis, the more so, the more the period studied is dominated by major wars.[3]

[2] It is possible that the Civil War is another case of this sort, but the data are not now sufficiently complete to determine this.

[3] This paragraph perhaps answers the question posed by several discussants of Hickman's paper [47, 63, 78], namely, whether experience since the 1930's is to

An implication of these observations is that the issue of the "reality" of long swings is unlikely to be resolved, pro or con, by purely statistical studies, valuable and necessary though these are. To the extent one concentrates on output series relating primarily to the war-torn twentieth century, as is true of the Adelman study, the more one is likely to be unconvinced. On the other hand, by emphasizing periods less disturbed by war, as well as series in which the swings are prominent in unprocessed data, a stronger case can be built, though this inevitably leaves doubt as to current relevance. In any case, it is clear that statistical analysis needs to be complemented by economic analysis: Are the observations on long swings consistent with a model of relationships based on economic theory? This is the question I seek to contribute to solving in this chapter.

THE ANALYTICAL MODEL

Although the intellectual progenitors of the model suggested here are numerous, particular acknowledgement is due contributions by Kuznets [102–105, 107], Abramovitz [4–6], Isard [92, 93], Hickman [90], and Burnham Campbell [29, 30]. The model proceeds in three steps: (1) the impact of aggregate demand on labor market conditions, (2) the effect of labor market conditions on the number and spending behavior of households, and (3) the reaction of the latter on aggregate demand.

Aggregate Demand and the Labor Market

Assume, to start with, that growth of GNP in the last business cycle or two occurred at less than the full-employment growth rate and that the economy has accumulated excess capacity with regard to labor. One manifestation of this would be a tendency toward a rising unemployment rate at successive business cycle peaks (or troughs). Assume, next, that for some reason the rate of growth of private investment rises, producing a corresponding upsurge in the growth of aggregate demand, and that the higher level is sustained for some

be interpreted as one long swing or two shorter swings. The additional fluctuation is directly due to the movement in government spending (cf. [90, p. 493]), and is thus an interruption in the basic long swing.

time. The spatial distribution of this increased demand and the employment opportunities thus created would not necessarily conform to that of the existing labor supply. On the contrary, in a developing economy the locus of investment opportunities tends to be predominantly nonfarm, whereas the increase of the labor force through natural growth of the working-age population is disproportionately large in the farm sector.

The increased growth in aggregate product demand would have a corresponding effect on the demand for labor in the favorably affected centers of economic activity. Initially, one would expect the increased labor input requirements thus created to be met locally through an appropriate movement in the rate of change of the unemployment rate, and perhaps via a rise in the growth rate of hours. Increasing tightness of the labor market would tend to be reflected too in an increase in the rate of change of wage rates. The longer this process continues, the more likely it becomes that labor force growth in the favored areas will be enhanced by migration in response to the new employment opportunities. The origins of the migration would be lower wage areas elsewhere in the country (notably the older farm areas) and/or abroad. Labor force growth might also be raised by an increase in labor force participation rates of reserve labor groups such as females, youths, and older persons. The relative role of the several possible sources of increased labor input in satisfying the new demand would depend on the supply elasticities of the groups involved.

Reaction on Household Growth in Centers of Increased Demand

To the extent that increased labor-input requirements are met via unemployment or hours changes, one would usually expect the stimulus to household growth to be relatively mild, since the beneficiaries of the increased income are most likely to be members of established households in the area. To be sure, the slackened growth rate in the immediately preceding cycle(s) and the resulting higher average unemployment rate may have led some young persons to defer marriage or those already married and living with their parents to postpone establishing a separate household. For these, the progressive improvement of labor market conditions would lead to implementing previously deferred decisions. The longer the foregoing slack period, the more siz-

able the quantitative effect of this would probably be. Moreover, if the labor market impact were for some reason particularly favorable for those in the household-forming ages, plans might be advanced and household growth accelerated through a general reduction in the average age of marriage and of household formation.

Typically, however, one would expect a more immediate and sizable effect on household growth in the centers of increased demand if the increased labor input requirements were met via migration flows, because migration flows add directly to the number of households at the point of destination. In this case the growth in persons employed is more nearly matched by corresponding growth in the number of households. This is the special significance of the migration response: it has a much greater impact than other sources of labor input on household growth in the areas of increased labor demand.

Effect of Household Growth on Aggregate Spending

Households newly established in an area generate demands, not only for housing but for urban services generally, as well as for the furnishing of new homes. They thereby tend to create an urban development boom—new residential construction and new municipal investment in services associated with it, as well as new business investment in retailing and similar activities. (The mechanism might of course involve an intermediate stage in which new migrants displace previous residents in established areas and the latter are those immediately involved in new real estate development.) Thus the increase in households, typically associated with the migration flow, leads to further growth not only in consumer spending but in private and public investment as well, and it is this induced rise in the growth of aggregate demand which tends to sustain and prolong the expansion.

Why Kuznets Cycles Rather than Business Cycles?

Established households whose head or members have profited from new employment and income opportunities would generate a multiplier effect via new consumer spending; possibly, new business investment would also be induced. A reaction of this type figures frequently in theoretical discussion of the regular business cycle.

Why should the present chain of events, operating through house-

hold growth result in a more protracted boom?[4] One possible answer lies in the composition of the induced demand which results when household growth intervenes between the labor market response and the increased spending this response produces. This view would emphasize the central importance of housing and real estate development and the associated stimulus to local government spending on municipal services and to business spending on retail services, many of which require a long gestation period to bring to fulfillment. This argument rests essentially on the special characteristics of the industries benefitting from the induced demand—on product supply conditions.

A second, and perhaps more compelling answer, is based on demand considerations. Marriage, household formation, and migration are points of critical decision in the life cycle of an individual. Typically, they involve commitment to new and increased spending over several years as a new home is established and a family started or settled, a commitment reflected in the substantial indebtedness to relatives and financial institutions regularly incurred during this period of the life cycle.[5] On this basis, one might reason that in a population experiencing a substantial rise in the growth of households there will not only be a shift in the composition of consumption but a rise in the propensity to consume as well. This would be sustained over several years, carrying over from one business cycle to the next, and would only gradually become exhausted. In effect, such long-term spending commitments are geared to a notion of permanent income, and tend to be rather insensitive to short-term income changes.

It is this feature of longer-term spending commitments which may constitute the analytical key to Kuznets-cycle phenomena. The frequent association of such commitments with series most noticeably marked by long swings has been pointed out particularly by Abramovitz. Because this feature has so far received insufficient attention, his statement merits repetition in full:

[4] Charles Tiebout [165] has drawn a similar distinction between a long-run and short-run multiplier, with population growth playing a central role in the former.
[5] The most thorough study I have encountered of spending behavior in relation to life-cycle stage (which is not synonymous with age) is that by Lansing and Morgan [108], though even in this the stages are very broad. Consumer panel studies should generate still more pertinent data. Ferber's article [64] provides a valuable survey.

One common attribute of all these processes of resource development involving the movement of people from country to country and place to place, the formation of households and the birth of children, the foundations of business, and the investment of capital in highly durable forms is that they involve long-term decisions and commitments. Hence they pick up speed and come to fruition slowly and when they slow down, they are not easily or quickly set in motion again. They give rise, therefore, to long waves of resource development and output growth. These processes involving long-term decisions, on the other hand, respond only sluggishly to the impact of the ordinary short and mild business contractions. By contrast, the most prominent feature of short business cycles is a fluctuation in shorter term investment, particularly inventory investment [5, p. 414].

While our concern here is with household behavior, it is worthwhile to underscore Abramovitz's point that various types of private business investment also involve longer-term commitments. Perhaps the most notable of these arise in connection with the establishment of new businesses, a phenomenon which, judging from the long-term series on new incorporations (Figure 13) exhibits long swings in the unprocessed annual data.[6] (As for the future, the growth in importance as spending units of various government bodies and private nonprofit institutions, both potentially significant sources of long-term commitments, suggests the need to study them as well.) This line of reasoning obviously leads to the general view that Kuznets cycles may arise from mechanisms, such as that discussed here, which result in a bunching of long-term spending commitments.[7]

The Effect of Major Wars on Kuznets Cycles

The analytical model sketched above starts with a private investment boom, but any source of sustained increase in the growth of aggregate demand, including government expenditure, could initiate

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[6] Research on investment spending by new firms (or, more generally, in relation to the "life cycle" of business units) is scarce. One valuable study is that by Bridge [23; cf. also 60, 219].

[7] A discussion of spending behavior inevitably leads on to the question of financing, and thus to the role of monetary and financial variables in long swings. While this subject is clearly "off-bounds," it may be noted that money supply, interest rates, prices, capital imports (Figure 13), and similar variables do show long swings [cf. 4, 22b, 41, 102, 113, 128a, 146a, and 216]. This subject, among others, is treated in the forthcoming NBER study of trends in money, income, and prices by Milton Friedman and Anna J. Schwartz.

the process. In the case of major wars, however, the process is interrupted, because the war itself places constraints on new household formation and construction. At the same time, a protracted war sets the stage for a postwar Kuznets-cycle boom, by building up substantial backlogs not only for private and public investment but household formation and consumer spending as well. Thus, a major war would tend, on the one hand, to interpose an additional fluctuation during which the growth of GNP and aggregate construction pursue divergent paths; on the other hand, if one smooths this fluctuation statistically, a major war would tend to yield a Kuznets-cycle movement of more extended duration.

Are Kuznets Cycles Self-Generating?

While the interaction between economic and demographic phenomena emphasized here is chiefly of a multiplier type, there are clearly elements of induced investment on the basis of which one might postulate a self-generating model of the multiplier-accelerator variety. Also, the positive association between labor market tightness and growth of aggregate demand implies the possibility of labor-cost changes which may react on investment spending in an adverse manner, tending to reverse the movement. On the other hand, irregular events such as wars, legislative acts (e.g., regarding immigration and wages), and speculative capital movements have affected observed long swings. The relative weight of endogenous vs. exogenous factors in initiating the swings is in my view an open question requiring further research.

But the value of the present model does not hinge on resolution of the self-generating issue. As Irma Adelman [8] and others have shown, the Klein-Goldberger model of the regular business cycle is so highly damped that it requires stochastic shocks to produce oscillations of the business cycle variety. The principal value of that model lies in suggesting mechanisms which tend to produce oscillatory movements in response to such shocks. Similarly, while the present analytical scheme leaves open the question whether Kuznets cycles may be wholly self-generating or require either small or strong shocks, it does suggest a mechanism that tends to produce cumulative upward or

downward movements over periods longer than the ordinary business cycle.[8]

Long Swings and Secular Growth

How, if at all, are Kuznets cycles related to the primary trend? Is the primary trend itself merely the path traced out by averages of successive Kuznets cycles? The answer suggested here is no. The primary trend reflects processes of technological change and of human resource and institutional development which lie outside the long-swing mechanism itself. However, in an economy where the free market system plays an important role in resource allocation, the pace at which new technology is adopted and diffused tends to be modified by a Kuznets-cycle mechanism. This is because efficient use of the new techniques flowing from the Industrial Revolution and its sequel has required increased geographic concentration of productive resources. This has created an imbalance between the geographic distribution of the growth of labor demand, arising from the industrialization process, and that of labor supply, which typically reflects the widespread population-dispersion characteristic of an agricultural society. Successful adoption of modern industrial technology has required, therefore, redistribution of the population in conformity with the needs of the new technological basis of production, and the provision of the requisite goods and services for this relocated population. The induced stage of the Kuznets-cycle mechanism, an urban development boom, is essentially the accomplishment of this requirement in a free market economy by a multiplier-type process.[9]

[8] Clearly, the present analysis does not agree with the view proposed in a subsequent paper [9] by Mrs. Adelman that a shocked Klein-Goldberger *business cycle* model may be sufficient to account for observed long swings. In this connection, it is worth noting that the simulated long swings that she obtained were of smaller amplitude than those actually observed, and that the Klein-Goldberger model does not incorporate economic-demographic interactions of the type described here.

[9] The long swings in patent data, noted by Kuznets and Schmookler and analyzed by the latter [103, 140], demonstrate that adoption of new techniques is related to Kuznets cycles.

The above aims to identify those conditions which characteristically underlie the observed association between modern economic growth and population redistribution. In certain cases, of which the United States is one, modern economic growth may, in addition, involve the opening up and settlement of new territory, and thus a further stimulus to population redistribution.

For contrast, this formulation may be compared with that of Isard [92, 93; see also 145]. He sees the swings as arising from successive transport innovations, and the urbanization facet as a consequence of the impact of such innovations on the location of economic activity. The present view rests basically on the geographic imbalance between labor demands and supplies created by modern technology generally, and does not require a new transport innovation either to initiate the swing or to account for urbanization, though such innovations may, of course, play a part in particular times and places.

An implication of the present view is that various characteristics of long swings tend to change secularly. The growth opportunities constituting the investment focus at an early stage of development will differ from those at a later stage; hence variations will tend to occur over time in the industrial characteristics and geographical distribution of the swing. For example, agricultural settlement or exports might loom large among the investment opportunities in the early growth stages; at a later time, domestic manufacturing may predominate. Similarly the potential sources of labor supply tend to change secularly. Immigrants may move more readily from one country at one time; from another, at a different time. The reservoir afforded by the farm population in older agricultural areas grows to a point but eventually begins to be depleted, and is perhaps increasingly replaced as a source of labor reserves by some of the nonfarm centers gradually being by-passed in the development process. Secular growth in family income and the appearance of innovations such as the automobile will alter the composition of induced household consumption spending—recent suburban as compared with earlier urban residential development is an illustration of this.

The analytical scheme suggested here bears a superficial resemblance to Schumpeter's [141], for it implies that growth in a free market economy tends to proceed in irregular surges. However, the duration of the movement differs from any contemplated by Schumpeter, as does the underlying mechanism of economic-demographic interactions. Moreover, with regard to secular growth, I would emphasize the independent significance of processes such as technological change and human-resource development. However, Alvin Hansen, in modify-

ing Schumpeter's conception to incorporate the building cycle [87] moved in the Kuznets-cycle direction. This step was carried forward logically by Isard, who arrived at a view similar in a number of respects to that advanced here. In so doing, Isard explicitly rejected Hansen's secular-stagnation thesis, which, one suspects, could be shown to run, in one form or another, a conforming Kuznets cycle of its own in economic discussion. Indeed, in striking contrast to the contemporary professional consensus, Isard, writing in 1942, predicted a postwar boom. His reasoning, however, gave undue weight to transport innovation which, as has been noted, is not an essential ingredient of my analysis.

The analysis here may also bear on the problem of defining a single given phase in the emergence of modern economic growth as an "industrial revolution," "take-off" [139] or "great spurt of industrialization" [75]. Attempts to apply such concepts to actual experience have frequently come up against the difficulty of deciding which among competing periods to so designate. And, where identified, the duration and other characteristics of the period sometimes correspond to those of Kuznets cycles. It is at least a plausible hypothesis that such an interval, seized upon as a unique phase, may be an early and particularly prominent long swing.
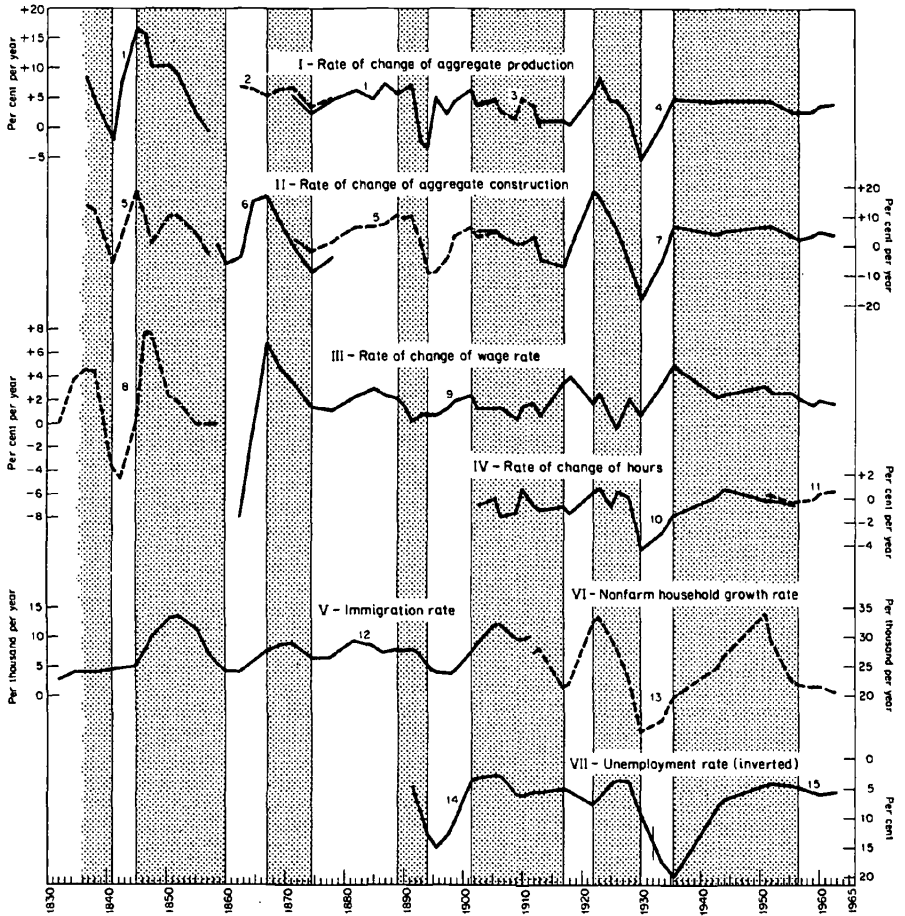
RECENT EXPERIENCE IN THE
LIGHT OF THE MODEL

Viewed in historical perspective, there are a number of similarities between recent and longer-term experience which are broadly consistent with the crude analytical model sketched above. There are differences, too, however, and on the demographic side these are so serious as to raise doubts about the model's validity. In this section, after noting some of these similarities, I focus on recent dissimilarities with regard to demographic aspects and attempt to reconcile them with the model.[10]

[10] The slackened growth rate of the economy in the cycles of 1953–57 and 1957–60 led several writers to point out similarities between recent experience and earlier lapses from full employment growth [5, 6, 16, 30, 40, 57, 78, 79, 89, 90, 217]. Others, however, have taken sharp issue with such views [47, 63, 129].

FIGURE 14

AVERAGE ANNUAL RATE OF CHANGE IN AGGREGATE PRODUCTION, AGGREGATE
CONSTRUCTION, WAGE RATE, AND HOURS; AND AVERAGE LEVEL OF IMMIGRA-
TION RATE, NONFARM HOUSEHOLD GROWTH RATE, AND UNEMPLOYMENT RATE,
NBER REFERENCE CYCLES, 1830–1964

Legend for Figure 14

I. Rate of change of aggregate production, percentage per year.
    1. Nonperishable commodity output, 1860 dollars (Gallman).
    2. Index of industrial and commercial production, 1899 weights (Frickey).
    3. Gross national product, 1929 dollars (Kendrick).
    4. Gross national product, 1954 dollars (Commerce).

(*continued*)

Parallels Between Recent and Earlier Experience

The analytical framework suggests the likelihood of longer-term fluctuations with roughly similar timing in output growth, labor market conditions, and household growth, particularly in the nonagricultural sector. For various reasons, other, perhaps independent, movements might occur in these series, but one would expect as a minimum that there would be some semblance of a common longer-term ryhthm. Is this the case?

Figure 14 assembles series relating to a century or more of U.S. experience on growth of aggregate output and construction, and indicators of changes in labor market conditions (pre-1914 immigration, hours, unemployment, wages), and in household growth (pre-1914 immigration and nonfarm households). A relatively moderate smoothing technique has been employed. The values are averages for successive business cycles as identified by the NBER reference cycle chronology, computed both for trough-to-trough and peak-to-peak cycles and plotted at the cycle midpoints. Only one departure was made from this procedure; it was warranted by the analytical considerations previously presented. The special fluctuations associated

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Legend for Figure 14 (concluded)

II. Rate of change of aggregate construction, percentage per year.
    5. Gross new construction, 1860 dollars (Gallman).
    6. Index of physical volume of construction (Abramovitz).
    7. Gross new construction, 1929 dollars (Kuznets).
III. Rate of change of wage rate, percentage per year.
    8. Money daily wages, Erie Canal (Smith).
    9. Real hourly wages, manufacturing, 1957 cents (Long).
IV. Rate of change of average hours of work per week in manufacturing, percentage per year.
    10. Jones.
    11. Bureau of Labor Statistics.
V. Gross alien immigration rate per thousand total population per year.
    12. Immigration and Naturalization Service.
VI. Rate of change of nonfarm households per thousand nonfarm households per year.
    13. Bureau of the Census.
VII. Unemployment rate, percentage of civilian labor force.
    14. Lebergott.
    15. Bureau of Labor Statistics.

NOTE: To facilitate visual comparison of the series, vertical lines have been drawn through the long-swing peaks and troughs of the rate of change in aggregate construction, and the area from peak to trough has been shaded.

SOURCE: Table B-2.

with World Wars I and II have been smoothed by ignoring the war-time business cycle peak and first postwar trough.[11] In this way, the cycle average counterbalances the rise in government expenditure and the subsequent decline to a more nearly postwar "normal."

Although certain variations in timing exist, it is possible, as suggested by the shading in the figure, to identify swings in the growth rate of aggregate output and construction, labor market conditions, and household formation, on a roughly one-to-one basis, thus lending some empirical plausibility to the model sketched above.[12] Some of the swings are quite pronounced, such as those terminating in the 1890's and 1930's; others are milder, such as those ending around World War I and the late 1950's. (The parallel between the recent period and experience in the first part of this century was previously pointed out by Hickman [90].) There is an apparent tendency for the swings in the immigration rate, nonfarm household growth rate, and level of the unemployment rate to lag behind the swing in the growth in aggregate output, though not without exception.

Several other similarities between recent experience and previous long swings may be mentioned. The growth rate of manufacturing capital shows a swing, with the capital goods industries tending to precede those oriented toward construction and urban development, as in the pre-1914 period (Figure 12). Spatially, the swing continues to center in nonfarm areas, appearing even more pronounced when more up-to-date census definitions are employed (e.g., metropolitan area rather than urban) and to exhibit wide diffusion among the different geographic divisions of the country. The postwar period has been characterized by an urban and suburban development boom. A swing in internal migration has also occurred [59, 158–160, 163].

Differences in Demographic Aspects

There have, of course, been differences between recent and previous characteristics of long swings.[13] As indicated in Chapter 2, on

[11] Thus, in the case of World War II the peak-to-peak average is for 1937–48 rather than for 1937–44 and 1944–48; and the trough-to-trough average is for 1938–49 rather than 1938–46 and 1946–49.

[12] The existence of long swings in the rate of change of wages has been pointed out and analyzed by Clarence Long [115]. A statistically significant association between the annual rate of change of wages and that of unemployment was found by Bowen and Berry [21] in a study covering 1900–58.

[13] For a more general discussion, see [5, 6, 90].

the demographic side, these relate not so much to movements in the aggregate variables, that is, growth of total population, total labor force, and total households, as to the underlying components of change. For the present purpose, it is convenient to group these components of change as follows:

Population	Labor Force	Households [14]
1. Mortality rate	Mortality and aging	Mortality and aging
2. Net immigration rate	Net immigration	Net immigration
3. Fertility rate	Labor force participation rate	Household headship rate

All three of the aggregative demographic variables share in common mortality and migration components. (The addition of the aging component to mortality in both labor force and households is necessary because these variables are defined with reference to a population above some minimum age, and thus receive additions as those initially below the limit grow older.) Each aggregative variable also has its distinctive component: fertility rates in the case of population change, labor force participation rates for labor force, and headship rates for households. If one were dealing with a geographic subdivision of the national total—for example, the nonfarm sector—internal migration would of course be included with international migration as a component of change.

The alignment of the components in the tabulation is designed to facilitate the subsequent discussion. From the viewpoint of demography as such, the components of labor force and household growth on line 1 are analogous to natural increase of the population, i.e., the difference between components 1 and 3 of population growth.[15] This grouping, however, is used to bring out parallel features for long-swings analysis. Thus, the components on line 1 are largely exogenous

[14] I am in debt to Burnham Campbell for recognizing the possibility of the present partition scheme for household growth [30, see also 62]. A "headship rate" is defined, along lines identical with that for a labor force participation rate, as the proportion of the population in a given demographic group (e.g., classified by age and sex) who are household heads.

[15] A more elaborate analysis would, in fact, further subdivide the components of labor force and household growth on line 1 into, respectively, entries versus exits and formations versus dissolutions. A brief investigation, chiefly for 1930 onward, suggests that the movements shown here in the net balance are overwhelmingly due to the positive elements (entries and formations), just as those in natural increase are typically a reflection of births.
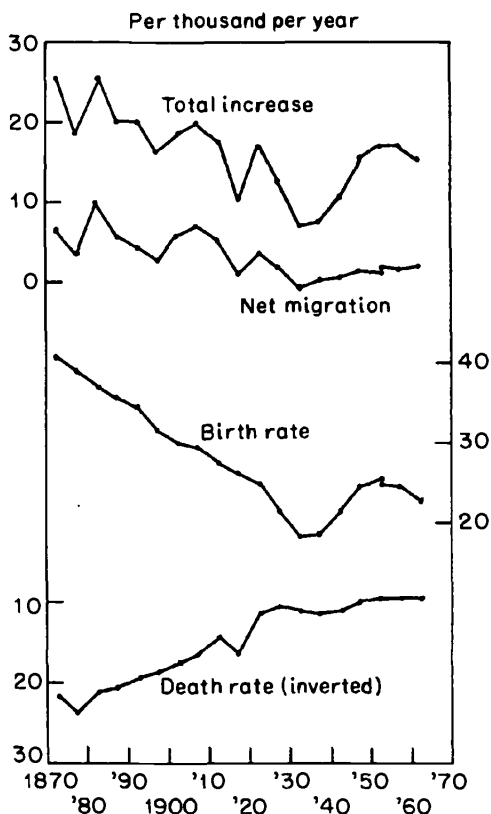
to a given long swing; those on lines 2 and 3 are responsive, with line 2 representing a component common to all three variables (migration), and line 3, components which are distinctive. Moreover, since in the subsequent discussion the components on line 3 are frequently referred to collectively, it is convenient to designate each as the "rate" component of its respective aggregate, though this terminology is imprecise.

Figures 15 to 17 show for the nationwide values of each of the aggregative variables, the relevant components of change for the period since 1870 or 1880.[16] The basic data—chiefly the decennial censuses—are too crude to permit a highly refined analysis relating to such questions as timing and amplitude; on the other hand, they clearly show the swings, and permit certain broad inferences pertinent to the comparison between recent and earlier experience. All three figures show the predominant role of net immigration in the swing in the aggregate throughout most of the period covered, but for the swing from the 1930's through the late 1950's, the distinctive "rate" component for each variable becomes paramount. Indeed, the movement since 1940—up and then down—of the "rate" component in the three figures is startlingly similar. Clearly this raises a question whether the analytical model suggested in the previous section is indeed relevant to current experience. In that model, migration played a key part, filling the dual role of labor market response and source of household growth. What happens to the model when migration no longer enters into the swing in substantial magnitude?

In part, the answer to this is that migration in the form of *internal* migration still enters in, and to this extent the model is pertinent in its typical form. As noted, recent experience shows a continuation of the historical swings in internal migration [59, 158–160, 163]. On the other hand, although it is difficult to make temporal comparisons of the amplitude of internal migration, there seems to be little evidence that the current swing in the rate of internal migration reached greater dimensions than previously, as would be necessary if it were to compensate for the damped movement in international migration. More-

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[16] An alternative, or at least complementary, disaggregation would have been desirable for the nonfarm sector alone, but was not feasible with the time and resources available.

FIGURE 15

AVERAGE GROWTH RATE OF POPULA-
TION BY COMPONENT OF CHANGE,
QUINQUENNIALLY, 1870–1964

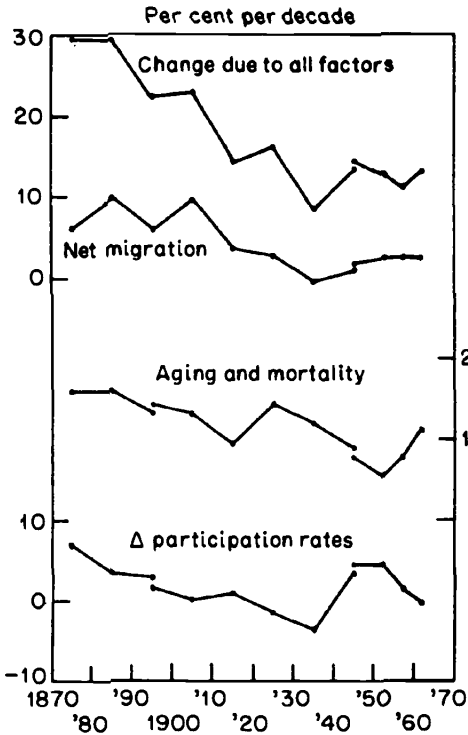SOURCE: Table A-2.

over, the actual swings in population, labor force, and household
growth, even at the nonfarm level, were undoubtedly due in sub-
stantial part to the unprecedented movements in the distinctive "rate"
components, as well as to internal migration. Reconciliation of these
"rate" movements with the analytical model is therefore essential in
accounting for the quantitative features of the current swing. Since
these "rate" movements are, in fact, the main subjects of Parts II and
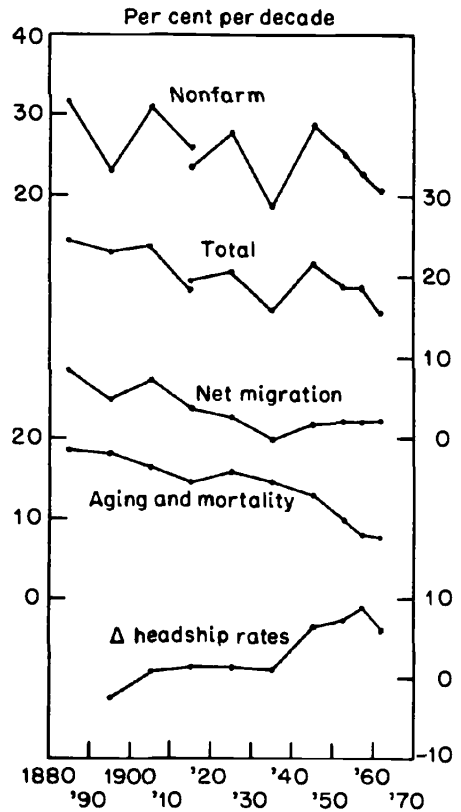III, it will suffice here to summarize the pertinent findings.

FIGURE 16

AVERAGE GROWTH RATE OF LABOR
FORCE BY COMPONENT OF CHANGE:
DECENNIALLY, 1870–1950; QUIN-
QUENNIALLY, 1950–65

SOURCE: Table A-3.

FIGURE 17

AVERAGE GROWTH RATE OF TOTAL
AND NONFARM HOUSEHOLDS, AND OF
TOTAL HOUSEHOLDS BY COMPONENT
OF CHANGE: DECENNIALLY, 1880–
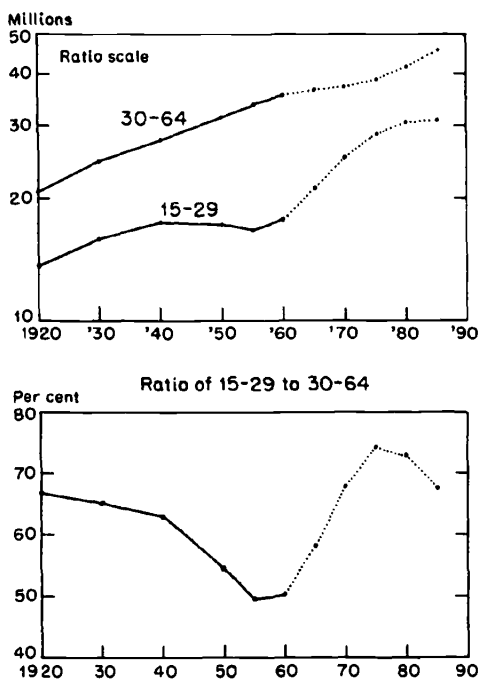1950; QUINQUENNIALLY, 1950–64

SOURCE: Table B-3.

Reasons for Recent Demographic Differences

The nature of the reconciliation is suggested by the model itself. It turns on the suggestion that the character of the labor market response to a Kuznets cycle in the growth of aggregate demand depends on the nature of labor supply conditions. In the recent swing these conditions were unique in several respects. First, the historical response through

immigration was severely curtailed by restrictions imposed since the mid-1920's as well as by World War II itself. Second, the contribution to labor force growth of the aging and mortality component reached an unprecedented low (Figure 16). This was an echo effect of the exceptionally rapid decline of the birth rate in the twenties and early thirties, and was particularly concentrated in the younger working ages, where, so far as one can judge, for the first time in recorded experience the absolute number of persons aged 15–29 leveled off and actually declined slightly (Figure 18). This number showed a substantial decline in relation to those aged 30–64 (Figure 18, lower panel). Finally, the educational level of younger persons compared with older was dis-

FIGURE 18

MALE POPULATION AGED 15–29 AND
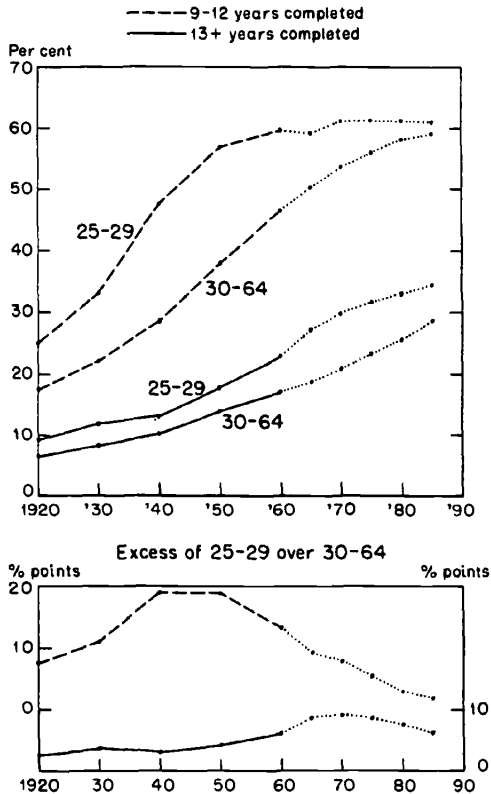30–64; ACTUAL AND PROJECTED,
1920–85

SOURCE: Table B-4.

proportionately higher than usual in the recent period (Figure 19). This arose from the rapid expansion of secondary education in the 1920's and 1930's, which temporarily enlarged the educational gap between young and old. Though there is now no historical evidence on this, I suspect that it would be necessary to go fairly far back in the nineteenth century to find a comparable period of rapid acceleration in universal schooling.

FIGURE 19

PERCENTAGE OF POPULATION AGED 25–29 AND 30–64 WITH 9–12 AND 13 OR MORE YEARS OF SCHOOL COMPLETED; ACTUAL AND PROJECTED, 1920–85

SOURCE: Table B-5.

In short, in the most recent Kuznets-cycle upswing, the relative number of those in young working ages was unusually low, and the relative quality (so far as this depends on formal schooling) was unusually high. These young adults are precisely the ones who in the past played an important part in the quantitative adjustment of labor to the swing in the growth of aggregate demand, as is evidenced by their predominance in migration flows, whether internal or international. The unique labor supply conditions in the recent swing, however, resulted in an exceptionally tight labor market for those in the younger age groups, and gave rise to unusually favorable income growth (and, one suspects, to expectations of such growth as those involved, learned by experience of the tightness of the labor market). In other words, for younger persons, the labor market response took the form predominantly of a price adjustment rather than a quantity adjustment. This unusually favorable income situation for younger persons, in turn, induced a sharp reduction in age at the time of marriage and household formation, and a sharp upswing in fertility. This accounts for the abrupt upsurge in the headship and fertility rates. At the same time, the shortage of younger persons redounded to the benefit of the only labor reserve group available in substantial numbers—older married women who were unencumbered by child-dependency responsibilities. As a result, a substantial increase in the total labor force occurred through participation-rate change for the first time. Thus, as in the past, an upswing in the growth of aggregate demand was accompanied by labor market changes and an associated rise in the growth rate of households which tended to sustain and prolong the boom. Because of the unique labor supply conditions, however, the mechanism of the association was substantially altered, with migration playing a less important role and the "rate" components of change in the demographic variables playing a leading one.

THE FUTURE: IMPLICATIONS OF AN ECHO EFFECT

One of the intriguing features of population growth is that it contains within itself a mechanism capable of generating longer-term swings.

Thus, writing in 1937 about German experience, August Lösch states [118, p. 650]:

While the movement of population shows unimportant and irregular [short term] fluctuations which seem to be mere reflections of economic, sanitary and other conditions, we find quite clearly great waves, the main cause of which are the great wars. The deficit of births during a war and the surplus of births in the immediate postwar period repeat themselves about thirty-three years later, when the new generations are at their time of highest fertility. For the same reason thirty-three years later a third wave occurs.

Recognition of this leads naturally to the thought that long swings in economic activity may have their origins in the peculiar structural mechanism of population growth. My analysis of past U.S. experience, however, does not support this view. Fluctuations in demographic variables have typically arisen from movements in immigration or the "rate" components of change rather than from an echo effect of a surge in births, operating through the aging and mortality component.[17] Such demographic fluctuations were induced rather than initiated by changes in economic activity, although they had important feedback effects. This is not to say that no echo effects at all existed. One can, in fact, trace them in detailed data, but in the past they have been mild, reflecting the fact that before 1940 long swings in fertility were confined to the rate of change rather than the level of that variable.

Now, however, things have changed. The new demographic developments accompanying the most recent upswing—notably, the dramatic baby boom—have, in turn, set up an echo effect currently being felt in the form of a sharp upsurge in the young adult population. What, if any, are the implications of this echo effect for future long swings? Has the economy, perhaps, shifted to a new situation in which long swings are at least partly built in through a natural demographic cycle, even though this was not the case in the past?

[17] The rise between 1910–20 and 1920–30 in the aging and mortality component, which contributed to a corresponding movement in labor force and household growth, appears to contradict this observation (Figures 16 and 17). This is primarily due, however, not to an earlier upsurge in the birth rate, but to the fact that the 1910–20 level of this component was depressed sharply below normal by high mortality among young persons resulting from the flu epidemic of 1918. Thus, with reference to Figure 15, the movement is chiefly a reflection, not of a prior fluctuation in the fertility curve, but of a concurrent dip in the mortality curve (inverted), centering on 1910–20.

A satisfactory analysis of this question, as of so many this chapter has touched on, calls for a more complete model of long swings. Nevertheless, a few tentative impressions may be gained by looking in some detail at the impact of the echo effect on labor force and household growth now and in the coming decade. Moreover, this is of interest in its own right because of its possible bearing on attempts to assess more generally the outlook for the next decade.[18]

The Next Decade

To start with labor supply conditions, the echo effect of the baby boom is currently yielding its fruits in the form of an unprecedented growth in the labor force from the aging and mortality component. Since the first half of the 1950's, the rate at which this source has been contributing to labor force growth has risen from around 5 to 11 per cent per decade, and the projected figure for the last half of the 1960's is almost 14 per cent. This means that the aging and mortality component alone in the late 1960's will yield a rate of growth in the total labor force as high as that *due to all components* in the 1940's, and higher than that in the 1950's. The impact of this is concentrated among the younger age groups, with the result that the relative number of those aged 15–29 to 30–64 is now increasing more and faster than in the preceding decline (Figure 18). Moreover, an independent but significant development is that the advantage of young over old in high school education has declined sharply in the last decade and will decline somewhat further in the next (Figure 19). With regard to college education, the advantage of the young rose somewhat through 1965, but shows little prospect of further increase. On the whole, therefore, a substantial reversal of the situation in the preceding period as to relative quantity and quality of younger versus older persons is now in progress.

The marked impact of the aging and mortality component on labor force growth suggests that the labor requirements of an upswing in the growth of aggregate demand might for the first time be met very largely from this component rather than from either increased

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[18] Cf. for example [148]. Interestingly, this NICB study, while not adopting a long-swings framework as such, looks at the next decade on the basis of experience in the past two, viewed not as a succession of short cycles, but as a major boom and ensuing retardation.
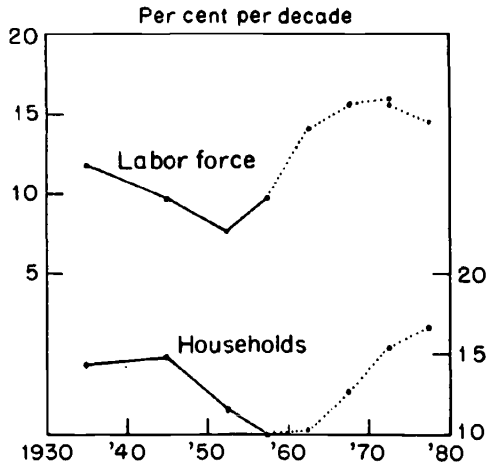
immigration or participation-rate change. (One would expect also, of course, a response through internal migration, perhaps taking more the form of a movement among nonfarm centers as the farm reservoir becomes even further depleted.) Would this rather different labor market response be accompanied by an upsurge in household growth as in the past?

One's initial reaction is to say, "of course," for the same demographic echo effect that is operating to raise labor force growth is also acting to increase household growth. On investigation, however, several mitigating circumstances come to light.

First, there is a difference in the timing and shape of the impact of the demographic movement on labor force versus household growth. The average age at labor force entry is lower than that of household formation, so that an echo effect tends to raise labor force growth in advance of household growth. This is illustrated in Figure 20, where the contributions of population change to labor force and household

FIGURE 20

CONTRIBUTION OF POPULATION CHANGE TO
LABOR FORCE AND HOUSEHOLD GROWTH:
ACTUAL, DECENNIALLY, 1930–50, QUINQUEN-
NIALLY, 1950–60; AND PROJECTED, QUIN-
QUENNIALLY, 1960–80

SOURCE: Table B-6.

growth since the 1930's are compared.[19] Note that the movement in household growth tends to lag behind that in labor force growth, reaching its trough and then its peak roughly five years later. Moreover, the rise in household growth is somewhat smaller in amplitude and less precipitous than that in labor force growth. This is because among young males the rise in rates of household headship not only centers at a later age than that in labor force participation, but is also less abrupt. As a result, the temporal distribution of an echo effect on household growth is more attenuated than it is on labor force growth. Thus, while the baby boom does produce an echo effect tending to raise household as well as labor force growth, the former tends to lag behind the latter and be slightly more spread out over time.

Second, in order for an echo effect in the population component of change to raise the *total* growth rate of households—that due to all sources—it is necessary that the headship-rate component not decline in compensating fashion. Since the analysis for 1940–55 has already suggested the possibility of a mechanism causing the population and "rate" components to move in at least partly offsetting fashion, it is essential to appraise the outlook for the rate component as well as that for the population one. This is facilitated by Figure 21, which repeats the curves of Figure 20 for labor force and households and adds the curves showing growth due to all sources (actual through 1960–64 and projected through 1975–80).[20] For each variable, the vertical difference between the two curves represents the contribution of the rate component.
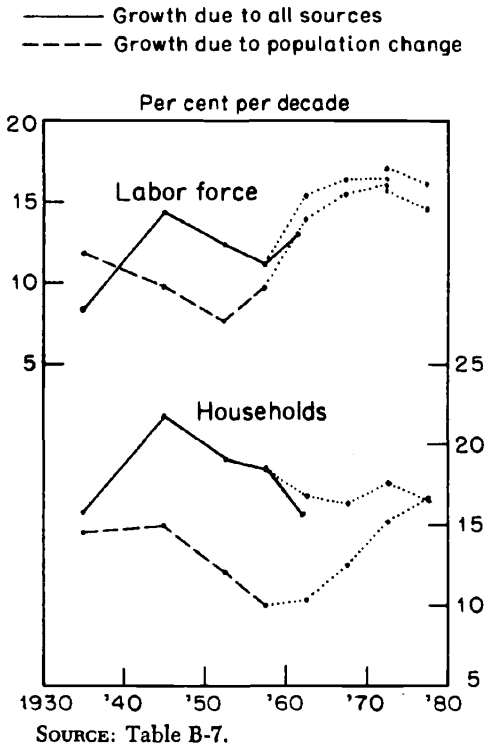
The startling feature of Figure 21 is that while the echo effect is currently producing and, according to the projection, is to produce a sharp rise in the growth rate of labor force, an upsurge of comparable magnitude in that of households, even with a lag, is not foreseen. In the case of labor force, in order to offset the echo effect completely,

[19] For convenience of exposition, immigration has been combined here with the aging and mortality effect. The point remains valid if confined to aging and mortality alone, since the movements during the period shown are due almost entirely to this component.

[20] For households, Series B projections are used, but the use of Series A would not alter the present conclusions, since from 1965 on the growth rates implied by the two projections differ very little.

FIGURE 21

AVERAGE GROWTH RATE OF LABOR FORCE AND
HOUSEHOLDS DUE TO ALL SOURCES AND THAT
DUE TO POPULATION GROWTH ALONE: AC-
TUAL, DECENNIALLY, 1930–50, QUINQUEN-
NIALLY, 1950–64; PROJECTED, QUINQUEN-
NIALLY, 1960–80

————— Growth due to all sources
– – – – Growth due to population change

SOURCE: Table B-7.

the contribution of the "rate" component would have to drop to a
negative value, that is, participation rates would, on the average, have
to decline. This is not the case with regard to households, however.
The contribution of the "rate" component has been so high in the
past, that a drop to a lower positive value, implying merely a
retardation in the average rise of headship rates, is sufficient to almost
wholly offset the echo effect.

Is a slowing of the rise in headship rates, such as that implied by

the projection, likely? Actual experience in the first half of this decade compared with 1955–60 does show such a tendency. Although further study is needed, two considerations suggesting the likelihood of its continuation may be noted, one endogenous and one exogenous. First, even under relatively high employment conditions, the change in relative quality and quantity of young workers which is now taking place means that they are unlikely to enjoy an excess demand situation comparable to that of 1940–55. Hence, it seems doubtful that a significant contribution to household growth through increases in headship rates will occur among this group. Second, an important factor raising household growth in the past fifteen years has been the noticeable rise in headship rates among the older population, aged 55 and over, and it is questionable that this will continue at the same pace. A principal factor in this has been the rapid extension of social security coverage. The percentage receiving OASDI benefits in the relevant population groups provides a rough though imperfect indication: [21]

	1950	1963	1975 (projected)
Males aged 60–64	0	16	22
Males aged 65 and over	25	78	89
Females aged 60–64	0	29	29
Females aged 65 and over	17	72	90

Although projections relating to such politically sensitive areas are patently hazardous, the figures provide some justification for the view that the economy has largely passed through the period when the adoption of social security would have its largest impact on headship rates among the older population. Though some additional growth from this source is probable, its quantitative importance seems likely to be less than in the immediate past.[22]

[21] I am grateful to Francisco Bayo, of the Social Security Administration, for the absolute data on beneficiaries, on the basis of which these percentages were computed.

[22] This discussion bears on Edward F. Denison's criticism [47, p. 531] that ". . . the long-wave background gets [Burnham] Campbell no farther than others who have based forecasts of housing starts on the normal increase in households that would result from population changes in relevant age-sex groups. . . ." The present analysis suggests that not only the population component of household change should be studied, but also the "rate" component, and that the long-swing

To sum up, although a more thorough investigation is needed, this analysis makes clear that in the current and coming decade, contrary to what one might expect, an upswing in household growth is neither a simultaneous nor automatic accompaniment of a surge in labor force growth arising from the echo effect of the baby boom. True, there is an echo effect exerting an upward pressure on household growth, but it lags behind that in labor force growth and is more attenuated. In addition, there are circumstances, partly endogenous and partly exogenous, which may dampen this upward pressure by slowing the rise in headship rates among young and old, thereby reducing the contribution to household growth from the "rate" component source. Therefore, under such new circumstances of labor supply, in which an echo effect supplies the labor requirements arising from an upswing in the growth of aggregate demand, it is far from clear that a substantial reinforcing stimulus to the boom from an upsurge in household growth will occur as it did in the past.

Longer-Term Future

Though at first glance it is tempting to pronounce that the emergence of an echo effect has created a new "built-in" long-swing mechanism, a more careful look at current changes and those in prospect over the next decade creates doubt that any such simple generalization is warranted. However, more study of the determinants of household growth by age group is needed, including attention to "gross" changes (formations and dissolutions) and their implications for spending. (Clearly, implications for spending when social security forestalls dissolution of a home are likely to be quite different from those arising from accelerated household formation among young persons.) The relative weight of endogenous vs. exogenous elements in labor force and household growth needs clarification too. For example, while the present analytical scheme suggests that there is

approach may be of value in clarifying the movements in the "rate" component. The reference to OASDI, however, shows clearly that other factors are pertinent and that more intensive study is needed of the determinants of headship rate changes, including factors such as school enrollment and marital status. Clearly, throughout this analysis, no attempt has been made to consider the possible bearing of the Vietnam War.

a tendency for movements in the "rate" and population components to be at least partly offsetting for both labor force and household growth, the dampening at present appears to be greater for household growth. Is this attributable wholly to exogenous circumstances or is it partly inherent in the mechanism? Moreover, perhaps undue attention has been given here to demographic reactions from the household growth side. In commenting on this chapter, Abramovitz pointed out that, in addition to such considerations, accelerated growth in labor force, for whatever reason, may at least permit a protracted boom to be sustained by keeping the "natural rate" of output growth above the "warranted rate" for a longer period, thus postponing the time when an output ceiling may act as a brake on long-term capital investment.

Certainly the emergence of demographic echo effects is a new phenomenon which must be reckoned with in assessing the longer-term future. For example, another possibility, though not the only one, is that an echo effect creates a tendency toward waves in labor force growth with a duration longer than Kuznets cycles and, at the same time, upswings in the growth of aggregate demand initiated by nondemographic factors occur with the frequency of past Kuznets cycles. Under such circumstances, the impact of the demand movement on the labor market and the reactions stemming therefrom could be highly variable, depending on whether the flood, ebb, or some intermediate stage of labor force growth prevailed at the time. In this connection, it should be noted that the current decline in the crude birth rate has, in only eight years, wiped out the increase since 1940. (This is not true, however, of age-adjusted fertility measures.) Beyond 1975, this will produce a shift in relative numbers of young and old in a direction similar to that of the 1940's and early 1950's (cf. Figure 18). If aggregate demand conditions are favorable, this creates the possibility of economic-demographic interactions at that time like those of the post-World War II era.

Finally, there is nothing in this analysis which implies that Kuznets cycles in the economy's growth rate are not susceptible to elimination through appropriate policy measures. If the emphasis

on the central role of aggregate demand is correct, then, as Abramovitz and Hickman have also suggested, manipulation of effective demand should make it possible largely to eliminate discernible long swings. But the analysis does imply that determination of the appropriate policy measures may call for more attention to variables and relationships of the type suggested here than has been customary in the past.