

# Long-Run Trends in Labor Supply

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*The recent “benign” combination of strong output growth and low inflation has led to speculation that the potential growth rate of real GDP has increased. This paper examines trends in labor supply to see whether this source of GDP growth might have accelerated.*

*Discussions of labor supply often focus on labor force participation. But other considerations—such as the length of the workweek, the amount of time spent away from work and the demographic structure of the population—also have been important in causing trend shifts in labor supply.*

*My analysis suggests that no significant increase in the growth rate of any of these dimensions of labor supply is likely in the near future. So if potential GDP is to accelerate, this must come from faster productivity growth.*

In recent quarters, the U.S. economy has achieved a “surprisingly benign” combination of strong real growth and low inflation (see Greenspan 1997). The reason it is surprising is that, typically, sustained strong real growth has led to inflationary pressures. The question of why inflation has remained low has given rise to a heated debate over whether the U.S. economy has entered a new era in which it can enjoy faster aggregate demand growth without provoking inflation.

Many economists (e.g., Meyer 1997) subscribe to the view that there is some threshold level of the unemployment rate at which supply and demand are balanced in the labor market (and perhaps in the product market as well). This balance yields a constant inflation rate. If the unemployment rate falls below this threshold level (often called the *Non-Accelerating Inflation Rate of Unemployment*, or NAIRU), inflation tends to rise progressively over time. The current unemployment rate is widely believed to be below this threshold; hence the puzzlement at the low inflation rate.<sup>1</sup>

A possible explanation of the recent failure of inflation to rise in the face of strong GDP growth and low unemployment is that the NAIRU has declined, i.e., the level of the unemployment rate at which the supply of and demand for labor are in balance may be lower than it used to be. The argument, expressed, for example, by Chairman Greenspan (1997), that technological change has added to workers’ insecurity in recent years and made them less willing to push for higher wages may be thought of as one version of this explanation. Greater insecurity might reduce the upward pressure on wage rates at any unemployment rate and so lower the threshold rate at which wages (and prices) would begin to move upward.

However, any improvement in the trade-off between real GDP growth and inflation coming from a decrease in the NAIRU would be temporary. Once the NAIRU settled at a new (lower) level, further declines in unemployment coming from rapid GDP growth would again put upward pressure on inflation. Put differently, although workers may be

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1. Governor Meyer (Meyer, 1997) provides a series of alternative estimates of the NAIRU, all of which are above the current 5 percent unemployment rate.

temporarily inhibited from seeking wage hikes if they are insecure in their jobs, insecurity will not increase continually. At some point, strong GDP growth will cause unemployment to fall so low that workers will overcome their inhibitions, and wages (and prices) will begin to accelerate again. A permanent improvement in the trade-off between real growth and inflation can come only from an increase in the steady-state or potential growth rate of real GDP. Such an increase in potential growth makes it possible for output to grow correspondingly faster without pushing the unemployment rate below its threshold, wherever that happens to be.

In the long run, the growth in the nation's real GDP depends on the growth of the available supply of labor and the productiveness of that labor. Most recent estimates of this steady-state growth rate put it at about 2 percent annually, comprised of 1 percentage point of growth in the labor supply and another 1 percentage point of productivity growth. A higher potential growth rate would mean that policymakers could aim for faster growth in nominal aggregate demand while continuing to keep inflation under control. The Federal Reserve, with its stated goal of moving the economy toward price stability, has a strong interest in the determinants of potential growth. This paper looks at some of the factors behind one of the determinants of potential growth, namely, the growth rate of the labor supply, with a view to judging whether this has changed in recent years.

## I. LABOR FORCE PARTICIPATION

The labor force participation rate measures the proportion of the adult population that is either employed or looking for work.<sup>2</sup> The three decades prior to 1990 saw a significant increase in labor force participation in the United States. During 1960, some 59.4 percent of the civilian adult population was either employed or looking for a job. The participation rate had risen to 60.4 percent by 1970, and greater increases followed in the subsequent decades, bringing the rate to 63.8 percent in 1980 and 66.5 percent in 1990. However, in the first half of the current decade, growth in participation slowed sharply: it averaged 66.6 percent in 1995. More recently, growth in participation appears to be picking up again: between January 1996 and July 1997, the labor force increased by 3.4 million persons and the participation rate rose by  $\frac{1}{2}$  percentage point to 67.1 percent. If this growth in participation were to continue, it

might imply faster growth in the supply of labor and hence in potential GDP.

Most of the growth in participation prior to 1990 was due to the entry of increasing numbers of women into the paid labor force. Female participation went from 37.7 percent of the female adult population in 1960 to 57.5 percent three decades later.<sup>3</sup> Most of this increase was among women in the prime working ages from 25 to 55 years. Over this same period, male participation trended slowly downward—from 83.3 percent in 1960 to 76.4 percent in 1990—largely due to earlier retirement by older male workers. Thus, the age and gender makeup of the labor force changed significantly in this period.

It is useful to decompose the overall change in participation into that due to changes in the participation of individual demographic groups in the population and into that due to changes in the demographic structure of the population (in terms of age, race, and/or gender). Thus, a rise in total participation that occurs when an individual person chooses to enter the work force may be thought of as a “real” increase, whereas a rise that occurs, for example, because the number of prime-age persons (with high rates of participation) increases and that of older or younger persons (with lower participation) declines—but no individual changes his or her behavior (except as a result of age)—is a “demographic” effect.

The effects of demographic changes over any period may be separated out from other influences by estimating how the overall participation rate would have evolved if participation by individual population groups (defined in terms of age, race, and/or gender) had changed, but the proportions of those groups in the overall population (the “demographic structure” of the population) had remained constant from a particular base period.<sup>4</sup> A problem with this procedure for constructing a “real” or “demographically adjusted” participation rate is that it depends on the date chosen as the base period. The change in the adjusted participation rate between, say, 1987 and 1997 will be different according to whether it is computed using the population structure in 1987, 1997, or some other base period. Similarly, if there has been a substantial change in the demographic structure since the base period, changes in an adjusted participation rate constructed in this way may be misleading. For example, the change in the adjusted participation rate from 1996 to 1997 constructed using the

2. More precisely, the civilian participation rate is the ratio of the civilian labor force to the non-institutionalized civilian population, 16 years of age or older.

3. For a useful discussion of longer run trends in women's participation, see Smith and Ward, 1985.

4. Research on the effects of changes in unemployment on inflation frequently uses “demographically adjusted” unemployment rates that are constructed in a similar way. See, for example, Motley (1990).

demographic structure of, say, 1987 may be a misleading indicator of what actually happened to the labor supply between those two years.

The division of participation changes into real changes and demographic changes is analogous to the decomposition of nominal GDP changes into those associated with changes in output (real GDP) and those due to changes in the prices at which output is valued. Exploiting this analogy, I have decomposed the participation rate using the same method as that used by national income accountants in decomposing nominal GDP.

The overall participation rate may be written as the weighted sum of the participation rates of the various demographic groups, where the weights represent the shares of each group in the total population. Thus:

$$(1) \quad I = \frac{L}{P} = \frac{\sum_{i=1}^N L_i}{\sum_{j=1}^N P_j} = \sum_{i=1}^N \frac{P_i}{\sum_{j=1}^N P_j} \times \frac{L_i}{P_i} = \sum_{i=1}^N i_i l_i.$$

In this expression,

$$I = \frac{L}{P} \quad \text{and} \quad l_i = \frac{L_i}{P_i}$$

are the overall participation rate and the participation rate of the *i*-th group (*i* = 1, *N*) in the population, and

$$i_i = \frac{P_i}{P} = \frac{P_i}{\sum_{j=1}^N P_j}$$

represents the proportion of group *i* in the population.

A “Laspeyres” measure of the real or demographically adjusted change in participation over some period is constructed by computing how much overall participation would have changed if the proportions of each demographic group in the population had remained constant at the levels of the beginning of the period.<sup>5</sup> Conversely, a “Paasche” measure would hold the proportions constant at the levels of the end of the period. A “Fisher ideal” measure is the geometric average of the Laspeyres and Paasche indexes. In the national accounts, a Fisher ideal measure is used to construct the growth rate of real GDP.<sup>6</sup>

The Laspeyres and Paasche measures of the growth in participation from period *t* to period *t*+1 are:

$$\frac{I_{t+1}}{I_t}^L = \frac{\sum_{i=1}^N i_{i,t} \times I_{i,t+1}}{\sum_{i=1}^N i_{i,t} \times I_{i,t}}$$

and

$$\frac{I_{t+1}}{I_t}^P = \frac{\sum_{i=1}^N i_{i,t+1} \times I_{i,t+1}}{\sum_{i=1}^N i_{i,t+1} \times I_{i,t}}.$$

The Fisher ideal index is the geometric mean of the Laspeyres and Paasche measures:

$$(2) \quad \frac{I_{t+1}}{I_t}^F = \left( \frac{I_{t+1}}{I_t}^L \right)^{\frac{1}{2}} \times \left( \frac{I_{t+1}}{I_t}^P \right)^{\frac{1}{2}} \\ = \frac{\sum_{i=1}^N i_{i,t} \times I_{i,t+1}}{\sum_{i=1}^N i_{i,t} \times I_{i,t}} \times \frac{\sum_{i=1}^N i_{i,t+1} \times I_{i,t+1}}{\sum_{i=1}^N i_{i,t+1} \times I_{i,t}}.$$

I have constructed Fisher ideal indexes of participation from 1960 to 1996 using a demographic breakdown of the population by age, race, and gender.<sup>7</sup> Equation (2) is used to construct quarterly growth rates of the Fisher ideal index. These quarterly *growth rates* are chained together (forward and back) from the 1980.Q4 level to yield a chain measure of the *level* of the real or demographically adjusted participation rate. The advantage of this chaining procedure is that the measure of participation growth in each quarter de-

5. The “demographically adjusted” unemployment rates referred to in the preceding footnote usually are constructed as Laspeyres-type indexes.

6. In the national accounts, the Fisher ideal measure is preferred partly because it avoids the ambiguity associated with the choice of a base pe-

riod, but also because both the Laspeyres and Paasche measures of real GDP growth are subject to so-called “substitution” bias. This bias arises because changes in the relative prices of individual goods and services cause purchasers to alter the composition of their spending. It can be shown that, provided various technical conditions are satisfied, use of the Fisher index eliminates substitution bias. For a discussion of Fisher ideal indexes in the context of national accounting, see Triplett (1992).

A similar sort of bias in measuring overall participation might arise if changes in population shares (*i<sub>i</sub>*) affected group participation rates (*l<sub>i</sub>*). This could occur, for example, if an increase in population in group *i* tended to lower relative wages to workers in group *i*, which reduced participation in group *i*. In this case, the Laspeyres index would tend to be biased upward, and the Paasche index to be biased downward. In general, it is not known if such biases exist. However, over the period from 1972 to 1996, changes in the Laspeyres measure generally exceeded changes in the Paasche measure, which might be evidence of bias.

7. In these calculations, each gender is divided into 7 age groups and 3 race groups, so that *N* is 21 (7 × 3) for each gender. For the whole population, *N* is therefore 42.

depends on the structure of the population in that quarter.<sup>8</sup> This procedure is similar to that used in constructing measures of the level of real GDP in “chained (1992) dollars.”

The results of this adjustment are shown in Figure 1. The solid lines refer to the actual data, while the dashed lines refer to the demographically adjusted estimates. Taking account of demographic changes makes almost no difference to the trend of female participation, indicating that changes in the race/age structure of the female population have been only minor factors in the growth of participation since the mid-1970s. Most of the increase in female participation, in other words, was a “real” phenomenon, as individual women chose to enter the workforce. In the case of males, demographic changes had a greater effect, most recently in the early 1980s and, to a lesser extent, in the early 1990s. From 1980.Q1 to 1984.Q4, for example, the actual male participation rate fell by 1.3 percentage points, whereas the demographically adjusted rate fell by 1.8 percentage points. By contrast, actual male participation fell 1.4 percentage points from 1990.Q4 to 1996.Q4 but only 1.1 percentage points when demographic effects are removed. Thus, demographic changes slowed the decline in male participation in the early 1980s, but hastened it in the early 1990s.<sup>9</sup> As Figure 1 makes clear, however, although demographic changes have, on balance, slowed the decline in male participation in the last 20 years, the overall downward trend has been primarily a “real” phenomenon and not the result of changes in the structure of the population.

## II. PARTICIPATION AND EXPERIENCE

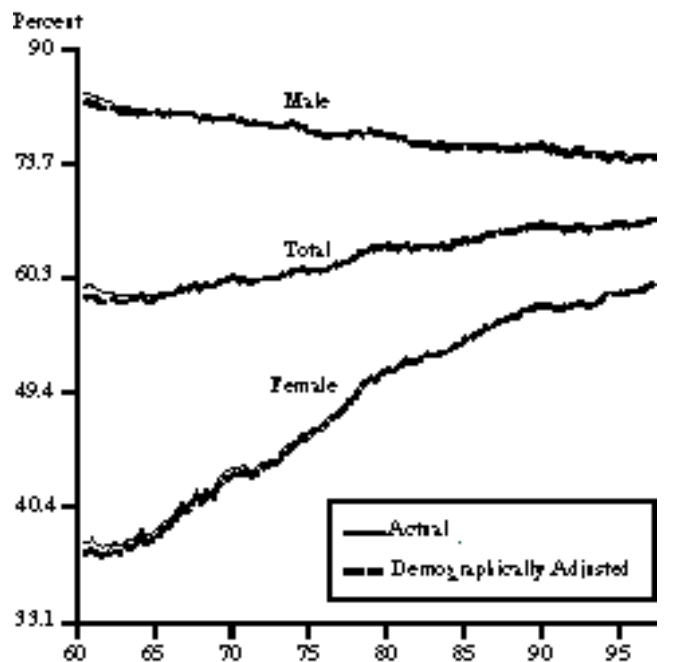
A majority of members of the labor force are year-round full-time workers, but significant numbers work either for only part of each week (usually described as “part-time” workers) or for only part of the year.<sup>10</sup> In 1995 (the latest year for which data are available), 62.9 percent of those who worked at all during the year were employed full-time (that is, for 35 or more hours weekly) for at least 50 weeks.

8. Strictly, it depends on the demographic structure at the beginning and at the end of the quarter.

9. These demographic effects on male participation mostly reflect changes in the population of teens and older persons. Teenagers and males over 55 years have lower rates of participation than those in the prime working years, and these persons were a decreasing proportion of the population in the early 1980s (which tended to slow the decline in overall male participation), but an increasing proportion in the early 1990s (which tended to speed the overall decline).

10. In what follows, the phrase “part-time” will be used to describe employment for less than a full week (less than 35 hours). Persons who spend less than a full year (50 weeks) in the labor force will be described as “part-year” workers.

FIGURE 1  
PARTICIPATION RATE



Another 15.8 percent worked full weeks but fewer than 50 weeks in the year (part-year full-timers), 9.1 percent were employed part-week for at least 50 weeks (year-round part-timers), and the remaining 12.2 percent were both less than full year and less than full week workers (part-year, part-timers).

The data on labor force participation discussed in the preceding section refer to both full-time and part-time participants. A person is treated as a member of the labor force in a given month if she is employed or looking for a job during the survey week, without regard to whether she is a full-time or part-time worker. These data are gathered from the monthly Current Population Survey (CPS), a sample survey of households from which, for example, the unemployment rate data also are constructed.<sup>11</sup> In March of each year, additional questions are added to this Survey, which are used to develop the “labor force experience” data for the preceding year. These data show the numbers

11. Labor market data derived from the CPS contain occasional discontinuities resulting from sample changes and redesigns of the survey. For example, samples are changed periodically to incorporate results of decennial population censuses. There is no evidence that these changes had sufficiently large effects on the data to upset any of the conclusions of the paper.

of persons who participated in the labor force, either working or looking for work, *at any time* during the year.

The “experience rate” in any year is the proportion of the population that participated (worked or looked for work) at any time in the year. Since many persons are not year-round participants, the experience rate for a year always exceeds the average monthly participation rate. Indeed, the ratio of the average monthly participation rate to the annual experience rate is an estimate of the proportion of the year that a typical individual with *some* experience actually spent in the workforce. For example, if 80 percent of the population was in the labor force at *some* time during a year (the experience rate was 80 percent), but the average monthly participation rate was only 60 percent, this implies that the *average* person actually participated during only three-fourths (60 divided by 80) of the year or nine months.

The increase in the overall participation rate since the mid-1960s has been due to both a gradual increase in the proportion of the total population that participated *at any time* during the year (rising “experience”) and an increase in the proportion of the year that the typical individual participated (rising “weeks participated”). In 1966, 68.4 percent of the adult population spent some part of the year either working or looking for work. By 1995, this proportion had risen to 70.9 percent. Over this same period, the proportion of the year that the typical individual either worked or looked for work rose from 45 weeks to almost 49 weeks.<sup>12</sup> There are no data on experience rates after 1995, so the most recent pickup in participation cannot be decomposed into the effects of changing workyears and changing experience rates.

I have used data on labor force experience broken down by gender and age to construct age-adjusted experience rates for each gender using the same Fisher index methodology as applied to participation rates.<sup>13</sup> Age-adjusted

12. The measure of “weeks participated” is calculated as the ratio of the participation rate to the experience rate multiplied by 52.

13. For the period since 1988, I have obtained data on labor force experience by age and gender. These data show the numbers of persons in each age-gender category who worked or looked for work during each year and are comparable with the data on labor force participation discussed earlier. For the period prior to 1988, the decompositions by age and gender are available only for persons who worked during each year and so do not include the (small) number of individuals who looked for work in any year *but never found it*. These data *do* include individuals who worked *and* looked for work during the year. In constructing the demographically adjusted measures of experience in this earlier period, I have assumed that the age-sex distribution of the narrower group (those who worked at some time in the year) is the same as that of the broader group (those who worked or looked at some time in the year).

“weeks participated” are constructed as the ratio of the adjusted participation rate to the adjusted experience rate multiplied by 52. The experience rates are shown for males and females in Figure 2, while Figure 3 shows the proportions of the year (measured in weeks) that the typical (male or female) individual either worked or looked for work.<sup>14</sup>

Figures 2 and 3 show that the long-term increase in the proportion of the population that participates in the labor force reflects changes both in the numbers that spend any time in the labor force and in the proportion of the year that those persons participate. The proportion of the male population spending any time in the labor force (the male experience rate) has trended downward more or less continually since 1960. The female experience rate has risen, though at a gradually slowing pace, and this rise in female experience has more than offset the decline in male experience. Similarly, most of the increase in “weeks participated” has been due to longer workyears of females, especially during the 1970s, although the workyears of males also trended upward slightly from the early 1970s to the early 1980s. Since the early 1980s, the lengthening of the workyear of females has continued, but at a slower pace, while that of males has largely stopped.<sup>15</sup>

Although demographic changes have had only small net effects on overall participation (see Figure 1), this is less true of its two components, the experience rate and the workyear. For males, Figures 2 and 3 indicate that most of the effect of demographic changes on overall participation in the last 20 years came through their impact on the length of the workyear between the late-1970s and the late-1980s. In this period, the gradual aging of the male population (and the corresponding movement of individuals into their prime working ages) caused the actual workyear to increase more than the demographically adjusted workyear. For females, changes in the age-structure also tended to cause a lengthening of the workyear, but at the same time they slowed the increase in female experience; as a result, age-structure changes had only minor net effects on female participation.

14. In the data used to construct Figures 2 and 3 (but not Figure 1), the adult population and labor force include persons aged 14 years or over for years before 1966, but only those aged 16 years or over from 1966 onward. In these data, both the experience and participation rates jumped between 1965 and 1966 because of the exclusion of 14–15 year-olds beginning in 1966. Since the labor force activity of these young persons was low, their exclusion causes average experience and participation rates to be higher after 1965. Unexpectedly, as indicated by Figure 3, their exclusion does not appear to have caused any significant upward shift in the level of “weeks participated” for either males or females.

15. As will be discussed later, although the growth in participation slowed after 1982, other aspects of work effort increased more rapidly.

FIGURE 2  
EXPERIENCE RATE

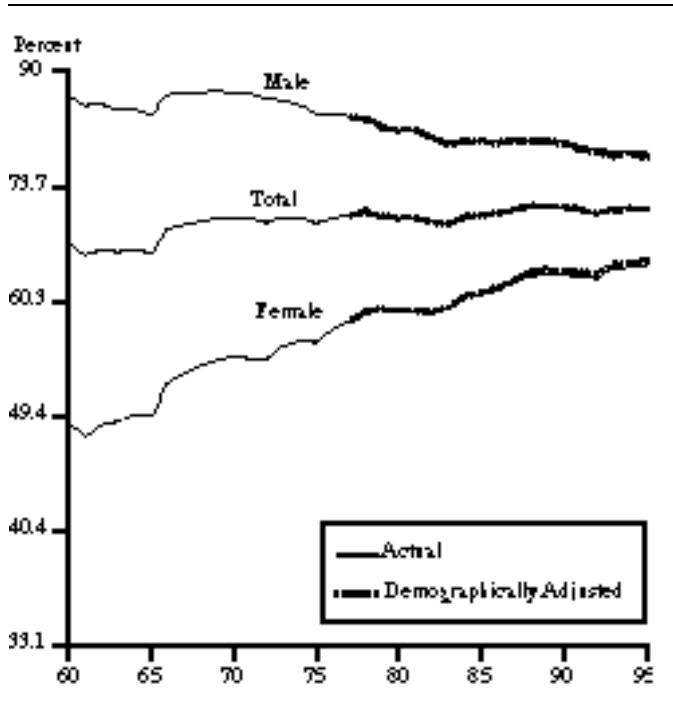
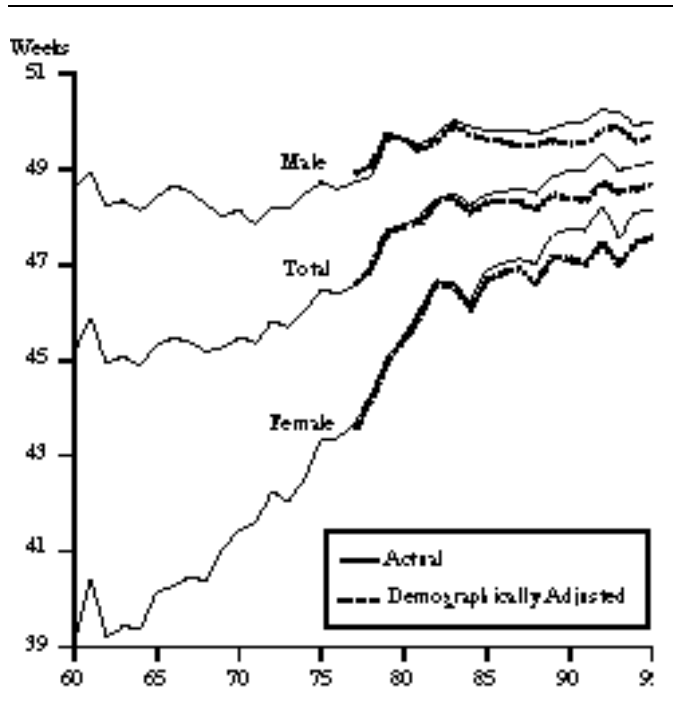


FIGURE 3  
ANNUAL WEEKS OF PARTICIPATION



The evidence on the sources of change in participation suggests that there is only limited scope for further increases in overall labor force participation and that any increases probably would have to come from increases in the number of females with labor force experience rather than from lengthening the workyears of individuals who participate already. For example, in 1995, the average work-year was 48 weeks for females and 50 weeks for males. Raising the female workyear to the same length as for males would increase overall participation by only 1¼ percentage points to about 68½ percent from its current level of 67¼ percent.

The female experience rate remains significantly below that for males: in 1995, 78 percent of men spent some part of the year in the labor force, compared to only 64 percent of women. This means that overall participation could increase significantly if female experience were to rise toward the male level. In the foreseeable future, however, the proportion of women who choose to spend time in the paid labor force (i.e., the female experience rate) seems likely to remain below that of men. This is due partly to the traditionally greater role of women in raising children, which is likely to keep women's participation below that of men unless there is a significant change in child-raising practices.<sup>16</sup> A second factor that will continue to hold down overall female participation is the larger share of older persons in the female population.<sup>17</sup>

As an example of these considerations, suppose the female experience rate were to rise so as to close half of the gap between the male and female rates, that is, to 71 percent. With no change in the male experience rate, the overall participation rate would rise from its current 67 percent to about 70 percent if the female workyear were to remain at its current length and to almost 71½ percent if the female workyear were simultaneously to lengthen to equal the male workyear of 50 weeks. If these changes were to occur over as short a period as five years, they would add slightly more than 1 percentage point annually to labor supply and so to potential GDP growth over this period.

16. A change in child-raising practices that led to more women entering the paid labor force might also involve lower participation by men and so lead to a lesser net change in overall participation. Also, to the extent that increased female participation was accompanied by an increase in the amount of child-care performed by paid providers, part of the resulting increase in measured GDP would occur because services previously performed within families would become products exchanged through markets. This would be the opposite of Alfred Marshall's famous example of measured national output being reduced when a man marries his housekeeper (Samuelson, 1976, p.199).

17. In 1996, persons aged 65 years or more were 17.7 percent of the female adult population but only 13.9 percent of the male population.

I would judge this to be an upper limit to any increase in GDP growth likely to come from rising labor force participation in the years immediately ahead. Such changes in labor force behavior—if they occurred at all—would be likely to require a period of adjustment longer than five years. Also, contrary to the assumptions in the above example, the experience rate of men may continue its long-run downward trend as the population ages and average incomes rise. For similar reasons, the experience rate of women may continue to decelerate rather than to accelerate as the example assumed.

Although changes in household behavior seem unlikely to have major effects on *overall* labor force participation, there is scope for significant changes among some of the nation's demographic groups. For example, the participation rate of black males has been substantially less than that of other males ever since the 1960s. In 1996, the participation rates of males were 68.7 percent for blacks but 75.7 percent for non-blacks.<sup>18</sup> Thus, there is room for participation of these individuals to rise significantly.<sup>19</sup>

It is not known how much of this difference in the labor force behavior of black males is due to personal decisions not to participate (labor supply) and how much reflects a lack of available jobs (labor demand).<sup>20</sup> The high rates of unemployment among black males suggest that the problem comes from the labor demand (lack of jobs) side, which would imply that lowering their unemployment rate might lead to a noticeable increase in black male participation. On the other hand, unemployment among black women is equally high, but (excluding teenagers) participation is higher among black than among non-black females.<sup>21</sup> This suggests that the lower participation rate of black men is, at least in part, the result of choice rather than due to lack of available jobs.

18. The low participation of male black teenagers explains only part of this difference. For persons aged 20 and above, the participation rates in 1996 were 72.3 percent for black males and 77.3 percent for non-black males.

19. However, even a substantial increase in participation by black males would not significantly affect overall participation rates. For example, if the participation rate of black males were to rise to the average of non-black males (with no changes in participation by other groups), the overall participation rate would rise only  $\frac{1}{4}$  percentage point.

20. If the low participation were due to lack of demand by employers, one might expect there to be a large number of black male "discouraged workers" (those who are available for employment, but not actively looking for work). Unfortunately there are no data on the number of discouraged workers broken down by race.

21. In 1996, the participation rate for non-teen black females was 62.4 percent compared with 59.5 percent for non-blacks. The unemployment rates for these two groups were 8.7 percent and 4.2 percent, respectively.

A second group with notably different labor force behavior is the Hispanic population. Labor force participation by male Hispanic persons is significantly higher than for non-Hispanics. Moreover, this higher participation reflects both a higher proportion of the population having some job experience as well as longer workyears among this group. In this case, the difference in behavior is primarily due to differences in age: for example, almost one-fourth of the total male population is aged 55 years or more, whereas only 14 percent of the male Hispanic population is this age. Although they also tend to be younger than average, participation among Hispanic women is significantly lower than that of other groups. Most of their lower rate of participation may be traced to a lower experience rate, suggesting that it represents a life-style choice. The larger numbers of children in Hispanic families is consistent with this interpretation.

### III. LONGER YEARS VS. LONGER WEEKS

Figure 3 shows that the average workyear of both men and women increased during the 1970s.<sup>22</sup> This was a significant source of the overall rise in labor force participation during this period. After about 1983, this lengthening of the workyear slowed for women and almost stopped for men. However, although the increase in the supply of labor coming from the lengthening of the workyear slowed, other indicators of the amount of time devoted to work accelerated during the 1980s, thus offsetting the effects of slower growth in participation. This suggests that a focus on labor force participation may give a flawed indication of trends in labor supply. In this section, I examine other dimensions of the labor supply.

For a long period up to the early 1980s, the average workweek trended downward.<sup>23</sup> Weekly hours averaged  $41\frac{1}{4}$  hours in the mid-1950s but under 39 hours in the late 1970s. The workweek decreased further during the 1980–1982 recessions, as it had in earlier business cycle downswings. During the 1980s, however, this long-time downward trend was reversed: average weekly hours increased from a low of 38 hours in 1982—a recession year—to a peak of 39.6 hours in 1989 before declining a bit in the 1990–1991 recession. The upswing in this measure of effort has not resumed in the current economic expansion, but neither has the earlier downward trend reasserted itself. From 1993

22. Note that I use the term "workyear" to include time spent looking for work as well as that spent employed.

23. For an earlier discussion of long-run trends in the average length of the workweek, see Judd and Trehan (1990).

to 1996, average weekly hours remained quite stable at 39.3 hours, about the same as during the late 1980s.<sup>24</sup>

The lengthening of the workweek during the 1980s largely reflected longer workweeks of full-time workers. The proportion of employed persons who work part-time for non-economic reasons increased sharply during the 1960s, but has remained relatively stable since 1970.<sup>25</sup> Thus, changes in this proportion do not explain the changes in the average workweek since 1970. The average workweek of full-time workers averaged about 43 hours during the late 1970s and early 1980s, but has been about 43<sup>3</sup>/<sub>4</sub> hours since 1989. This lengthening of the full-time workweek during the 1980s appears to be largely due to more workers taking second jobs. The average workweek *per job* has declined a bit since the late 1970s, which suggests that the increase in hours *per worker* has been largely due to more workers having more than one job. In addition, Rones, Ilg, and Gardner (1997) show that the increase in average hours of work has been associated with an increase in the proportion of workers with very long (49 hours or more) workweeks. This also is consistent with an increase in the number of individuals with more than one job. During the 1960s and 1970s the proportion of workers having more than one job varied around 5 percent, but since 1989 it has been above 6 percent.

Data on the weekly hours of work of non-agricultural workers are available by age and gender since 1976, making it possible to use a Fisher ideal index to derive demographically adjusted hours of work.<sup>26</sup> This adjustment shows that changes in the age structure of the population made a modest contribution to the lengthening of workhours after about 1978, but have had no significant effect since 1992. Thus, between 1978 and 1982, average weekly hours declined by 1 hour but by 1.2 hours when changes in the age-structure of persons at work are excluded. Similarly, between 1982 and 1992, weekly hours increased by 1 hour, but by only 0.8 hour after demographic adjustment. Most of this demographic effect tending to raise average hours came from the decrease in the shares of younger (16 to 24 years) and older (55 years and over) workers in total employment. Between 1978 and 1992, the share of younger

and older individuals in the adult population declined from 38.9 percent to 28.6 percent. Since the working hours of persons in these groups tend to be less than those of prime-age workers, the reduction in their share of the population had the effect of raising average weekly hours.<sup>27</sup> Since 1992, the age-gender structure of the population has not changed much, and weekly hours have been about constant for all groups, so that average weekly hours also have not changed.

In addition to the length of the workyear and of the workweek, another indicator of work effort is the ratio of numbers of persons *at work* to numbers *employed*.<sup>28</sup> After declining for the previous 20 years, this ratio has been rising gradually since the early 1970s, meaning that workers have been taking less and less time away from the job because of vacation, sickness, labor disputes, or other reasons.<sup>29</sup> This development added slightly less than 0.1 percentage point to the annual growth rate of the labor supply between 1974 and 1996, after subtracting about the same amount from growth in the preceding 20 years.

#### IV. SOURCES OF GROWTH IN LABOR SUPPLY

The discussion in the preceding sections shows that an individual may adjust her supply of work in a number of ways. In addition to deciding whether or not to participate in the labor force *at all* during a year, she can change the number of weeks during the year that she participates, vary her weekly hours of employment (by working full- or part-time, working at one or more jobs, or choosing a job with a longer or shorter work schedule), and alter the amount of vacation time or sick days taken during the year. The first two of these adjustments will show up as variations in labor force participation, while the second two will not. In addition, a household of more than one individual can vary its total supply of labor by altering the labor market behavior of each of its members, as when one spouse works part-week or part-year while attending school or caring for children and the other spouse takes a second job.

24. The CPS was redesigned in 1994, but this redesign appears to have had no effect on the measured trend of workhours in the 1990s.

25. This excludes persons who are part-timers because of weak labor market conditions and probably would take a full-time job if conditions improved.

26. Unlike the data discussed earlier, these data on average weekly workhours exclude farm workers. It is unlikely that their inclusion would alter the conclusions, since they represent only a small (3 percent) proportion of the employed population.

27. Average hours of work of younger workers are not only lower but also have trended downward in the last 20 years, apparently because an increasing proportion of this age group are in school. Average hours of older workers have been roughly constant over this period. See Rones, Ilg, and Gardner (1997).

28. Most persons who are employed but not at work in any month are either on vacation or sick. Other reasons for absence include bad weather and labor disputes.

29. This increase in the numbers of employed persons actually at work has occurred in almost all age and gender groups. Applying a demographic adjustment to the data has almost no effect.

The presence of these other dimensions implies that variations in the participation rate are potentially misleading indicators of changes in labor supply.<sup>30</sup> Thus, some of the increase in the *workyear* of the typical individual during the 1970s—which registered as an increase in the participation rate—and the subsequent slowing in the 1980s and 1990s—which showed up as a slowdown in participation growth—did not represent net changes in the amount of time devoted to market work, since during these periods individuals also altered the number of hours that they devoted to work during a typical *week*.

To attempt to address these issues, Figure 4 presents both a more comprehensive measure of labor supply and a decomposition of the measure into a series of components since 1960. The top panel shows the comprehensive measure, workhours per person per year:<sup>31</sup>

Workhours per person per year

$$= \frac{\# \text{ Persons at work} \times \text{Hours at work per week} \times 52}{\text{Adult population}}$$

The thin solid line in the top panel may be viewed as a “cyclically adjusted” measure, as it shows how workhours per person would have varied if the unemployment rate had remained constant at its mean (6 percent) throughout the period.<sup>32</sup> The dashed line in this and the other panels shows the data adjusted for demographic changes using the Fisher index method described above.<sup>33</sup>

The remaining panels show the following components of the decomposition:

30. For example, an increase in weeks worked per year from 44 weeks to 48 weeks accompanied by a shortening of the workweek from 36 to 33 hours implies no change in the number of hours per year spent in the workforce. But the increase in weeks worked would imply a rise in the average participation rate.

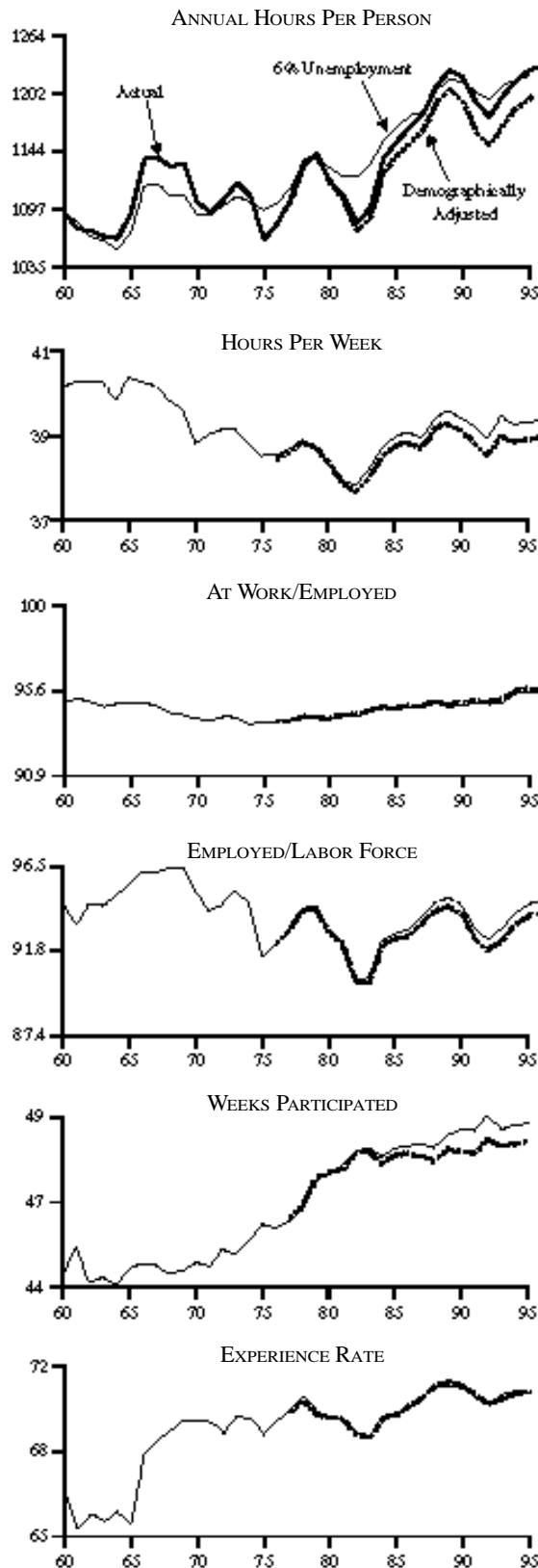
31. Note that this series refers only to persons at work and so does not include hours spent looking for work. A similar series over a shorter time period is constructed in Bureau of Labor Statistics (1997).

32. Variations in the unemployment rate do not capture all of the effect of the business cycle because hours of work also vary cyclically.

33. Age/gender data are not available that permit a demographic adjustment of these series for years before 1976. Also, although workhours per person per year can be constructed for 1996, the full decomposition cannot be made because it requires data from the Work Experience Survey, which was conducted in March 1996, but will not be released until the end of 1997.

FIGURE 4

ANNUAL WORKHOURS: SOURCES OF CHANGE



$$\begin{aligned}
 \text{Workhours per person per year} = & \\
 & \text{Average workhours per week} \quad \times \\
 & \text{\# At work / \# Employed} \quad \times \\
 & \text{\# Employed / [\# Employed} \\
 & \text{or looking for work]} \quad \times \\
 & \text{Average weeks employed} \\
 & \text{or looking for work per year} \quad \times \\
 & \text{[\# At work or looking} \\
 & \text{for work at any time]} / \text{Adult Population}
 \end{aligned}$$

The first two components refer to the supply of workhours by persons who are actually employed. Workhours per person will increase if the average weekly hours of the persons at work increase or if a larger proportion of employed persons are actually working in an average week (less time away from the job for vacations, sickness, etc.). The third component represents the proportion of the labor force that is employed (that is, one minus the unemployment rate) and so captures most of the effect of the business cycle on average annual hours. The line labeled “6% Unemployment” in the top panel is constructed by holding this third component constant at its mean level. Finally, the product of the last two components represents the participation rate: as already discussed, participation may increase either if the workyear lengthens or if a larger proportion of the population chooses to spend some part of the year in the labor force.<sup>34</sup>

A number of features in this figure are notable. First, in the top panel, the overall measure shows that, in addition to the cyclical movements in workhours per person, the trend moved down until the mid-1970s and has moved upward since then.<sup>35</sup> The faster growth in workhours after the mid-1970s appears to represent a clear change in trend, suggesting that it was due to an increased willingness to work rather than to stronger growth in labor demand. The fact that this change of trend predates the fiscal changes initiated by the Reagan Administration in the early 1980s suggests that those changes were not the root cause of the faster growth in labor supply.<sup>36</sup> A possible explanation of this trend change is that the slowing of productivity and

real wage growth in the early 1970s led households to increase their supply of work effort (that is, to decrease their demand for leisure) in order to continue to enjoy the rising real income levels they had experienced in the 1960s.

Second, like Sherlock Holmes’s “curious incident” of the dog that “did nothing in the nighttime,” it is significant that this measure of labor supply did not rise until the second half of the 1970s, even though labor force participation began to increase a full decade earlier. Until the late 1970s, the increase in participation was offset by the declines in average weekly hours and in the working/employed ratio (see the second and third panels of Figure 4). Third, and conversely, annual workhours did increase during the 1980s and remained high in the 1990s, despite the slower growth in participation. These second and third features support the conjecture that the participation rate may be an incomplete and sometimes misleading indicator of changes in labor supply.

Finally, the labor supply was increased in the 1980s and early 1990s by changes in the age and gender structure of the population. As shown in the top panel, *actual* workhours increased more rapidly than *demographically adjusted* hours during this period. As increasing numbers of the baby-boom generation moved into their prime working years, average annual workhours were boosted because both workhours per week and workweeks per year are higher for these individuals than for younger or older persons.<sup>37</sup> In the next few years, this demographic effect is likely to remain stable because all of the boomers are currently in the prime working years of their lives. Further into the future, however, the aging of the boomer generation may put this demographic effect into reverse. As these individuals move out of their prime years, average annual hours is likely to be pulled down by the growing proportion of older persons in the population.

The panels of Figure 4 show that the changes in trend in the various components of work effort occurred at roughly, but not precisely, the same time. The shift from a slight downward to a slight upward trend in the ratio of numbers at work to numbers employed occurred in the early 1970s, and, apart from brief cyclical variations, this ratio has continued rising since that time. The lengthening of the *work-year* actually began in the late 1960s, but accelerated sharply in the 1970s. Initially this upward trend in the proportion of the year devoted to participation in the labor force was largely offset by the continued shortening of the *workweek*. But, beginning in 1983, the average workweek also increased, contributing to the sharp upswing in the total labor supply that characterized the 1980s. An interpretation

34. The (logarithmic) scales of the panels of Figure 4 are chosen so that vertical distances in the lower panels sum to distances in the top panel.

35. The sharp increase in average hours between 1965 and 1966 reflects the exclusion of persons aged 14 and 15. Apart from this shift, the series had a downward trend from 1955 to 1965 and from 1966 to 1975.

36. However, the fact that the faster growth in hours per head persisted in the 1980s may have been the result of the changes in the fiscal environment. For evidence that the tax law changes did stimulate the supply of labor see Bosworth and Burtless (1992).

37. See the second and fifth panels of Figure 4.

that is consistent with these data is that, during the 1970s, households chose to work more weeks per year while continuing to reduce hours per week, but that in the 1980s hours of work per week reversed their downward trend and began to increase while weeks of participation continued to rise.<sup>38</sup> Finally, the bottom panel shows that the growth in the proportion of the population choosing to participate in the labor force at all during the year (the experience rate) also increased in the 1980s, though trends in this rate are obscured by the cyclical fluctuations in this series.<sup>39</sup> In the cyclical upswing from 1977 to 1979, the experience rate averaged 70.3 percent; ten years later it averaged 70.9 percent.

The decomposition shown in Figure 4 indicates that a focus on labor force participation alone may yield a misleading picture of the changing trends in labor supply. Although participation accelerated in the 1970s and decelerated in the 1980s, the same was not true of overall labor supply. Rather, the 1970s appears to have been a decade in which households chose to rearrange their labor force activities toward more weeks of work but fewer hours per week: this showed up as a rise in labor force participation only because that measure is affected by changes in the annual number of weeks of work but does not distinguish between long and short workweeks. By contrast, the 1980s and early 1990s were a period in which the workweek lengthened, and this was associated with stronger growth in overall labor supply even though the growth in participation slowed.

## V. RECENT DEVELOPMENTS

As indicated in the introduction to this paper, there are signs that the growth of labor force participation has picked up in recent quarters. After remaining in a narrow band between  $66\frac{1}{4}$  percent and  $66\frac{1}{2}$  percent for several years, the participation rate has exceeded 67 percent so far in 1997. Faster growth in labor force participation might imply an increase in the potential growth rate of real GDP, which would mean that nominal aggregate demand could grow faster without triggering faster price inflation.

There are reasons to doubt that this latest uptick in participation growth represents a permanent change of trend in the labor supply that will allow the economy to grow faster over the longer term. First, there is some indication

that part of this increase in participation is due to the effects of recent changes in welfare programs that have induced some welfare clients to enter the work force (Daly 1997). Although these changes may permanently affect the level of participation of some demographic groups, they are unlikely to have permanent effects on the *growth rate* of total participation. Second, some of the increase in participation may reflect the strong demand for labor, which may be bringing individuals into the labor market who would not be there if unemployment had not declined so sharply and who may not remain there in the longer run. More fundamentally, as argued earlier, there is much less scope for a permanent rise in participation now simply because a larger proportion of the population is working for a larger proportion of the year than was true in the late 1960s when the earlier upswing in participation began.

The earlier discussion of the other dimensions of labor supply pointed out that individuals may increase their supply of work effort in other ways in addition to increasing their participation. However, although average weekly hours increased strongly during the 1980s, Figure 4 suggests that this upswing—which reversed the downward trend of the prior two decades—petered out in the 1990s. This implication is confirmed by monthly data on workhours, which show that the increased participation in the last couple of years has not been accompanied by a rise in cyclically adjusted average workhours. To the extent that the increase in average workhours during the 1980s was associated with a rise in the number of persons holding more than one job, it seems plausible that the scope for continued increases is limited. This speculation is confirmed by the observation that, over the recent period in which participation has risen, the proportion of employed persons holding more than one job has remained steady at 6 percent.

## VI. CONCLUSIONS

Several commentators have argued that the U.S. economy could grow faster in the future than it has in the last decade or so. This paper has examined one source of potential output growth: the increase in the supply of labor.

Over the last three decades the supply of labor has been boosted by a substantial rise in labor force participation. This may be traced largely to the increased participation of women in the paid labor force. The proportion of adult women who spend any time in the labor force during any year (the female experience rate) has risen, as has the proportion of the year that these women with labor force experience actually participate.

The annual weeks of participation of women with labor force experience now is only slightly below that of men (48 weeks compared to 50 weeks). This means both that there

38. These successive changes in household behavior may have been associated with the continuing shift toward more female participation and less male participation.

39. Recall that the sharp rise in the experience rate in 1966 is due to the exclusion of 14–15-year-olds in that year.

is not much scope for boosting female participation by further increasing the time that women spend in the work force and that the lower participation rate of women compared to men is due mostly to the smaller proportion of women who spend *any* time in the labor force. My speculation is that the lower experience rate of females is due primarily to the greater role of women in child-raising.<sup>40</sup> Although this role may change, any such change seems unlikely to occur quickly.

Overall labor supply depends not only on the rate of participation but also on such other factors as the amount of time actually spent on the job (measured by the ratio of numbers at work to numbers employed) and average weekly hours. Both these indicators increased during the 1980s, largely offsetting the slowing in labor force participation. The working/employed ratio may now be close to its practical maximum. In 1996, this ratio exceeded 95 percent and was higher than at any time since 1960, implying that there is little scope left for increasing the supply of labor by reducing the amount of time away from the job due to such things as vacation, sickness, and labor disputes. Similarly, the rise in weekly hours of work during the 1980s seems to have petered out in the present decade. The earlier increase in workhours seems to have been associated with an increase in the proportion of workers who hold more than one job. In recent years, the number of multiple jobholders appears to have stabilized at around 6 percent of total employment. In particular, the increase in labor force participation that has occurred in the last year or so has not been associated with an increase in multiple jobholding. Finally, during the 1980s, the supply of workhours was boosted by demographic changes that increased the proportion of the population in the prime working years of their lifetimes, during which persons are more willing to work more hours per week and more weeks per year. Looking forward, it is plausible to expect that this demographic effect will go into reverse early in the next century as the baby-boom generation ages.

These various considerations suggest that faster labor force growth is unlikely to make a significant contribution to raising overall GDP growth over the years ahead. If anything, the analysis of this paper suggests a slowing of labor force growth is more likely. This does not, of course, mean that GDP growth cannot be increased, but only that any increase will have to come from faster growth in labor productivity rather than from faster growth in the supply of labor.

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40. A second factor likely to hold average female participation below that of men is the larger proportion of older persons in the female population.