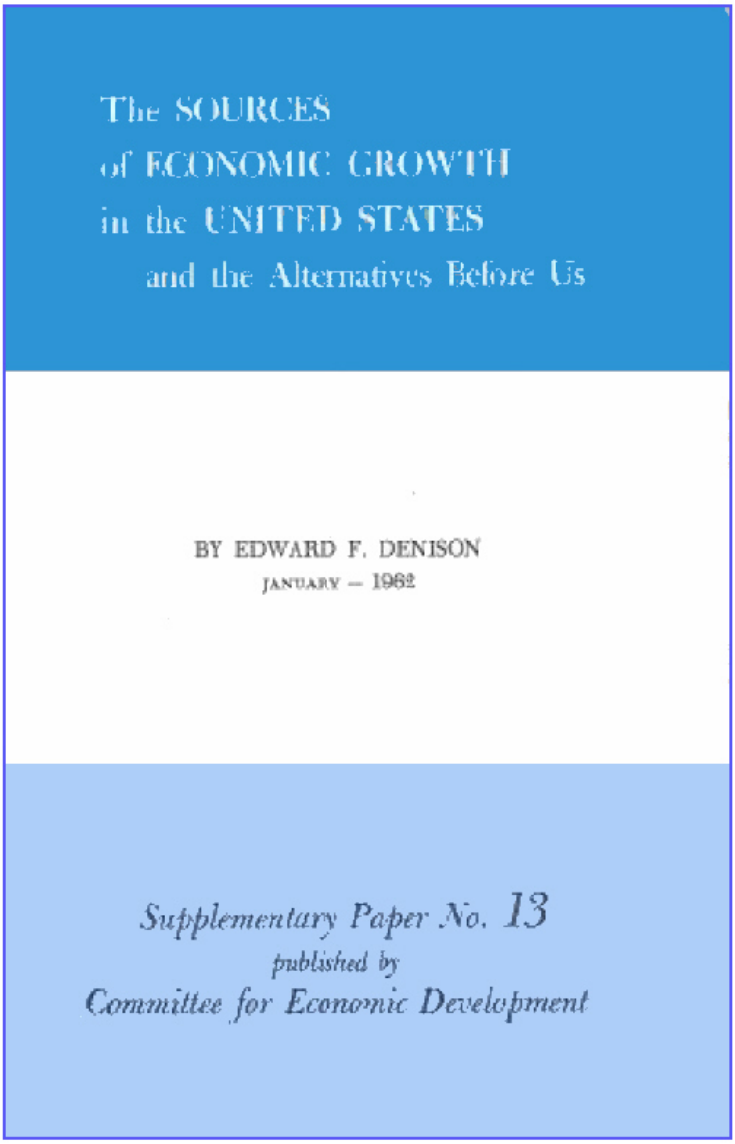

Chapter 5

Employment and Hours of Work: Their Contribution to Past Growth and a Projection of the Future

The Sources of Economic Growth in the United States and the Alternatives Before Us
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Chapter 5

Employment and Hours of Work: Their Contribution to Past Growth and a Projection of the Future

Labor is by far the nation's largest productive resource. Consequently it is particularly important to measure it accurately. The progressive shortening of weekly and annual hours of work interposes the largest obstacle to doing so.[1]

The difficulty arises because neither an hour's labor nor a year's labor is the same amount of work when a man works 72 hours a week as when he works 48 or 35. As hours are shortened, the product turned out in an hour usually increases as a direct consequence of the change in hours. A measure of labor input is needed that takes account of the relationship between hours and output so that a unit of labor represents the same contribution to production regardless of the length of the workweek or workyear.[2]

Series for employment and hours

The first three columns of Table 5 provide an index of employment and estimates of both average "potential" working hours per year and average actual hours per year for the period 1909 to 1958. (Projections to later years shown in the same table will be discussed later.) Beginning with 1929 the employment index is based on the Office of Business Economics series for "per-

1. I refer here to long-run changes in normal or standard hours, not short-term changes reflecting the state of demand, which involve different considerations.
2. Were our object to measure the efficiency of the economic system in the sense of the ratio of its output to aggregate real costs of production, we should have to be concerned with the fact that an additional hour of work probably entails more "disutility" when hours are long than when they are short. For our purposes, the more important question concerns the relationship between hours and output. Importance of the purpose to the choice of a measure of labor input is discussed in (and much of the following discussion draws upon) the author's article, "Measurement of Labor Input: Some Questions of Definition and the Adequacy of Data," appearing in *Studies in Income and Wealth*, Volume 25, by the Conference on Research in Income and Wealth, a Report of the National Bureau of Economic Research, Princeton University Press, 1961, pp. 347-386. See also footnote 1 to Chapter 14.

sons engaged in production," the series most consistent with the national product estimates.[3] In this series, part-time workers are reduced to a full-time equivalent basis. The other estimates are all taken from a study by James W. Knowles.[4] The series for "potential" hours is intended to measure normal or standard hours; it is a series so smoothed as to eliminate the temporary effect of business fluctuations and wars on actual hours worked. These three series provide a starting point for derivation of the desired series for labor input.

Importance of knowing relationship between hours and output

The initial reductions from the six-day, sunup to sundown, standard that had prevailed in the Western world since the acceptance of Christianity occasioned no loss in total output; they probably increased it.[5] Aside from some very limited early experiments, these initial reductions took place, in different areas and industries, during the latter nineteenth century and the first three decades of the twentieth. Although the evidence is less clear, it is probable that further hours reduction since 1929 has cost something in output but that the loss has been far less than in proportion to the reduction in hours. It seems likely that hours are now sufficiently short for the major impact of further reductions to fall upon output.

Knowledge of the relationship between working hours and output is of great significance in the present study:

1. It is needed to measure the contribution of additional labor to past economic growth. From 1929 to 1957 employment increased 44.1 per cent but total man-hours worked increased only 17.5 per cent. Average annual growth rates were 2.93 per cent for total real product, 1.31 per cent for employment, and 0.58 per cent for man-hours worked. During this period labor comprised about 73 per cent of total factor inputs. If labor input were measured by employment, on the assumption that shorter hours had no effect on output per man, we would conclude that had nothing changed but the quantity of labor, the national product would have increased at a rate of .96 per cent a year (73 per cent of 1.31, the growth rate of employment). Hence we would suppose the increase in the quantity of work done explains 33 per cent (.96/2.93) of the growth rate of total output over this period.[6] However, if labor input

3. *Ibid.*
4. James W. Knowles, *The Potential Economic Growth in the United States,* Study Paper No. 20, Joint Economic Committee, January 30, 1960, pp. 26-27. Knowles relied mainly on estimates by John W. Kendrick.
5. The only reason for any doubt that they increased total output by increasing labor efficiency is that hours reduction had a dual effect on output. It not only improved the efficiency of the worker himself, but also was frequently the occasion for reorganization of procedures within the establishment to offset the cost of a higher per-hour wage. This latter effect is also relevant to the study of growth, but not to the measurement of labor input as such. Historical studies show rather conclusively that hours shortening did not reduce (and often increased) output per man, but cannot distinguish clearly between the two kinds of effect.
6. This is only an approximation (but a close one) to the method I finally adopt (in Chapter 23) to compute the contribution of the change in each type of input to the growth rate. For the mathematically minded, it may be noted here that a main advantage of basing the computation on growth rates is the near-elimination of the statistical problem of "interaction" among the various sources of growth. See Chapter 13.

Table 5

Employment, Hours, and Labor Input Adjusted for Hours Changes 1909 - 1980

Year	(1) Employment (index, 1929 = 100)	(2) Average annual hours per employee (in hours) Potential	(3) Average annual hours per employee (in hours) Actual	(4) Labor input adjusted for hours (index, 1929 = 100)
1909	73.1	2,704	2,704	72.5
1910	75.0	2,700	2,705	74.6
1911	76.2	2,696	2,715	76.2
1912	78.4	2,692	2,722	78.8
1913	79.6	2,687	2,704	79.6
1914	78.7	2,683	2,688	78.4
1915	79.1	2,678	2,659	78.1
1916	84.3	2,669	2,668	83.8
1917	87.2	2,661	2,665	87.0
1918	92.4	2,654	2,611	90.6
1919	88.9	2,642	2,551	85.6
1920	87.2	2,630	2,584	85.4
1921	82.7	2,619	2,461	77.6
1922	86.9	2,607	2,507	83.5
1923	92.3	2,596	2,544	90.4
1924	91.0	2,585	2,527	88.9
1925	93.5	2,573	2,549	92.6
1926	96.2	2,562	2,563	96.2
1927	96.4	2,551	2,547	96.3
1928	97.4	2,540	2,545	97.6
1929	100.0	2,529	2,528	100.0
1930	95.4	2,518	2,477	93.9
1931	88.8	2,507	2,435	86.3
1932	81.3	2,496	2,352	79.0
1933	82.3	2,486	2,336	77.4
1934	89.6	2,460	2,167	78.9
1935	92.8	2,429	2,210	84.3
1936	99.5	2,394	2,269	93.9
1937	102.0	2,366	2,310	98.9
1938	98.0	2,338	2,238	92.9
1939	100.8	2,312	2,272	97.8
1940	104.9	2,286	2,277	102.8
1941	114.9	2,270	2,300	114.3
1942	125.5	2,254	2,342	127.7
1943	137.8	2,238	2,410	144.9
1944	140.0	2,222	2,424	148.8
1945	136.4	2,206	2,331	140.1
1946	124.1	2,191	2,232	122.5
1947	124.7	2,175	2,199	121.8
1948	126.8	2,163	2,176	122.8
1949	123.8	2,150	2,153	119.0
1950	127.1	2,138	2,131	121.2
1951	135.8	2,126	2,117	129.1
1952	138.7	2,115	2,113	131.9
1953	140.8	2,104	2,096	133.2
1954	137.1	2,095	2,075	128.6
1955	140.2	2,086	2,098	133.2
1956	143.6	2,078	2,090	136.1
1957	144.1	2,069	2,061	135.0
1958	140.3	2,060	2,057	131.4
High employment projections:				
1960	149.5	2,039	2,039	139.3
1965	161.4	1,988	1,988	147.7
1970	176.0	1,936	1,936	158.2
1975	191.5	1,885	1,885	168.4
1980	208.8	1,833	1,833	179.3

were measured by man-hours, on the assumption that shorter hours had no effect on output per man-hour, only 15 per cent (73 per cent of .58/2.93) of the total growth rate would be ascribed to the increase in the quantity of labor. I believe both assumptions are extreme and untenable.

2. Knowledge of the relationship between hours and output is needed for projections of the probable future national product. As hours are shortened, the offset in greater labor efficiency must progressively decline, and at an increasing rate. Whatever the magnitudes and breaking points may be, it follows that a projection that assumes a continuation of hours reduction will have an upward bias if it implicitly assumes the increase in labor efficiency from shorter hours will be as great in the future as in the past; this is almost inevitable if the hours relationship is not treated explicitly. Indeed, a projection that uses *man-hours* in measurement of labor input and relies upon past experience to project productivity contains a built-in upward bias even if no future reduction in hours is assumed.

It is remarkable, in view of the virtual unanimity of opinion among economists as to the general shape of the relationship between hours and output, that the effect of hours shortening has received so little attention in published projections. It is often completely ignored even in their description.

3. Knowledge of the relationship between hours and output is needed to judge by how much output, and the future rate of economic growth, can be changed by altering the future course of hours.

The length of the workweek (and workyear) is, indeed, of particular interest in a study of growth because it is one of the few growth-determinants that ordinarily is established by conscious group decision. Federal and state governments, through legislation, now play a predominant role in establishing the general level of standard hours. Within the boundaries set by legal limitations, uniform hours are usually established for an entire group of employees.

Moreover, it is at least *possible* that working hours are not now set at levels that provide for maximum economic welfare. The actual process of hours determination may have led to hours too short to meet that criterion. If so, slackening the rate of hours reduction would accelerate economic growth while also increasing welfare.

Economic welfare is greatest when individuals work to the point at which the additional disadvantage of extra work and less leisure just equals the value of the additional production contributed or income earned. Unless employers and employees know the amount by which production is impaired by shorter hours, rational decisions are impossible. I do not believe either employers or employees have this information. Nor, with the present great uniformity of standard hours, can it be supposed that competition among firms, leading to expansion of those arriving at the correct level of hours and contraction of those that do not, serves as a substitute mechanism to assure arrival at a correct level.

In practice, past demands by workers for a shorter workweek have almost always explicitly required that there be no reduction in their weekly

earnings,[7] implying that no income (or at most one year's normal increment to real income) was to be sacrificed for more leisure. From the standpoint of any particular group, this is possible without impairing profits only (1) if there is in fact no reduction in output per man or (2) if higher costs are passed on by their employers in the form of higher prices. But if the second is the case, the burden of the loss is simply shifted to others. As hours moved downward in all occupations, the income loss from shorter hours must have been dispersed throughout the population.

It is only a small exaggeration to say that workers' requests for shorter standard hours have in the past postulated *no* sacrifice of income (and hence, implicitly, no loss of output) while employer resistance to shorter hours has postulated a loss of output fully proportional to the reduction in hours. Only by sheer chance would these conflicting assumptions result in decisions that maximized welfare.

Moreover, in addition to comparisons of income and leisure, the desire for more jobs has influenced hours reduction. The general 40-hour week derives from the Fair Labor Standards Act of 1938, passed in a period of extremely widespread unemployment; in turn, it was conditioned by the earlier NRA codes put into effect when unemployment was even larger. It is at least doubtful that standard weekly hours would have been set where they were if the reduction had not been expected to result in more employment rather than entirely in less work being done.

Demands for a shorter standard workweek frequently result from declining employment in a particular trade or industry.[8] Recently, most demands for a shorter workweek (as distinguished from demands for holidays and vacations) appear to spring from such situations. They can succeed in their objective only if output per man declines (and, of course, if demand for the particular labor affected is inelastic), and it will not be surprising if workers do what they can to assure that it does in fact decline. Hours reduction for this purpose is the clear enemy of growth since it means that resources freed by rising productivity or changes in demand patterns are lost instead of being applied to production elsewhere.

At present, one can only surmise whether hours are too short or too long to maximize economic welfare. We need to know the actual rate of exchange between income and leisure.

Few studies offer more promise of adding to welfare and contributing to wise decisions in a matter that may greatly affect the future growth rate than a really thorough investigation of the present relationship between hours and output. Such an investigation would deal with a wide variety of occupations and industries operating under different conditions. It would consider different work patterns. The same number of annual hours may involve any number of combinations of vacations, holidays, occasional long weekends and normal weekly hours. The same number of weekly hours may be obtained by various combinations of daily hours and days or half-days of work.

7. This is less true of demands for longer vacations and more holidays, which are often considered in a context in which higher pay is an alternative.
8. This situation should be distinguished sharply from temporary reduction of actual hours to spread work in periods of general recession, which may often be desirable.

Each of these patterns, the scanty evidence available suggests, may affect output differently. Partly because of commuting time, their benefit to employees also varies. Such an investigation would have to be on a large scale, and would face such exceptional difficulties that it might prove inconclusive. But it might aid in rational resolution of questions of the greatest importance to growth.

Derivation of labor input adjusted for hours changes

Since employment and man-hours are both biased measures of labor input and biased to a different degree at different times, their use is unacceptable when a series can be constructed that at least *may* be reasonably correct. I therefore present a third, notional, series for labor input that could be a reasonable approximation of the truth; its merit is that it is consistent with the general pattern of expectations and is not, I think, demonstrably wrong.

I assume that at the level of normal hours prevailing in 1929 (2,529 hours a year or an average of 48.6 a week based on 52 weeks) a slight reduction in hours is fully offset by a rise in output per man-hour. I assume that at the level prevailing in 1957 (2,069 hours a year, or 39.8 a week) a slight change in hours is offset to the extent of 40 per cent by an opposite change in output per man-hour, so that a 1 per cent reduction in hours reduces output per man by .6 per cent.

Corresponding changes at intermediate levels are established by proportional interpolation. (Thus, at 2,299 hours, half-way between, production is assumed to change .3 per cent with a 1 per cent change in hours.) This turns out to imply that the effect of the 18.2 per cent reduction in average potential hours over the entire 1929-57 period was to reduce output per man by 6.0 per cent, in comparison with what it would have been in 1957 had hours not changed.

The relationship was extended upward to derive a series for the 1909-29 period. This implies that before 1929 hours were above the point of maximum output per man, but the resulting series is almost identical with that for employment. Later, in derivation of a projection for the future, the relationship is also extended downward. This implies that changes in output become fully proportionate to changes in hours at a level of 1,762 hours a year, or 33.9 hours a week based on 52 weeks.

In short, I put the point of maximum total output per man at 2,529 hours a year and that of maximum output per man-hour at 1,762 hours.[9]

By use of this assumed relationship, and the series presented for employment and potential average hours, a series is constructed that measures labor input, adjusted for changes in normal hours, when actual hours are the same as potential hours.

This series is then adjusted to measure actual labor input by multiplying it by the ratio of actual average hours to potential average hours. This adjustment is of no consequence in the comparison of our "key" years, 1909,

9. I assume the curve relating output to hours to be stable over time (when hours are stated on the horizontal axis and output, measured as a percentage of output at any given number of hours, is plotted on the vertical axis).

1929, and 1957. For years in which actual and potential hours differ substantially (which includes the entire period from 1930 to 1946 except perhaps 1937 and 1940-41) this series has limited meaning because it does not take account of the short-term relationship between hours and output. This difficulty is no greater and no less than in the use of aggregate man-hours to measure labor input. The improvement is in longer-term comparisons, which abstract from business fluctuations. The final series is shown in column 4 of Table 5.

Whether or not the numbers I have used to allow for hours changes are near the truth, the general principle they imply is certainly correct. As the workyear becomes shorter, each percentage reduction in hours entails a progressively greater sacrifice of output. Thus a given percentage increase in aggregate man-hours worked (resulting from a rise in employment partially offset by shorter hours) has meant, and will continue to mean, a progressively smaller percentage increase in effective labor input.

The assumed relationship between hours and output is meant to reflect the fact that business capital and land usually are used less intensively as working hours fall.[10] The measure views the resulting loss of output as wholly the consequence of a decline in labor input, not capital and land input. Consistent with this, my measures of input of capital and land do not fall when working hours decline.

The contribution of changes in employment and hours to past growth

From 1929 to 1957 the quantity of labor input adjusted for changes in hours increased at an annual rate of 1.08 per cent. With labor comprising 73 per cent of total factor input in this period (as given in Table 4) it follows that the change in employment and hours alone would have provided an average annual increase in real national income of .79 percentage points (73 per cent of 1.08), or 27 per cent of the actual (2.93) growth rate of national product. I therefore credit 27 per cent of the growth of output in this period to the increase in the quantity of work done.[11]

The reader was promised the opportunity to adjust my results if he preferred assumptions different from mine. The main specific assumption upon which this result rests is that greater efficiency *resulting* from shorter hours offset 68 per cent[12] of the average annual reduction in hours over the 1929-57

10. Charles L. Schultze states that "in all probability not less than two-thirds of the historical reduction in average hours of labor was accompanied by reduced hours of business capital utilization." ("Some Effects of Changes in Working Hours on Investment, Output, and Real Wages," a paper presented at the American Statistical Association meetings held in Detroit in September 1956.) He has subsequently indicated to me that he now thinks this is probably an overestimate.
11. When all changes in "inputs" have been derived I shall give similar estimates for 1909-29. At this preliminary stage, I confine myself to the 1929-57 period. Also, when all elements in growth have been measured, the results shown here, and in other chapters considering separate elements, will be slightly modified. Final results are given in Chapter 23; in this case my final estimate is also 27 per cent.
12. This figure is based on growth rates; it means that the growth rate of labor input adjusted for hours (1.08) was 68 per cent of the distance from the growth rate of man-hours (.58) to that of employment (1.31).

period as a whole (with the offset dropping from 100 per cent at its beginning to 40 per cent at its end). The estimate of a 68 per cent offset would be reduced if the point at which output per man is highest had been set above the equivalent of 48.6 hours a week for 52 weeks or if the estimate of a 40 per cent offset at 39.8 hours a week (the 1957 level) were reduced. Conversely, setting the point of highest output per man below 48.6 hours a week, or raising the 40 per cent offset assumed at 39.8 hours a week, would increase the 68 per cent offset calculated for the 1929-57 period.

Two alternative patterns may be considered. If the point of maximum output per man were put at the highest figure I have heard suggested, 60 hours a week for 52 weeks (with the assumption of a 40 per cent offset at the 1957 level of hours retained) the estimate of a 69 per cent offset from 1929 to 1957 would drop to 53 per cent.

On the other hand, adoption of a pattern suggested by Professor Reynolds would yield a larger offset. He writes: "There have been too few careful studies to enable one to speak with much confidence about the actual length of the maximum output week in the United States at present. The evidence suggests, however, that it is probably somewhere between 40 and 50 hours for most occupations." In order to calculate the effects of a further reduction of the standard workweek from 40 to 30 hours, he supposes that this would cause an increase of 20 per cent in output per man-hour, so that weekly output per man would fall by 10 per cent.[13] This pattern gives nearly as great an offset (60 per cent, since output per man-hour would be up 15 per cent with a 25 per cent reduction in man-hours) in moving from 40 hours to 30 as I have allowed for the reduction from 48.6 to 39.8. It evidently implies an almost complete offset in the 1929-57 period.

The effect of altering the 68 per cent figure upon my estimate that changes in employment and hours were responsible for 27 per cent of growth from 1929 to 1957 can be readily calculated. I have already noted that the extreme assumption of no offset in greater efficiency would ascribe 15 per cent of the total growth rate of national product to the increase in the quantity of work done, while the assumption of a complete offset in greater efficiency would ascribe 33 per cent of total growth to this source. The reader can obtain the result of any other assumption simply by multiplying the percentage offset he wishes to assume by the difference between these two numbers, 18, and adding it to the lower figure, 15. Thus, the assumption of a 50 per cent offset would ascribe 24 per cent of growth (15+50 per cent of 18) to the increase in work done, the assumption of an 80 per cent offset 29 per cent of growth, the assumption of a 110 per cent offset (implying that in 1957 hours were still above the point of maximum output per man) 35 per cent of growth and so on. The reader should understand that, while I do not imagine my result to be at all precise, neither do I think it is subject to anything like the error that the wide range of calculations given in this paragraph might suggest. An offset of less than 50 per cent or as much as 100 per cent — and hence a contribution of less than 24 per cent or as much as 33 per cent of total growth — strikes me as unlikely.

13. Lloyd G. Reynolds, *Labor Economics and Labor Relations*, 2nd Edition, Prentice-Hall, Inc., New York, 1954, pp. 255-6.

My results as finally adjusted imply that, other things being the same, if hours had remained at the 1929 level the average annual growth rate of national product from 1929 to 1957 would have been 3.13 per cent rather than 2.93.

Future changes in employment and hours

The Bureau of Labor Statistics has prepared projections of the total labor force (including the armed forces) for the years 1960, 1965, 1970, and 1975. To extend the B.L.S. series to 1980, I have used the 1975-80 percentage change implied in an earlier projection by the Bureau of the Census.[14] As a measure of employment under prosperous peacetime conditions, I take 96 per cent of the projected labor force (including the armed forces). These figures, together with the comparable employment estimate for 1957 reported in the *Monthly Report on the Labor Force,* serve as an index to project into the future the 1957 employment estimate of the Office of Business Economics.[15] One adjustment is required. The Bureau of Labor Statistics projects an increase in the proportion of part-time workers sufficient, with no change in hours of full-time workers, to reduce average weekly hours of full-time and part-time workers combined by one-half hour from 1955 to 1965, or about 1.22 per cent in ten years. (After 1965 no further adjustment is indicated.)[16] To obtain a series for "persons engaged in production," the employment series was adjusted downward by .122 per cent a year from 1957 to 1965. The resulting index of employment is shown in Table 5.

The labor force projection underlying this series reflects changes in the size and composition of the population as now foreseen, and continuation of past trends in labor force participation rates. There is, of course, room for differences of opinion as to how these should be measured. The B.L.S. projection, and three projections by the Bureau of the Census, compare as follows:

	Labor Force (millions)			
Year	Census series A	Census series B	Census series C	B.L.S.
1957 (actual)	70.7	70.7	70.7	70.7
1960	73.3	73.3	72.8	73.6
1965	79.7	79.7	78.6	79.9
1970	87.3	87.3	85.6	87.1
1975	95.7	95.6	93.3	94.8
1980	104.8	104.2	101.5	103.4[1]

[1] Estimated from the 1975-80 movement of Census Series B.

14. *Bulletin 1242,* Bureau of Labor Statistics, U.S. Department of Labor; Census Projection B from 1959 *Statistical Abstract of the United States,* Table 264, p. 207.

15. I have linked at 1957 to minimize difficulties created by differences in cyclical movement between Census and Office of Business Economics employment estimates. Census employment in 1957 was 95.85 per cent of the labor force (including the armed forces).

16. *Bulletin 1242,* Bureau of Labor Statistics, U.S. Department of Labor, p. 50.

The three Census projections utilize the same numbers for total population but different labor force participation rates.[17] The B.L.S. prepared its own estimates of population, and used participation rates based on average annual rates of change from 1920 to the average of April rates for 1954-56.

The actual labor force in 1960 was reported as 72.8 million, 0.8 million below the B.L.S. projection and the same as the Census Bureau's "C" series. The gap between the 1960 estimates and the B.L.S. projection for 1960 may arise (1) because the B.L.S. projection is an overstatement and the Census "C" series is correct; or (2) because sampling or reporting errors caused understatement of the reported 1960 labor force; or (3) because the 1960 labor force was temporarily smaller than it would have been if employment opportunities had been more plentiful.[18] My use of the B.L.S. series may seem to imply that the second or third, rather than the first, of these possibilities represents the true situation. However, it reflects no real judgment that this is so but only the necessity of making some choice among the available projections, taking note that the Census A and B series rise above the B.L.S. projection after 1965, and that the Census "C" series, which also assumes high employment, has not been widely used.[19] However, a strong case for use of the "C" series could be made.

The range from the highest to the lowest labor force projections is enough to affect the projected future growth rate of national product over the next 10 or 20 years by only about .1 percentage point, but actual experience may easily fall outside this range.

There is less basis for projection of working hours than of the labor force. The past general pattern of changes in normal or "potential" average annual hours of work was a gradual decline until the thirties, then a sharp decline until the late forties, followed by a slowing-down of the decline until about 1954 when it leveled off at a low rate. From 1948 to 1958 Knowles' estimates of potential average annual hours per employee drop an average of 10.3 hours per year. This is the smallest decline experienced over a decade since 1920[20] and may be a reasonable estimate of future declines if business is generally prosperous and no important changes occur in legislation affecting hours. I use this decline to extrapolate "potential average annual hours per employee" after 1958. From 2,069 in 1957 the series thus drops to 1,936 in 1970 and 1,833 in 1980. The product of the employment series and potential hours furnishes a measure of aggregate man-hours under high-employment conditions. Application of the assumed relation between hours and output already described furnishes a series for labor input adjusted for the effects of changing hours.

17. Series A projects the average annual rates of change observed in labor force participation rates from 1920 to 1954-56, Series B those observed from 1950 to 1955. Series C uses Series B rates for men 14 to 24 and women 14 to 34, and Series A rates for other age groups.

18. See Chapter 6, pp. 64-65.

19. The B.L.S. projection replaced those of the Census Bureau in the 1960 *Statistical Abstract of the United States*, thus gaining whatever degree of official status this may imply.

20. Over the short period 1954 to 1958, the decline is 9 hours a year.

How does the prospective future growth of labor input adjusted for the effect of changes in normal hours compare with past trends?

Table 6

Average Annual Growth Rates of Employment, Man-hours, and Labor Input Adjusted for Hours

(per cent per annum)

Period	Labor Input Adjusted for Hours	Employment	Man-hours
1909-57	1.30	1.43	0.85
1929-57	1.08	1.27	0.58
1957-70	1.23	1.55	1.06
1957-80	1.24	1.63	1.11

Table 6 shows that the average annual growth rate in this series from 1929 to 1957 was 1.08 per cent and over the whole period 1909 to 1957 it was 1.30 per cent. The growth rate implied by the projection is 1.23 per cent from 1957 to 1970 and 1.24 per cent from 1957 to 1980. These are a little lower than the 1909-57 rates, but about 0.15 percentage points above the increase from 1929 to 1957, which I have argued is a more relevant basis for comparison. This difference may warrant the statement that the growth in labor input, adjusted for hours, will contribute more to economic growth in the future than in the recent past but the difference is not striking.

The acceleration is much less than would be indicated by the crude use of either employment or man-hours to measure labor input. The rate of growth of employment is indicated to be above the 1929-57 rate by 0.28 percentage points from 1957 to 1970 and by 0.36 percentage points from 1957 to 1980. The indicated rate of growth of man-hours (the series most commonly used in projections) from 1957 to 1970 is 0.48 percentage points, and from 1957 to 1980 0.53 percentage points, above the 1929-57 rate. These differences between past and future rates are more than triple those indicated by my measure of labor input. If my adjustment for the effect of changing hours is at all near the mark, the use of man-hours much overstates the contribution that an accelerated rate of increase in labor input is likely to make to future economic growth.