

THE CHANGING LABOR FORCE: SOME PROVOCATIVE FINDINGS

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A labor force participation rate is defined as the percentage of the population in the labor force. The labor force, in turn, is defined as the sum of the numbers of employed and unemployed persons. The total labor force includes armed forces personnel, while the civilian labor force does not. The Bureau of Labor Statistics (BLS) publishes labor force participation rates for various age, sex, and racial groupings.

This article examines changes in the labor force participation rates in various sex and age groups since 1950, with particular emphasis on developments since 1976. It also studies long-term trends in labor force participation by major age/sex group after mid-1981 and tests labor force participation rates to see whether they have varied with real GNP, inflation, and/or unemployment since 1976.

The data show that while female participation rates have been rising rapidly since 1950, male participation rates have been falling, and falling especially rapidly for males 55 years and older since 1970. The popular press has widely reported the increase in female labor force participation, attributing it to the "feminist revolution," among other things. But the press has largely ignored the decline in male labor force participation.¹

The results of a regression analysis of the trends in the data provide evidence on several key issues. These are: (1) the effects of the Reagan administration's tax policies on worker behavior in the 1980s, (2) whether any significant part of the labor force is composed of secondary workers who participate only when times get hard such that extra earnings are needed to maintain the family's income (the so-called "additional worker" effect), and (3) whether any significant portion of workers become discouraged and drop out of the labor force in hard times when jobs are difficult to find.

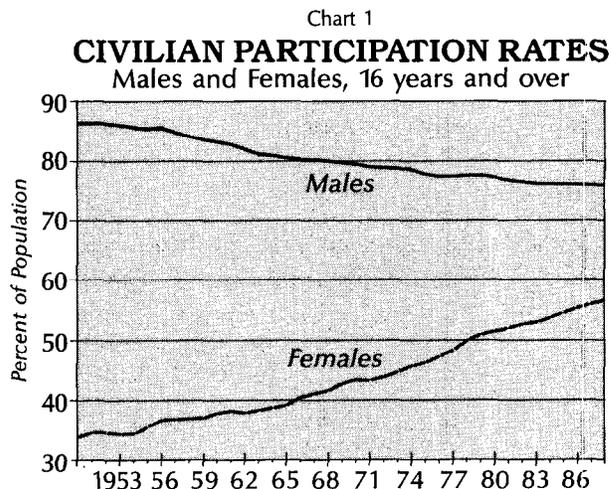
¹ The economics literature, on the other hand, is replete with studies that recognize and attempt to explain the declining labor force participation of older males. See, for example, the survey articles by Killingsworth and Heckman [1], Lazear [2], and Pencavel [3], in the *Handbook of Labor Economics*.

The analysis concludes that the Reagan administration's reductions of marginal income tax rates after mid-1981 had no apparent influence on labor force participation. Other findings cast doubt on the extent of a discouraged worker effect on labor force participation but provide evidence consistent with an additional worker effect. The results of the analysis also suggest some surprising possible effects of the female work revolution on female and male labor force participation. Before these issues can be discussed, however, it is necessary to present the data and the regression analysis.

I. TRENDS IN LABOR FORCE PARTICIPATION SINCE 1950

Chart 1 depicts civilian participation rates for males and females 16 and over for the 1950 to 1988 time period. Almost 34 percent of the 16 and over female population was in the labor force in 1950, but by 1988 the percentage had increased to 56.6. In contrast, 86.2 percent of the 16 and over male population was in the labor force in 1950, but that percentage had declined to 76.2 by 1988.

The chart thus summarizes the striking changes in the composition of the labor force in the past 38



years, which in numbers of persons affected might best be characterized as follows. If the population in 1988 had the same labor force participation by sex that it had in 1950, the labor force would include 8.9 million more males and 22 million fewer females.

Charts 2 and 3 illustrate the changes in labor force participation for females and males in the 20-24, 25-54, 55-64, and 65 and over age groups. Chart 2 shows that females in the prime 20-24 and 25-54 age groups have been the major source of female labor force growth, with the overall participation rate of 20-54 females rising from approximately 40 percent in 1950 to almost 73 percent in 1988. The participation rate of females in the 55-64 age category also rose over 15 percentage points from 1950 to 1970, but since 1970 participation rates in that age group have seemed to stabilize. Female labor force participation in the 65 and over category, on the other hand, remained stable from 1950 to 1970, but it began to decline very slightly after 1970.

Chart 3 illustrates the changes in male labor force participation by age group. In contrast to female labor force participation, where most of the change in participation is in the prime 20-54 age group, the change in the male labor force participation is mostly in the 55 and over age group. In 1950, for example, almost 87 percent of the males in the 55-64 age group were in the labor force, but by 1988 the participation rate had dropped to 67 percent. Also, almost 46 percent of males over 65 were in the labor force in 1950, but only 16.5 percent in 1988.

The decline in labor force participation of older males illustrated by Chart 3 has spawned a number of studies in the professional economics literature that attempt to explain the changes in male retirements. Some of the studies are concerned about the general

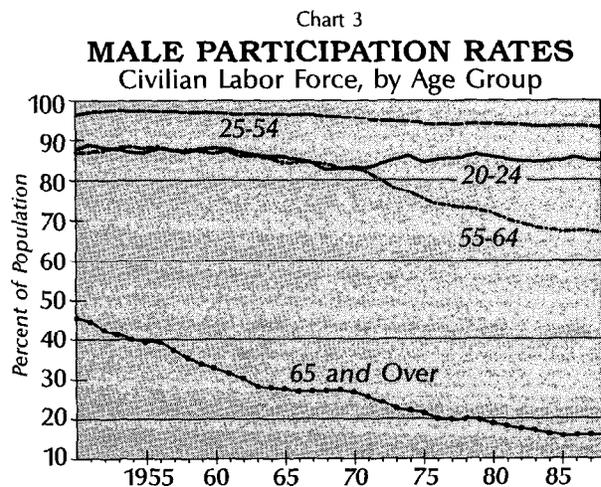
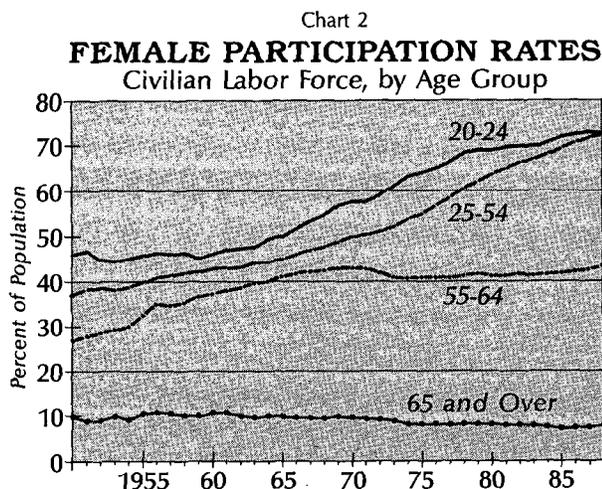
effects of earnings on the retirement decision, but most examine the changes over time in governmental social security and private pension programs. The results of the studies are somewhat inconclusive, however, for different economists have focused upon different causal factors. These factors include current earnings, lifetime earnings profiles, education levels, wealth, wages in alternative jobs, social security benefits, earnings tests, pension levels, pension payment schedules, and individual savings. A good survey of the retirement studies is provided by Edward Lazear [2].

Differences in Trends of Labor Force Participation Rates After 1981:2.

To examine changes in labor force participation before and after the enactment of the Economic Recovery Tax Act (ERTA) of 1981, the participation rates for the various age/sex groupings were examined using quarterly data over 1976-88. In particular, the participation rates of the ten age/sex groups were regressed on two variables—a simple time trend, and a time trend multiplied by a dummy variable that took a zero value until 1981:1 and a value of one after 1981:1.

The results of these regressions are shown in the accompanying table. Significant serial correlation of the data was found, so the regressions are reported with the Cochrane-Orcutt correction. The coefficients and *t* statistics listed in the column labeled "Trend 2" indicate the extent of the change in trend after 1981:1.²

² Trend 2 is the straight time trend multiplied by the dummy variable that takes a zero value before 1981:2 and a value of one after 1981:1.



REGRESSIONS OF PARTICIPATION RATES ON TREND AND A TREND DUMMY
(With Cochrane-Orcutt Correction for Serial Correlation)^a
Quarterly from 1976:1 to 1988:4

Sex-Age Group	R ²	Durbin-Watson	Constant	Trend 1	Trend 2	Rho-AR1
				(1950 = 1)	(1981:2 BREAK)	
FEMALES:						
16-19	0.68	2.19	45.64 (10.67)	0.0597 (1.71)	-0.0121 (1.96)	0.6845 (7.09)
20-24	0.96	2.33	52.37 (17.93)	0.1369 (5.87)	-0.0040 (1.08)	0.7514 (9.27)
25-54	0.998	2.27	28.36 (8.69)	0.2922 (12.33)	-0.0033 (1.66)	0.8984 (28.75)
25-54 ^b	0.998	2.22	21.36 (10.08)	0.3310 (22.87)	-0.0027 (1.41)	0.7947 (13.46)
55-64	0.78	1.77	33.52 (20.96)	0.0660 (4.90)	-0.0045 (1.73)	0.5433 (4.08)
65 and over	0.69	1.84	8.95 (9.46)	-0.0073 (0.92)	-0.00161 (1.07)	0.5910 (4.55)
MALES:						
16-19	0.91	2.19	68.07 (14.32)	-0.0636 (1.68)	-0.0142 (2.41)	0.7617 (8.50)
20-24	0.45	2.08	84.15 (53.94)	0.0146 (1.10)	-0.0076 (2.75)	0.3717 (2.79)
25-54	0.65	2.05	95.25 (193.40)	-0.0086 (2.04)	-0.0013 (1.48)	0.2501 (1.91)
25-54 ^c	0.69	2.03	95.16 (215.20)	-0.0075 (1.96)	-0.0015 (1.92)	0.1821 (1.35)
55-64	0.98	2.10	88.65 (61.90)	-0.1348 (11.10)	-0.0081 (3.31)	0.4717 (3.69)
65 and over	0.97	2.01	27.45 (6.70)	-0.0704 (2.36)	-0.0031 (1.20)	0.8943 (13.49)

^a The numbers in parentheses are *t* statistics.

^b A measure of the so-called "misery index" (the percentage change in the CPI from eight quarters before plus the unemployment rate) is included in this equation. The coefficient on the "misery" rate equals 0.1074; the *t* value is 2.98.

^c The percentage change in real GNP lagged one quarter is included in this equation. The coefficient on the change in GNP is -0.0129; the *t* value is -2.31.

The table shows that the coefficients for the Trend 2 variable are negative for *all* ten age/sex groups. One can therefore conclude that there was no significant upward surge of the trend rate of labor force participation after 1981 in any age/sex group studied.

The coefficient on Trend 2 was *significantly* negative (at the 95 percent confidence level), however, only for three male age groups—16-19, 20-24, and 55-64. This finding indicates that after 1981 relatively more 16-24 year-old and 55-64 year-old men began either (1) to quit their jobs (or discontinue their job searches) and drop out of the labor force or (2) to refrain from entering the labor force at all. In the case of 16-19 and 55-64 year olds, the

post-1981 change merely accentuated an existing trend toward lessened labor force participation.

The male 20-24 age group, however, had exhibited a trend of increasing labor force participation before 1981, being the *only* male labor force group that tended to increase its participation rate over the 1950-81 period. After the post-1981 trend correction is made, the net trend coefficient for the 20-24 year group remains positive, but its value is halved.

How Differences in Economic Conditions Affect Participation Rates

A regression equation containing the two trends and the percentage change in real GNP as inde-

pendent variables was also estimated for each of the ten age/sex groups. The objective was to determine whether the participation rates were sensitive to overall economic conditions. One frequently hears that the labor force tends to decline in times of economic contraction and to rise in times of expansion. For this claim to be consistent with the data, participation rates must vary *directly* with the rate of change in real GNP. As it turns out, they do not.

The coefficient on the change in GNP was significantly different from zero only for the regression with male 25-54 participation rates as the dependent variable. The results of that regression³ are reported in the table as the second equation for that age/sex group. As the table shows, however, male 25-54 labor force participation varied *inversely* with the change in real GNP. The implications, thus, are that 25-54 males participate relatively more in the labor force in times of economic contraction and relatively less in times of economic expansion, and that the state of the economy has little effect on the labor market participation of any other age/sex group. It is worth mentioning that the coefficient on the Trend 2 remained negative in the equations that included the change in real GNP.

Finally, to examine the notion that increases in inflation and unemployment might induce secondary workers to join the labor force in order to maintain the family's existing standard of living, a set of regressions was run with the two trends and a measure of the so-called "misery index."⁴ The coefficient on the misery index variable was significantly different from zero (at the 95 percent level) only for participation rates of females in the 25-54 age group. That equation is reported in the table as the second equation for females 25-54.

Two additional sets of regressions were also run: one using the unemployment rate as the third independent variable, and the other using the percent change in the Consumer Price Index (CPI). The coefficient on the unemployment rate was not significantly different from zero in any regression, but

³ Three sets of regressions were calculated—one with the current change in real GNP, one with the change in real GNP lagged one quarter, and one with the change in real GNP lagged two quarters—for all age/sex groups. Males 25-54 were the only group to be significantly affected by the change in real GNP (at the 95 percent level). The *t* value of the coefficient for the GNP variable was highest for real GNP lagged one quarter, so the results of that regression are reported in the table.

⁴ The misery index is generally defined as the sum of the inflation rate and the unemployment rate. For this estimation, it was specifically defined as the sum of the annual rate of change in the Consumer Price Index (CPI) from eight quarters earlier and the civilian unemployment rate.

the coefficient on the change in the CPI was significantly different from zero in one regression, that of females aged 25-54. Since the *t* value for the CPI change was lower than the *t* statistic on the "misery" coefficient, the table reports only the result of the regression using the misery index as an argument. It is again worth mentioning that the regression estimates of the coefficients on the Trend 2 variable remained negative in all cases.

II.

IMPLICATIONS FOR SUPPLY-SIDE TAX POLICIES

The early rhetoric accompanying the supply-side tax policies of the Reagan administration stated that, among other things, lower marginal tax rates would provide incentives for persons to work harder. As President Reagan put it in his first *Economic Report* (1982),

... the first part of the year we work for ourselves. We begin working for the government only when our income reaches taxable levels. After that, the more we earn, the more we work for the government, until rising tax rates on each dollar of extra income discourage many people from further work effort or from further saving and investment. . . . We have set in place a fundamental reorientation of our tax laws. . . . The reduction in marginal rates for all taxpayers, making Individual Retirement Accounts available to all workers, cutting the top tax bracket from 70 percent to 50 percent, and reduction of the "marriage penalty" will have a powerful impact on the incentives for all Americans to work, save, and invest [4, pp. 6-7].

In his last *Economic Report* (1989), President Reagan summarized his administration's accomplishments as follows:

And by reducing taxes and regulatory bureaucracy, we have unleashed the creative genius of ordinary Americans and ushered in an unparalleled period of peacetime prosperity. . . . Our New Beginning has restored personal incentives through a series of tax reforms and tax cuts. These reforms have reduced the top Federal marginal income tax rate to less than one-half the level that prevailed when we took office and decreased tax liabilities at all income levels [5, pp. 3, 7].

In the *Annual Report of the Council of Economic Advisers*, which is published with the President's *Economic Report*, Reagan's Council of Economic Advisers stated:

The Economic Recovery Tax Act of 1981 [ERTA] reduced the top marginal tax rate for individual income from 70 to 50 percent. It reduced marginal tax rates on given levels of nominal income for all tax brackets while indexing personal exemptions, the standard deduction, and the tax brackets in 1985 to prevent bracket creep. . . . The act significantly reduced the average burden of taxation for American families compared with what it would have been

without a change in the tax law. . . . The cuts in marginal tax rates acted to increase the incentives to work and to invest [5, pp. 86-7].

After evaluating the effects of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) and the Tax Reform Act of 1986 (TRA) on the changes in marginal tax rates initiated by ERTA, the Council's *Annual Report* observed that income tax savings (for median income families of four) remained substantial, even in 1988, over what they would have been under the tax law in existence in 1980. The report concluded:

The reductions in marginal tax on labor income encourage labor force participation, particularly of second earners. Because TRA reduced the difference between gross wages and net wages at the margin, it provides workers with an incentive to increase their work effort [5, p. 90].

Finally, a great deal of publicity was given in the early 1980s to the Laffer curve. The Laffer curve was based on a simple truism—that at lower levels of income taxation, raises in tax rates yield more total tax revenue, but that if tax rates continue to rise individuals eventually lose incentives to work and invest, so total tax receipts eventually decline. Thus, at a 100 percent tax rate, total tax receipts would be zero. From a political point of view, the Laffer curve provided a rationale for reducing taxes without reducing government spending, provided of course that one assumed that income tax rates already were so high that the economy was operating on the downward sloping side of the curve.

The foregoing quotations and the Laffer curve rationale for tax reduction imply that lower marginal tax rates will induce individuals to work, save, and invest. If this implication is correct, one would expect labor force participation rates to rise after tax rate relief.

In fact, however, no evidence of an increase in the trend rate of labor force participation was found. As the table shows, there was no significant upward movement in the trend rate of labor force participation in any of the ten age/sex groups studied after the first half of 1981, even after adjusting for changes in economic conditions.⁵

⁵ Of course, some workers may have responded by taking second jobs; a phenomena that would not show up in the participation rate data. Data on multiple job holding were gathered from the May supplement to the Census's Current Population Survey until 1980, when the supplement was discontinued. Special questions included in the May 1985 CPS, however, asked about multiple job holding, so data are available for 1985. By interpolation a quarterly series on multiple jobholders was estimated for males and females 16 and over for the 1970-85 time period. The estimates were then added to the civilian labor

Why did no such effect show up? One reason may be that the incentives were not large enough. At the same time that the income tax rates were being reduced, for example, the payroll taxes (contributions for social security, etc.) were rising. A 1987 study by the Congressional Budget Office (CBO), for example, concluded that the effective tax rates for overall federal taxes were slightly higher under 1988 tax laws than they were under 1977 tax laws for all but the highest decile of income earners.⁶ The CBO illustration showing the different effective tax rates by population decile is reproduced here as Figure 1.

Chart 4 shows personal taxes and social security contributions as percentages of personal income before tax deductions.⁷ This chart does show a modest reduction in average taxes after 1981.

That trends in labor force participation rates did not increase after 1981 implies either (1) that there were no significant reductions in marginal tax rates in the 1980s or (2) that the reductions in tax rates had no significant effect on labor force participation. The first possibility is contrary to the spirit of the 1989 *Economic Report of the President*. The second is contrary to the supply-side predictions of the early 1980s.

III.

OTHER IMPLICATIONS OF THE DATA

Discouraged Workers

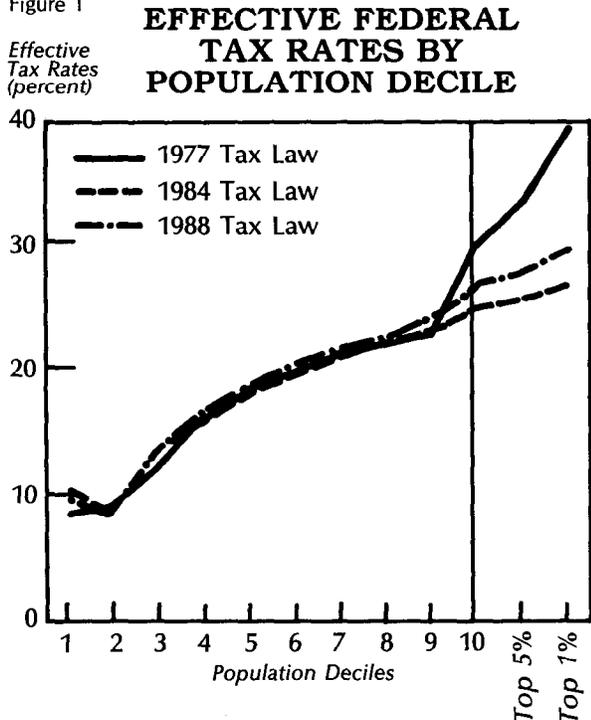
Some analysts argue that individuals will drop out of the labor force if they become too discouraged about their job prospects. Workers therefore would be expected to increase their labor force participation in periods of economic expansion and decrease it in times of economic contraction.

forces and new estimates of participation rates were devised that, in effect, counted the multiple jobholders as participating twice. Regressions were run on the revised participation rates over the 1970:2 to 1985:2 and 1976:1 to 1985:2 periods, again with the trend and trend dummy variables as arguments. It was found that adding the multiple jobholders made no difference to the regression results, and again all of the coefficients on "Trend 2" were negative.

⁶ The data utilized in the CBO study, however, are not wholly appropriate for analyzing changes in tax incentives on labor force participation. The CBO procedure allocated both employer and employee contributions to Social Security as well as the family's share of the corporate income tax to each decile's effective tax rate.

⁷ Personal income as defined by the Bureau of Economic Analysis includes transfer payments *net* of personal contributions for social insurance. To get an appropriate before-tax personal income measure to be used as the denominator for the series in Chart 4, personal contributions for social insurance were added to the BEA's personal income figure. Thus, the before-tax personal income statistic used includes transfer payments *gross* of social insurance contributions.

Figure 1



Note: Families are ranked by income size (1 being the lowest) Family income includes the family's share of the corporate income tax which is allocated to capital income. The lowest decile excludes families with zero or negative incomes. The effective tax rate is the ratio of taxes to family income in each income class.

Source: United States, Congressional Budget Office, "The Changing Distribution of Federal Taxes: 1975-1990," October 1987, Summary Figure 1, p. xv.

The data, however, show that since 1976 the only participation rates that were significantly related to changes in real GNP were those of males in the

25-54 age group, and that those participation rates were not related to GNP growth in the way predicted by the discouraged worker hypothesis. As the table shows, the coefficient on the change in real GNP lagged one quarter bears a negative sign.⁸ Thus, the analysis implies that a decline in the rate of growth in real GNP, other things equal, will induce a rise in the rate of labor force participation of age 25-54 males, which is exactly opposite to the sort of behavior predicted by the discouraged worker effect.

This inverse relation between real GNP growth and male 25-54 participation rates is consistent with either (1) the backward-bending supply curve of labor, according to which workers opt for more leisure and therefore drop out of the labor market when their incomes rise and come back in when their incomes fall, or (2) a variant of the backward-bending supply curve, the additional worker effect.

Additional Workers

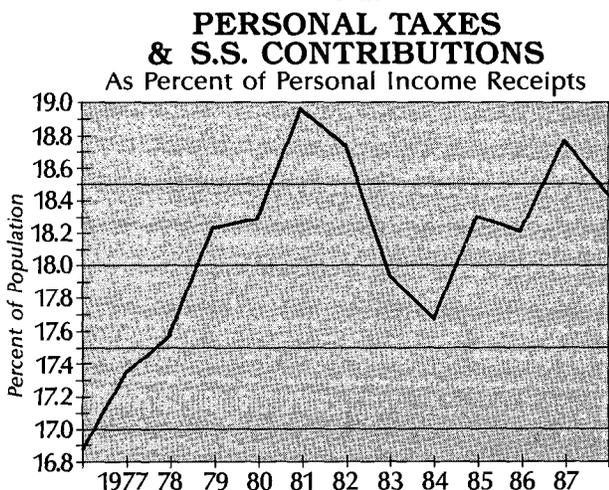
Underlying the additional worker effect is the concept that secondary workers (nonbreadwinners) enter the labor force in times of adversity to enable the family to maintain its standard of living. As noted above, the labor force participation rate behavior of age 25-54 males, who increase their participation as the economy expands and reduce it as the economy contracts, would be consistent with the additional worker hypothesis if those workers were indeed secondary workers. If male 25-54 participation rates were dominated by the additional worker effect, however, the regression of them on the misery index, the CPI, or the unemployment rate should also have been significant. It was not.

Evidence of the additional worker effect is found, however, in the regression of female 25-54 labor force participation on the trends and the misery index. As shown in the table, the regression results showed a significant positive relation between the misery index and participation rates in the female 25-54 age group.

As mentioned earlier, if a significant negative correlation between the rate of growth of real GNP and the female participation rate had been found, that result would also have been consistent with the additional worker hypothesis. Intuitively, however, it seems most appropriate to identify the misery index more closely with the additional worker effect than the change in real GNP, for inflation and

⁸ The sign was also negative for the regression using the current change in real GNP as an argument. The coefficient on the change in real GNP lagged 3 quarters was not significantly different from zero.

Chart 4



unemployment have immediate and direct effects on family real incomes. Therefore, it seems likely that the female 25-54 participation rates were affected more strongly by the additional worker effect than were the participation rates of males 25-54.

The labor force participation of age 25-54 males seems more likely to stem from behavior consistent with the classic backward-bending supply curve. The rationale for the backward-bending supply curve is that as individuals achieve certain levels of income, leisure becomes progressively more desirable and pecuniary income progressively less desirable. As a result, wage increases may sometimes induce workers to substitute leisure hours for work hours.

Speculations about Possible Effects of the Revolution in Female Labor Force Participation

As noted earlier, the composition of the labor force in 1988 is radically different from that of 1950. If the 1950 participation rates had continued to prevail, the 1988 labor force would contain 22 million fewer female workers and 8 million more male workers. Moreover, the growth in the female labor force has drawn from the prime 20-54 age population, while the source of decline in the male labor force participation has been in the older, 55 and over, ages.

One of the early rallying cries of the feminist revolution in the 1950s was that females were not encouraged to enter the labor force, but rather were expected to remain home and nurture their children. If that were true in the fifties, it has changed in the eighties. As Chart 1 shows, over 55 percent of all women over 16 participated in the labor force in 1988, far higher than the 35 percent female participation rate registered in 1950.

Whether the work situation for females has turned out to be consistent with the expectations of the feminist revolution, however, is open to question. First, a number of traditionally female jobs continue to pay lower wages than traditional male jobs. Second, the correlation of participation rates of 25-54 year-old females with the misery index provides evidence that a proportion of female workers have jobs not because they desire to work, per se, but because they and their families need the income.

How have males fared since 1950? Apparently quite well. Almost 45 percent of the male population over 65 was in the labor force in 1950, but only 15 percent in 1988. Such a change, of course, could indicate that prospective employers now tend to discriminate against older men, but that explanation seems unlikely. Rather, the reduction in labor force participation of 65 and over males most likely is beneficial to older men, as more of those who want to retire are now able to do so. The data also show

declining participation rates for 55-64 men, especially since 1970. Again, the trend could be interpreted as hurtful to the welfare of the 55-64 men, but the accuracy of such an interpretation would be questionable. It seems much more likely that the declining rates for 55-64 men indicate increases in welfare as more men are able to choose early retirement.

This decreasing male labor force participation has come in the face of stable (65 and over) or rising (55-64) female labor force participation rates in the older age groups. Does this development mean that the older men are now living a life of leisure secured by their retirement benefits and the earnings of their breadwinning spouses? It could. Does it mean that older men and older women are now living lives of leisure, traveling around the country in their RVs, using up the inheritance that might otherwise have gone to children and grandchildren? It could, for although female labor force participation rates have risen, they still do not exceed male labor force participation rates. Does it mean that laid off older males get discouraged about their job prospects and drop out of the labor force? It might, but participation rates of older men do not seem to vary in any consistent way with the rate of growth of real GNP, so if they get discouraged it relates more to secular than to cyclical developments.

So who has benefitted from the feminization of the work force? If benefit is based upon freedom to follow one's preferences without worry about breadwinning, the beneficiaries are not all female, nor have all females benefitted. Rather, older men are now apparently able to choose to retire at earlier dates, while some prime age females apparently work outside the home only because they and their families are facing hard times and they cannot afford not to work outside the home.

References

1. Killingsworth, Mark, and James Heckman. "Female Labor Supply: A Survey." In *Handbook of Labor Economics*, edited by Orley Ashenfelter and Richard Layard, 103-204. Amsterdam: North-Holland, 1986.
2. Lazear, Edward. "Retirement from the Labor Force." In *Handbook of Labor Economics*, edited by Orley Ashenfelter and Richard Layard, 305-55. Amsterdam: North-Holland, 1986.
3. Pencavel, John. "Labor Supply of Men: A Survey." In *Handbook of Labor Economics*, edited by Orley Ashenfelter and Richard Layard, 3-102. Amsterdam: North-Holland, 1986.
4. U.S. President. *Economic Report of the President*. Washington, D.C.: U.S. Government Printing Office, February 1982.
5. U.S. President. *Economic Report of the President*. Washington, D.C.: U.S. Government Printing Office, January 1989.