Reversals in the patterns of women's labor supply in the United States, 1977–2009

Despite strong increases in women's labor force participation—especially among married women with children—in the 1980s, and somewhat less strong increases in the 1990s, the first decade of the twenty-first century has seen declines across the board; these have been especially marked among single women, women with no children, and women with more than 16 years of education

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Most analyses of women's labor force participation in the past 15 years or so have focused on married women. The labor force participation rate of this group increased dramatically in the 1970s and 1980s, as reported by Marisa DiNatale and Stephanie Boraas,[1] and Chinhui Juhn and Simon Potter,[2] among many others. But the labor force participation of married women—especially those with children—increased only marginally in the 1990s, and began to decline toward the end of that decade. For married women with children, for example, the rate increased from 39.7 percent in 1970 to 66.3 percent in 1990, but then to only 70.6 percent in 2000; the rate was 69.3 percent in 2007. For married mothers with infants, the rate peaked in 1997, at 59.2 percent, and declined to 53.5 percent by 2005.[3]

The decline in married women's labor force participation in the last decade has been chronicled anecdotally in the popular press, where reporters tend to refer to it as the "opt-out revolution."[4] Claudia Wallis noted that opting out appears to occur more often among professional and managerial women, for whom "higher incomes permit more choices."[5] Similarly, Katharine Bradbury and Jane Katz found that declines in labor force participation were highest among highly educated women and married women with young children and high-earning husbands.[6] Opting out is also evidenced by Linda Hirshman's survey of women whose marriages were reported in *The New York Times*, which showed that "half the wealthiest, most-privileged, best-educated females in the country stay home with their babies rather than work in the market economy."[7] Similarly, Claire Shipman and Katty Kay suggest that a revolution is occurring among professional women in which employers accede to more flexible work schedules for working mothers.[8]

Such a revolution seems to be consistent with other observed trends. Using the results of four large social surveys covering the years 1976–98, Arland Thornton and Linda Young-DeMarco found that, compared with young Americans in the 1970s, "young Americans in the 1990s were more committed to the importance of a good marriage and family life."[9] They found that agreement with the statement that there are "more advantages to being single than married" declined from 23 percent among women and 34 percent among men in 1980, to 11 per-

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cent and 12 percent, respectively, in 1993. They concluded that, "although marriage became more optional and was perceived as more restrictive between 1957 and 1976, these trends do not seem to have continued into the 1980s and 1990s." And Saul D. Hoffman, looking at female labor force participation between 1984 and 2004, found that, while fertility among 20- to 24-year-olds fell by 3.3 percent between 1993 and 2004, fertility rose by 20 percent for women aged 30–34 and by 44 percent for women aged 35–39.[10] He found that, whereas single women with children were more likely to work in 2004 than in 1984, married women with children were less likely to do so. DiNatale found that workers in 1999 were more likely to prefer alternative work arrangements (contract, on-call, or temporary work) than workers in the mid-1990s.[11]

But more recent work, such as that of Joan C. Williams, objects to the notion that opting-out is a voluntary phenomenon. Her work documents many cases in which women have been "pushed out by workplace inflexibility, failures of public policy [the lack of adequate childcare], and workplace bias," referring even to some of the women mentioned in Lisa Belkins' earlier "opting-out" article.[12] Williams maintains that opting out arises from "systemic discrimination" rather than from mothers' own choices. Wallis states, ". . . a reluctant revolt is under way. Today's women execs are less willing to play the juggler's game."[13] Still, Williams states that "highly educated women are more—not less—likely to remain in the labor force than other women."

Heather Boushey maintains that the notable declines in the labor force participation of mothers with children are due largely to cyclical economic conditions, with women becoming unemployed in the 2001 recession and choosing to become "discouraged workers" who stay at home with children rather than search for elusive employment.[14] This hypothesis is hard to justify, however, in light of the fact that women's labor force participation rates began to decline before 2000. For women aged 25–34 the decline began in 1998 or 1999, whereas for women aged 35–44, it began in 1997. For women with children under age 3, it began in 1998.[15] In addition, Boushey's claim is contradicted by evidence from survey data reported by Louise Story, who found that young women at elite colleges "say they have already decided that they will put aside their careers in favor of raising children."[16] Similarly, James P. Vere, using a cohort analysis rather than a time-series analysis, found that "the women of Generation X are not only having more children than women from the baby boom generation but are also supplying fewer hours to the labor market."[17] He found that this phenomenon appears not to be simply an effect of timing, since the mean number of children that these women reported they desire was 34 percent larger than the mean number of children that women born in 1956 or 1957 reported desiring when they were the same age. Vere states that, "if the trends reflect differences across cohorts, then the recent decline in female labor force participation in the United States is only the tip of the iceberg, and female labor force participation will fall even further as women of the baby boom generation—now in their 40s and 50s—retire from the labor force."

Williams emphasized that the trend of opting out—whatever its causes—has been misrepresented because many of these women work fewer hours when they return to the labor force: "Women who work part time [in the United States] earn 21 percent less per hour than full timers. . . . On average, people who work 44 hours per week in the United States earn more than twice what those working 34 hours per week earn."[18] And she cited a study by the Wharton Center for Leadership and Change which found that, "while 70 percent of those surveyed reported feeling positive about their decisions to leave the labor force, 50 percent felt 'frustrated' when they tried to return to work, and 18 percent became 'depressed.'" In addition, Golden reported that, in order to obtain flexible work schedules, women must often accept either an increase in working hours, an evening shift, or a switch to part-time status.[19] Accepting one of these choices can often entail considerable hardship.

Thus, it is important to use data that are as comprehensive as possible to study the trend of opting out. What are its long-term implications? According to its intermediate projection, the Board of Trustees of OASDI expects that the overall women's labor force participation rate will increase from the 2007 level of 59.3 percent to a level of 60.4 percent by 2083.[20] This projected increase implies a continued increase in the participation rate of married women, so it is important to examine recent trends to try to determine underlying causation. Do the most recent declines signify the beginning of a trend—or are they simply, as some have speculated, a temporary effect brought on by the business cycle?

There have been a number of studies that have examined econometrically the rise in women's labor force participation before 2003 but have not discussed possible changes occurring after the mid-1990s. Francine Blau and Lawrence M. Kahn used Current Population Survey (CPS) data to focus primarily on the elasticity of hours worked by women aged 25–54 with respect to their own wages and the elasticity with respect to their husbands' wages,

finding a sharp decline from the 1979–81 period to the 1989–91 period that attenuated during the 1990s.[21] They also found a pronounced rightward shift of the labor supply function in the 1980s, but little change in the 1990s. In addition, Blau and Kahn's research indicates that the increase in hours worked that occurred during the 1990s was smaller than that which occurred during the 1980s. They indicated that little of this slowdown in the growth of hours worked could be traced to a change in wages, since real wages actually increased in that decade.

Bradley T. Heim also used the CPS and examined elasticity of labor force participation among married women aged 25–55 between 1979 and 2003, finding declines in elasticity similar to those found by Blau and Kahn.[22] But like Blau and Kahn, Heim did not specifically note differences that occurred in the late 1990s. His graphs of annually estimated elasticity of labor force participation with respect to income, however, indicate a slight increase in the absolute value of the elasticity that began in the late 1990s, suggesting that women in this period became more responsive to changes in their nonlabor income (typically the husband's income, which Heim included in his nonwage income category). If women did become more responsive to changes in their nonlabor income, it would suggest that declines in participation in this period were driven at least in part by increases in husbands' wages.

Heim also attempted to estimate the proportion of each measured change in elasticity that was due to simple changes in the demographic characteristics of the women in the samples, that is, changes in the age composition of the sample as baby boomers aged, changes in education levels, or changes in the number of children. He found that, in fact, the declines in elasticity would have been even greater had demographic characteristics not shifted. Thus, the changes in elasticity must be due to something other than demographic factors.

Interestingly, Kelly Bishop, Bradley Heim and Kata Mihaly conducted a similar type of analysis for single women and found similar declines in elasticities between 1979 and 2003—and here again, the elasticity of participation with respect to income showed a slight increase in absolute value in the late 1990s.[23] In addition, the elasticity of hours worked with respect to income also showed a slight increase in that period.

Three studies—by Julie L. Hotchkiss, Heather Boushey, and Saul D. Hoffman—focus specifically on the change in labor force participation that has occurred since the mid-1990s. Hotchkiss used CPS data for all women aged 25–54 between 1975 and 2005, and found that in the 2000–05 period the positive effect of education on labor force participation declined, and that the negative effect of unemployment on labor force participation declined as well. She calculated that, even if the unemployment rate had remained at its prerecession level, women's labor force participation "would still be significantly lower [in 2005] than it was in 2000."[24] Her findings appear to contradict those of Boushey, who found that "the business cycle penalty is significantly greater in 2004 than in 2000 for all educational groups except for women with advanced degrees and either young or older children and women with less than a high school degree and any children."[25] Hotchkiss found that the greatest contributor to the observed decline in women's labor force participation between 2000 and 2005 was "unobservables," which by definition cannot be identified or forecast.

Boushey, using the logit function on data on women aged 25–44 in CPS outgoing rotation groups[26] from the 1984–2004 period, focused on the possible effect of the presence of children on women's labor force participation during this period and found a declining "child penalty." Further analysis led Boushey to hypothesize that the decline in labor force participation rates during this period was a result of the 2001 recession; however, this hypothesis results from the use of year dummies rather than actual unemployment rates. And as pointed out earlier, this supposition does not explain why the decline began, for nearly all groups, before 2001. Boushey's finding is supported to some extent by Hoffman, who, in one of his models, used the same data and specification as Boushey. He also found a decreasing negative effect over time of children on mothers' labor force participation.[27]

However, when marriage–year interaction terms were added to Boushey's specification, Hoffman found that, although the negative effect of marriage declined from 1984 through 1993, it then increased from 1993 to 2000 and again from 2000 to 2004. Hoffman calculated that, by 2004, the negative effect of marriage was nearly as large as it had been in 1984, even after controlling for the year. Neither Boushey's nor Hoffman's analysis included any controls for income or wages.

In addition, Hoffman added marriage–child interaction terms for specific years, in both ordinary least squares and logit formulations, to Boushey's regressions in order to differentiate the effect of children on married women and the effect of children on single women in each year. He found that in 1984 the negative effect of children on married women's labor force participation was 15.5 percentage points lower than it was on single women's labor force participation. He then found a decreasingly negative effect of children on single women's participation from

1984 through 2004, to the point that children had virtually no effect on their participation by 2004.

However, Hoffman calculated that, although the effect of children on married women actually turned from negative to positive between 1984 and 1993 in the ordinary least squares formulation, it turned negative again between 1993 and 2000 and then remained around the same level through 2004. The logit estimates follow the same pattern and show, from 1984 to 2004, a net change in the effect of at least one child on the probability of a married woman being in the labor force of over 15 percentage points (from –25.6 percent to 41.2 percent, with all other variables held constant). As Hoffman points out, these results are similar to those found by Cohaney and Sok[28] for mothers with infants.

Although Hoffman's aforementioned results describe the effect of all children under age 18, Hoffman also considered separately the effect of children 0–5 and that of children 0–2. He found that the results for 2000 and 2004 were even more pronounced for this group, with married mothers with children 0–2 years of age 12.2 percentage points less likely to be in the labor force than their counterparts were in 1989. However, as mentioned earlier, Hoffman's analysis excluded controls for income and wages.

The question that arises, then, is what has happened since 2004? There are now CPS data that go through 2009, and by Hoffman's methods, these data suggest that, beginning around 2004, women's labor force participation rates leveled off or even increased slightly. Hoffman's results indicated that more change occurred from 1993 to 2000 than from 2000 to 2004. Were the effects measured in these studies simply one-time occurrences, or have they persisted? And did these analyses provide spurious results because of the lack of controls for income and wages?

Trends in women's participation rates

Given the varied pictures of women's labor force participation presented in the literature to date, it is worth examining trends in their participation by marital status, education level, and presence of children. To do this, this article presents detailed breakdowns of March data from the CPS for women aged 25–54 in the years 1977–2009.

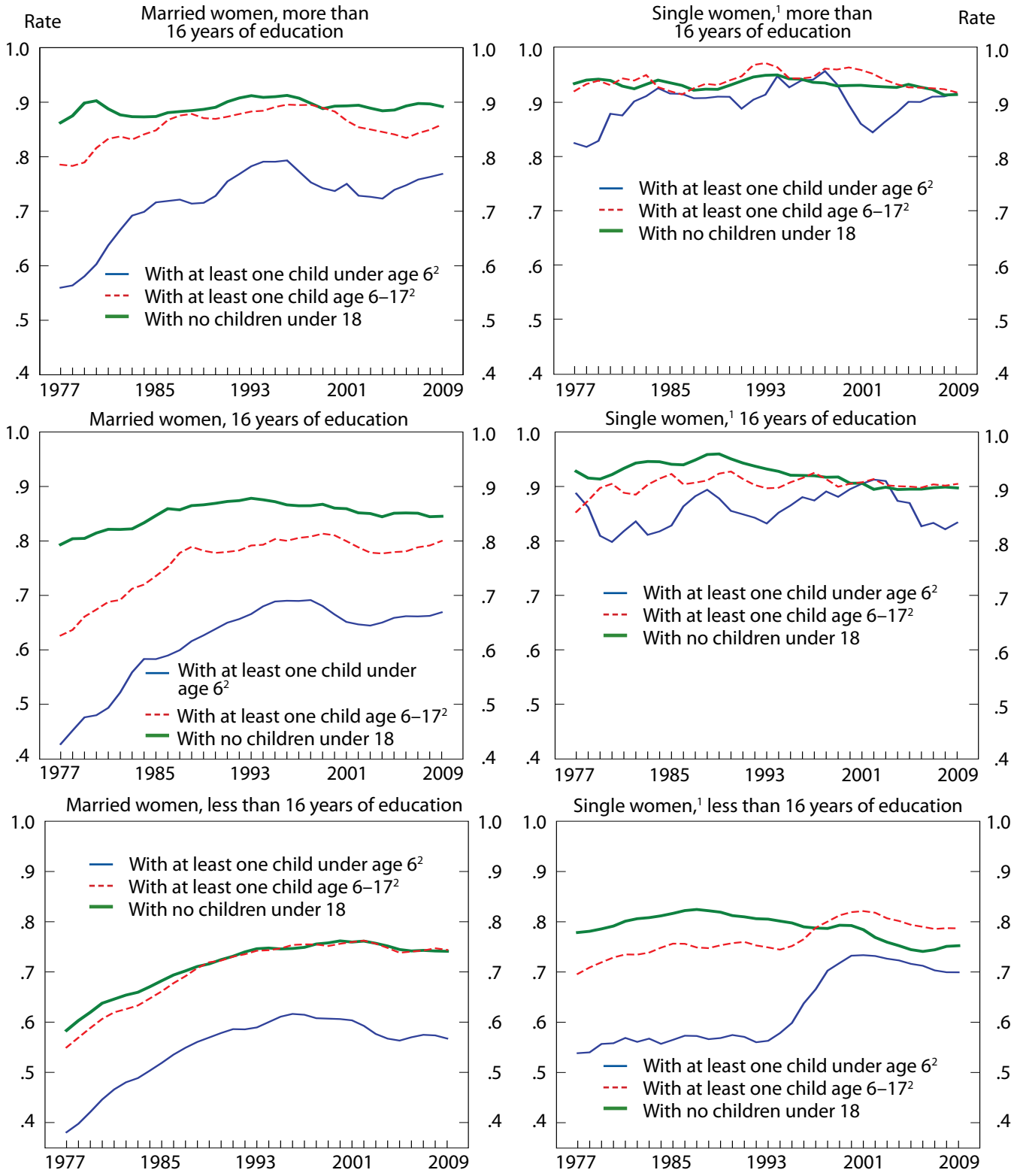
Chart 1 displays labor force participation rates by marital status,[29] level of education, and presence of children for women aged 25–54. The graphs on the left side present the data for married women, who have been the focus of virtually all of the recent literature. There one can see declines in the participation of women with children beginning as early as the mid-1990s, and one can see that the declines are the most pronounced for women with more than 16 years of education. These declines appear to be the ones that triggered the various articles in the popular press about professional women moving to the "Mommy track." For married women with at least 16 years of education who have children, the trend continued past the year 2000 but then reversed; however, for those with less than 16 years of education and with children under age 6,[30] the decline has proceeded nearly unabated. There has even been some decline beginning in the early 1990s among married women with 16 years of education and no children under age 18.

That decline in the labor force participation rate among women with no children under 18 has been even more pronounced for single women, a phenomenon that is visible in the panels on the right side of chart 1. Since the late 1980s, single women with no children and less than 16 years of education have experienced a decline of 7.2 percentage points, those with 16 years of education have experienced a decline of 6.2 percentage points, and those with more than 16 years of education have experienced a decline of 3.6 percentage points. For single women with children under 6, those with 16 years of education or more also have shown a decline in participation, but there has been a rebound among those with more than 16 years of education that began around 2002. Women with children and with less than 16 years of education exhibited marked increases in participation that began around the mid-1990s and may have been strengthened by welfare reform, but their rates have declined by about 3.5 percentage points since the turn of the century. On the whole, the picture has been one of decline in labor force participation for all single women, a decline that, for a number of groups of single women, began as early as the late 1980s or early 1990s.

Although the patterns in chart 1 are notable, there are also many substantive trends that underlie those patterns. Charts 2 and 3 examine some of these trends more closely, looking at single and married women by education level and age group. Chart 2 examines women with children under age 6, whereas chart 3 looks at women without any children under 18.

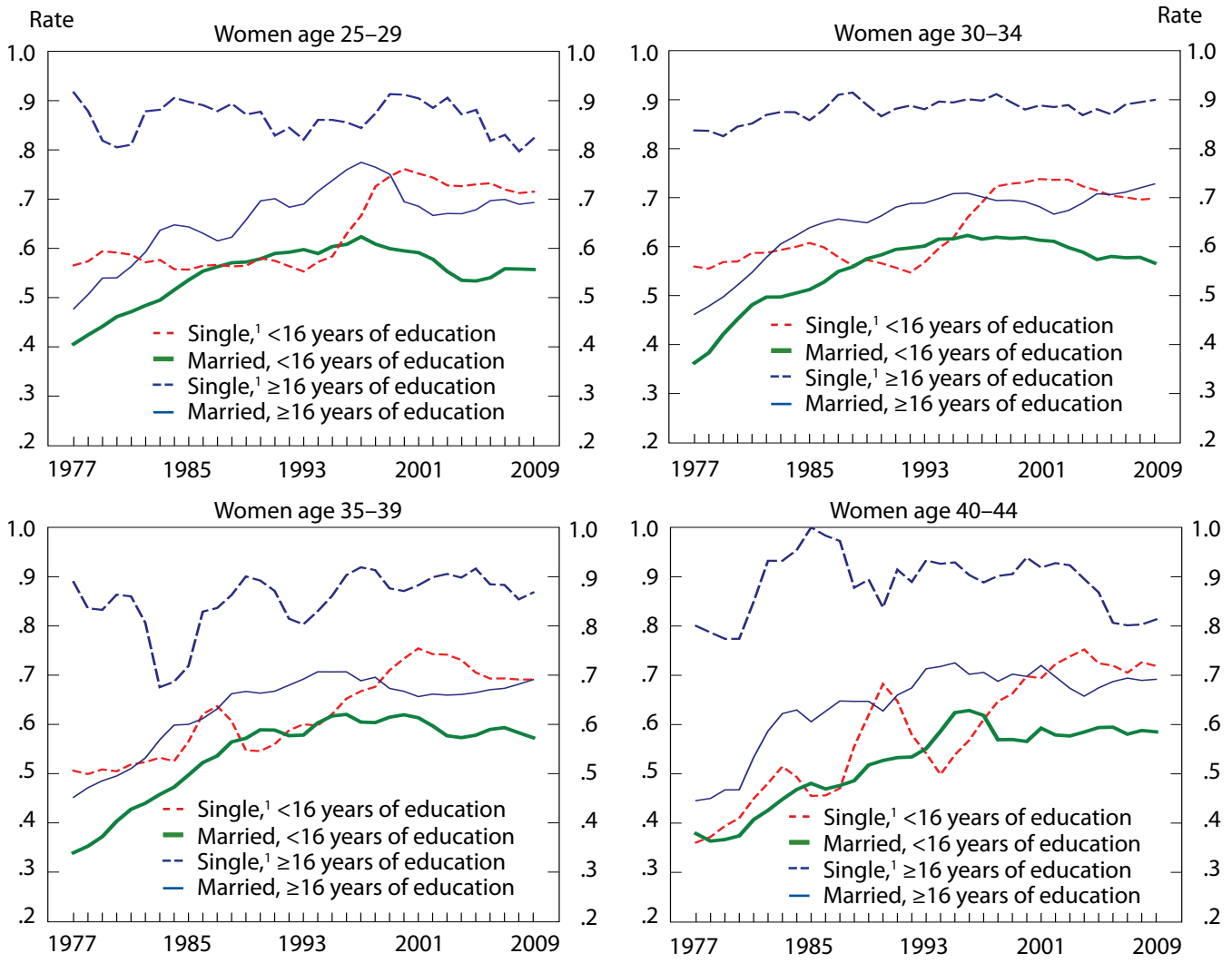
Some of the most substantial movements in chart 2 in the past 10 or 15 years have been among women aged 25–29 with children under 6. Within this demographic, the labor force participation rate has declined for single women with at least 16 years of education (by over 9 percentage points), married women with at least 16 years of education (by nearly 7 percentage points), married

Chart 1. **Labor force participation rates of women age 25–54, by marital status, level of education, and presence of children, annual data, 1977–2009**



[1] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.
[2] All women who have both a child under age 6 and a child age 6–17 are placed in the "under age 6" category.
NOTE: There are some data in the chart that are not statistically significant.

Chart 2. **Labor force participation rates of women age 25–54 with at least one child under age 6, by age, marital status, and level of education, annual data, 1977–2009**



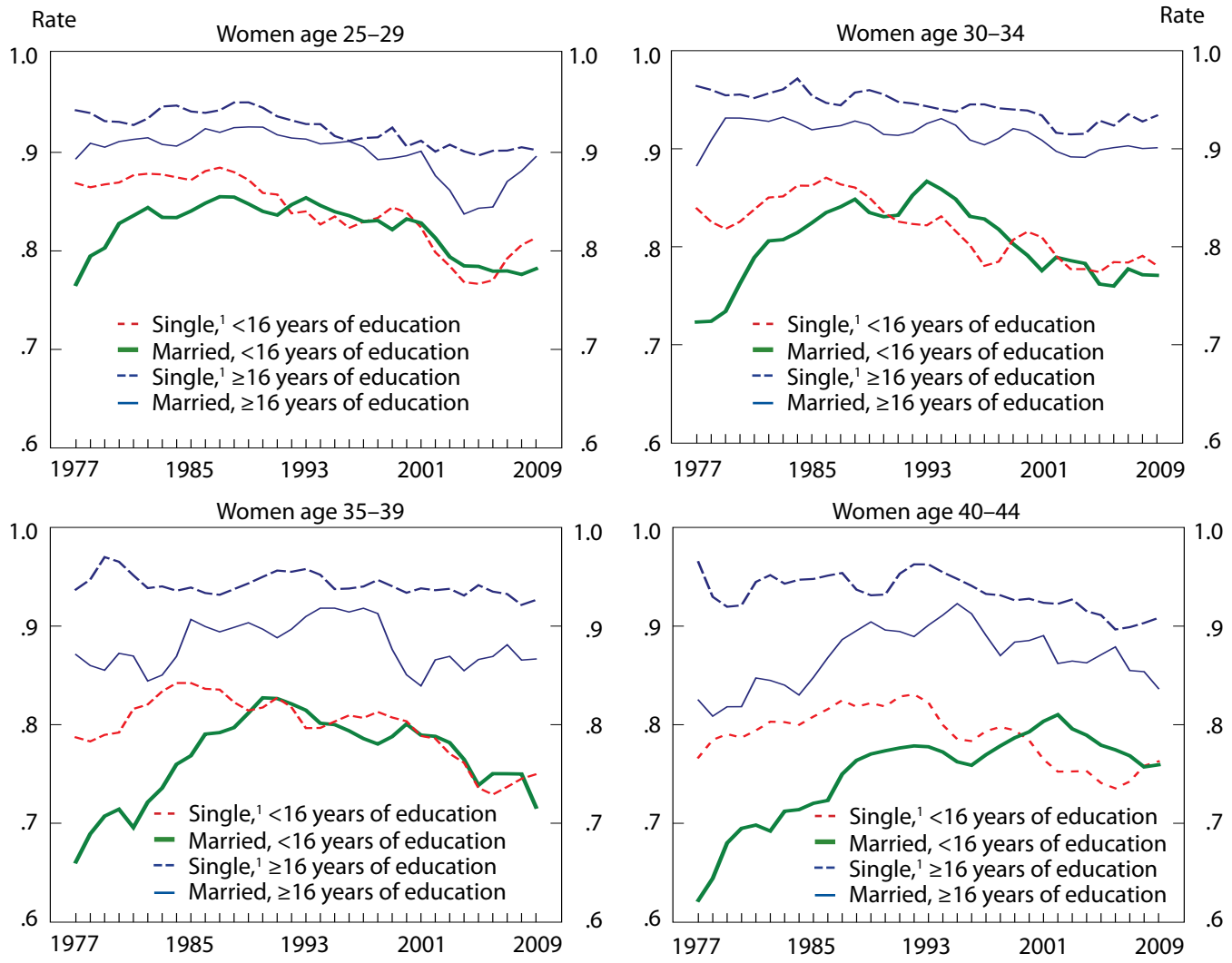
[1] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

NOTE: There are some data in the chart that are not statistically significant.

women with less than 16 years of education (by over 8 percentage points), and single women with less than 16 years of schooling (by nearly 3 percentage points). In addition, the rate declined among single women aged 40–44 with at least 16 years of education (by over 12 percentage points). The rates for women aged 30–34 with less than 16 years of education and children under 6 also have declined marginally. The trend among single college graduates aged 40–44 that appears in chart 2 corresponds with that in the many recent articles about older women with young children withdrawing from the labor force, although those articles tended to focus almost exclusively on married women. And those articles appear not to have shown the trend of decline during the past several years among 25- to 29-year-olds with children younger than 6: this is a notable trend that may signal a shift in behavior for this cohort.

Perhaps the most surprising results are presented in chart 3, however, which looks at women without any children under 18. Here we see declines—most extending back to the early 1990s or even late 1980s—among all groups based on education, marital status, and age, except for college graduates aged 35–39. The trends in these graphs seem to contradict the hypothesis that children are

Chart 3. **Labor force participation rates of women with no children under age 18, by age, marital status, and level of education, annual data, 1977–2009**



[1] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

NOTE: There are some data in the chart that are not statistically significant.

the reason for women's withdrawal from the labor force.

Accompanying these marked changes in labor force participation was a notable increase in the number of children from the 1999–2001 period to the 2007–09 period for almost every group. The figures for mean number of children can be seen in tables A-2 and A-3 of the appendix, which show an increase of 7.7 percent in the number of children under age 6 for married women and an increase of 15.5 percent in the same measure among single women. In some subgroups, the increase was much more marked. This was particularly so among women with more than 16 years of education: married women's number of children under 6 increased by 24.9 percent between 1999–2001 and 2007–09, and single women's number of children aged 6–17 increased by 29.6 percent in the same period. For single women with 16 years of education, the number of children under 6 increased by 27.9 percent from 1999–2001 to 2007–09.

Data and method

The objective of this study is to examine trends econometrically as an update to the Blau and Kahn study,[31] which estimated the elasticity of hours worked with respect to

wages for married women and found a trend of decline between 1979–81 and 1999–2001. As mentioned earlier, Blau and Kahn found evidence of a sharp rightward shift of the labor supply function for married women during the 1980s. They modeled annual hours worked in three 3-year groupings—1979–81, 1989–91, and 1999–2001—by use of March data from the CPS for married women aged 25–54 with spouse present, including wage data from the women's spouses.

The analysis presented in this article draws on March CPS data for all women aged 25–54, and for the husbands of those married with spouse present. The Blau and Kahn 3-year groupings were used, and data from the 2007–09 period were added to provide a more up-to-date 3-year grouping. In addition, this analysis includes the 1984–86 period in order to better examine trends from the 1980s, when female labor force participation was increasing at the fastest rate, before the declines seen in charts 1–3.

The analyses presented here examine not just married women with spouse present, but also single women—a group that has been defined in this article as comprising divorced, widowed, and never-married women, as well as those with spouse absent. Single women are included because of the notable trends observed for them in charts 1–3. Both groups—single women and married women, including husbands—exclude those in the military, the retired, and those with allocated[32] hours or weeks worked. March-supplement weights were used throughout the analysis, with the weights divided by the sum of weights in each year in order to ensure that each year in a 3-year grouping received equal weight. Summary statistics for the data used are presented in the appendix of this article.

The model estimated was

$$H = \beta_0 + \beta_1 \ln W_w + \beta_2 \ln W_h + \beta_3 I + \mathrm{B}'X + u \,, \quad (1)$$

where H is annual hours worked (including those with zeroes); W_w is the woman's own (instrumented) wage; W_h is the husband's (instrumented) wage, which is excluded from the equation for single women; I is nonwage income, which comprises interest, dividends, and rent; and X is a vector of control variables. The control variables include age, age squared, four education dummies, three race dummies—for the wife and the husband in the married women's equation, and for the woman only in the single women's equation—number of children under age 6, number of children aged 6–17, two year dummies, eight region dummies, and two indicators of Metropolitan Statistical Area (MSA) status.

The method employed in this article comprised three steps. In the first, hourly wages were calculated—in 2008 dollars by use of the Consumer Price Index—as total annual wage and salary income divided by annual hours worked, with the latter calculated as the number of weeks worked times the usual number of hours worked per week in the previous year. The annual wage and salary income was multiplied by a factor of 1.45 if topcoded, as it was in Blau and Kahn's study. The hourly wage was imputed for those with no reported wage, the self-employed, and those whose calculated wage fell outside the range of $2.50–$250 in 2008 dollars (again following Blau and Kahn). The imputation process was based on separate regressions of the natural logarithm of the wage (henceforth, "logwage") for those with less than 20 weeks worked and those with 20 or more weeks worked, separately for men, married women, and single women. That is, it was assumed, as in Blau and Kahn, that wages should be imputed on the basis of the reported wages of groups of people with similar numbers of weeks worked. As was the case in the Blau and Kahn study, the regressions included age and age squared, two year dummies, four education dummies, three race dummies, eight region dummies, and indicators for "central city" and "other MSA."

In the second step, with the women's and their spouses' wages treated as endogenous, wages were instrumented by regressing logwage on age and age squared, four education dummies, three race dummies, eight region dummies and the two indicators for MSA status. In addition, following on Blau and Kahn, a series of dummy variables representing wage deciles was included, which served as excluded instruments in the final hours equations. As indicated in Blau and Kahn, use of the deciles "corrects to some degree for measurement error in the wage" (p. 406).

The third step involved calculating estimates with the aforementioned equation, the results of which are presented in table 1. This equation was treated as a weighted instrumental variables linear model. However, two alternative methods were tested, for sensitivity. In the first, as in Blau and Kahn, a median regression was estimated in order to take account of the fact that, with higher levels of labor force participation, many women might be constrained to a standard work week. A regression at the median removes this constraint. The results of that median regression for married women are presented in table 2. The second alternative method was based on that of Heim,[33] who used the Heckman method, estimating an inverse Mills ratio to be included in a logwage regression, to produce an estimated logwage to be included along with the inverse Mills ratio in a regression for hours

Table 1. Instrumental variables estimates for women age 25–54, by marital status, selected years, 1979–2009 (dependent variable is annual hours worked, with zeroes included)

Measure	1979–81	1984–86	1989–91	1999–2001	2007–09
Married women					
Natural log of own wage	509.4	638.7	645.0	346.3	395.6
	(10.62)	(10.14)	(10.14)	(11.76)	(10.55)
Natural log of husband's wage	–285.9	–272.5	–259.7	–179.3	–208.0
	(9.67)	(9.39)	(9.88)	(11.92)	(10.72)
Nonwage income (in thousands)[1]	–2.66	–2.60	–1.84	[2]–0.81	[2]–0.84
	(0.42)	(0.37)	(0.40)	(0.41)	(0.44)
Number of children younger than 6 years	–380.2	–350.0	–349.6	–320.0	–288.4
	(5.6)	(5.93)	(6.09)	(8.75)	(7.64)
Number of children age 6–17 years	–99.1	–113.6	–119.6	–114.9	–99.5
	(3.76)	(4.17)	(4.43)	(5.81)	(5.24)
Number of observations	63,167	57.742	55,005	34.955	44,876
Elasticity of hours worked with respect to own wage	0.531	0.591	0.522	0.253	0.292
Elasticity of hours worked with respect to husband's wage	–.298	–.252	–.210	–.131	–.154
Single women[3]					
Natural log of own wage	453.7	550.6	556.6	185.2	306.4
	(15.49)	(13.42)	(12.17)	(12.07)	(9.78)
Nonwage income (in thousands)[1]	–4.32	–3.16	–3.53	[4]–0.35	[4]–0.90
	(0.86)	(0.69)	(0.68)	(0.63)	(0.85)
Number of children younger than 6 years	–287.3	–291.0	–267.5	–179.2	–145.6
	(12.54)	(11.25)	(10.45)	(13.49)	(10.47)
Number of children age 6–17 years	–99.6	–116.8	–91.4	–33.6	–22.3
	(6.13)	(6.23)	(6.72)	(6.91)	(5.73)
Number of observations	26,821	30,222	32,537	30,770	47,945
Elasticity of hours worked with respect to own wage	0.324	0.382	0.366	0.115	0.202

[1] Nonwage income comprises interest, dividends, and rent.

[2] Significant at the .05 level.

[3] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

[4] Not significant even at the .10 level.

NOTE: Standard errors are in parentheses. All coefficients are statistically significant at the .01 level or higher except for those indicated otherwise. All regressions include age, age squared, four education dummies, and three race dummies for women and for the husbands of married women, as well as two year dummies, eight region dummies, and indicators for central city, other MSA, and non-MSA.

worked.[34] The results of that procedure—which are very similar to those presented in table 1—are available from the author on request.

Results

The results in table 1 are similar to those in Blau and Kahn in regard to the decline in the elasticity of women's hours worked with respect to their wages (henceforth, "own-wage elasticity"). The table shows a very slight decline in this elasticity from the 1979–81 period (.531) to the 1989–91 period (.522), and then a stronger decline from the 1989–91 period to the 1999–2001 period (.253). However, the magnitudes of the elasticities are less than those of the elasticities estimated by Blau and Kahn (.766, .584, and .357, respectively).

However, as suggested in an article by Chinhui Juhn and Kevin M. Murphy,[35] the own-wage elasticity estimated here actually increased during the first half of the 1980s, from .531 in the 1979–81 period to .591 in the 1984–86 period, before declining to .522 in 1989–91. More notable in table 1, however, is the fact that the own-wage elasticity appears to have risen again between the 1999–2001 period and the 2007–09 period (from .253 to .292). A similar pattern is demonstrated in the bottom half of table 1, for single women, for whom the own-wage elasticity

first increases between 1979–81 and 1984–86, then declines to .115 in 1999–2001, and then rises to .202 in the 2007–09 period.

Similarly, the absolute value of the elasticity of married women's hours worked with respect to their husbands' wages (henceforth, "cross-wage elasticity"), presented in table 1, declined from 1979–81 to 1999–2001 (the actual value changed from –.298 to –.131), as in Blau and Kahn, but it, too, increased between 1999–2001 and 2007–09. (The actual value changed from –.131 to –.154.)

Most of the general patterns visible in table 1 also appear in table 2, which is based on median regressions. There, the own-wage elasticity rises from .736 in 1979–81 to .760 in 1984–86 and then declines to .271 in the 1999–2001 period, but rises again to .281 in 2007–09. And, as in table 1, the cross-wage elasticity falls from 1979–81 through 1999–2001 but then rises between 1999–2001 and 2007–09.

In order to explore these patterns further, separate regressions were run for various subgroups of married and single women, and the resulting elasticities are presented in table 3. Except for single women with 16 or more years of education, there exists the same pattern of increase in own-wage elasticity between 1979–81 and 1984–86 followed by a decline between 1989–91 and 1999–2001 in all groups. And except for married women with less than 16 years of education, and single women under age 35, there exists the increase in own-wage elasticity between 1999–2001 and 2007–09 that was demonstrated in tables 1 and 2. For single women with more than 16 years of education, the own-wage elasticity actually turned negative during the 1990s—probably a result of the dot-com boom during the late 1990s, which appears to have caused many women to make enough money that higher wages actually resulted in fewer hours worked. This hypothesis is consistent with Goldin's expectation that, as women become more career-oriented, their own-wage elasticity will approach that of men.[36]

As regards cross-wage elasticity, the pattern in table 3 echoes that in tables 1 and 2 for all groups, except women with children under 6, for whom the elasticity failed to increase between 1999–2001 and 2007–09. But in general, the pattern has been one of decline in the cross-wage elasticity from 1979–81 through 1999–2001 with a rebound thereafter.

Tables 4 and 5 present estimates of elasticity of women's hours worked with respect to the number of children in two age groups: under 6, and 6–17. For nearly all groups of women in the tables, a decline in elasticity throughout the 1979–2009 period can be seen: children were having less and less influence on their mothers' hours worked during the timespan. For married women with 16 or more

Table 2. Instrumental variables estimates for married women, calculated by use of median regressions, selected years, 1979–2009 (dependent variable is annual hours worked, including zeroes)

Measure	1979–81	1984–86	1989–91	1999–2001	2007–09
Natural log of own wage	705.3 (18.42)	821.5 (16.69)	736.7 (13.33)	371.0 (15.91)	380.3 (13.28)
Natural log of husband's wage	–441.1 (16.33)	–382.1 (15.04)	–339.0 (12.57)	–209.1 (14.40)	–224.5 (11.97)
Nonwage income (in thousands)[1]	–3.37 (0.67)	–3.73 (0.57)	–3.30 (0.48)	[1]–1.11 (0.51)	–2.27 (0.48)
Number of children younger than 6 years	–484.9 (10.70)	–479.9 (10.14)	–492.2 (8.42)	–479.3 (10.98)	–421.8 (8.92)
Number of children age 6–17 years	–150.7 (6.37)	–163.6 (4.17)	–164.0 (5.67)	–162.7 (6.88)	–134.8 (5.77)
Number of observations	63,167	57,742	55,005	34,955	44,876
Elasticity of hours worked with respect to own wage	0.736	0.760	0.596	0.271	0.281
Elasticity of hours worked with respect to husband's wage	–.460	–.354	–.274	–.153	–.166

[1] Nonwage income comprises interest, dividends, and rent.

[2] Significant at the .05 level.

NOTE: Standard errors are in parentheses. All coefficients are statistically significant at the .01 level or higher except for those indicated otherwise. All regressions include age, age squared, four education dummies, and three race dummies for women and the husbands of married women, as well as two year dummies, eight region dummies, and indicators for central city, other MSA, and non-MSA

Table 3. Elasticity of hours worked for women age 25–54, by subgroup, selected years, 1979–2009

Time period	All	More than 16 years of education	16 years of education	Less than 16 years of education	Younger than 35	35 and older	With no children under 18	With children under age 6
For married women, with respect to their own wages								
1979–81	0.531	0.290	0.443	0.568	0.519	0.537	0.453	0.740
1984–86	.591	.269	.463	.657	.647	.550	.473	.864
1989–91	.522	.349	.430	.566	.513	.526	.387	.757
1999–2001	.253	.079	.221	.289	.191	.272	.223	.326
2007–09	.292	.262	.359	.261	.274	.295	.231	.467
For single women,[1] with respect to their own wages								
1979–81	.324	.123	.151	.384	.299	.348	.241	.593
1984–86	.382	[2]–.004	.105	.504	.315	.443	.293	.688
1989–91	.366	.094	.153	.462	.314	.405	.282	.743
1999–2001	.115	–.118	.090	.153	.130	.106	.116	.102
2007–09	.202	[2].014	.125	.263	.106	.258	.216	.117
For married women, with respect to their husbands' wages								
1979–81	–.298	.243	–.343	–.292	–.274	–.311	–.187	–.411
1984–86	–.252	.233	–.240	–.257	–.226	–.273	–.170	–.313
1989–91	–.210	.167	–.216	–.213	–.190	–.221	–.135	–.284
1999–2001	–.131	.109	–.179	–.115	–.113	–.135	–.049	–.245
2007–09	–.154	.143	–.188	–.133	–.143	–.153	–.089	–.196

[1] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

[2] Not statistically significant at the .01 level.

NOTE: The coefficients used to calculate elasticity all were significant at the .01 level or higher except for those indicated otherwise. Regressions included the following, where appropriate: age, age squared, four education dummies, and three race dummies for women and their husbands, as well as two year dummies, eight region dummies, and indicators for central city and other MSA. In all cases, elasticity was calculated by use of weighted means, based on March-supplement weights.

years of education and for married women with children younger than age 6, there was a very small increase from 1999–2001 to 2007–09 in the elasticity of hours worked with respect to the number of children younger than 6. Similarly, there was a very small increase between 1999–2001 and 2007–09 in the elasticity of hours worked with respect to the number of children younger than 6 for single women with 16 or more years of education and single women under 35.

Interpretation of results

In order to try to determine what factors lie behind the marked changes in labor force participation seen in charts 1–3, and the changes in elasticity seen in tables 3–5, it is helpful to look at estimated values of labor supply based on the equations underlying tables 3–5. These estimated values can be broken down into components, and total estimated values can be compared with actual observed changes in labor supply. The results of such a procedure are presented in tables 6 and 7.[37] Table 6 breaks down estimates for the 1980s, when labor supply increased most dramatically in all groups, and table 7 does the same for the 2000–09 period, when so many reversals appear to have occurred.

Each table looks at married and single women separately. Lines 12 and 22 of table 6 indicate that, during the 1980s, significant increases occurred in all groups but that by far the most dramatic increases occurred for married women: the average increase for all married women was 276.42 hours, while for single women the comparable figure was 118.20 hours. For both married and single women, the largest increases occurred among those with exactly 16 years of education and those 35 years of age or older. But

Table 4. Elasticity of hours worked with respect to number of children for married women age 25–54, selected years, 1979–2009

Time period	All	More than 16 years of education	16 years of education	Less than 16 years of education	Younger than 35	35 and older	With children under age 6
Elasticity with respect to number of children younger than 6 years							
1979–81	–0.167	–0.177	–0.230	–0.155	–0.326	–0.048	–0.492
1984–86	–.145	–.126	–.200	–.138	–.280	–.049	–.428
1989–91	–.127	–.118	–.172	–.117	–.245	–.052	–.371
1999–2001	–.091	–.078	–.113	–.084	–.199	–.049	–.296
2007–09	–.089	–.098	–.116	–.077	–.189	–.049	–.301
Elasticity with respect to number of children age 6–17							
1979–81	–.118	–.084	–.109	–.124	–.112	–.123	–.086
1984–86	–.102	–.080	–.100	–.108	–.099	–.108	–.093
1989–91	–.088	–.077	–.091	–.090	–.080	–.097	–.082
1999–2001	–.077	–.069	–.091	–.079	–.056	–.087	–.091
2007–09	–.066	–.072	–.082	–.060	–.038	–.075	–.063

NOTE: The coefficients used to calculate elasticity all were significant at the .01 level or higher. In all cases, elasticity was calculated by use of weighted means, based on March-supplement weights. Regressions included the following, where appropriate: age, age squared, four education dummies, and three race dummies for women and their husbands, as well as two year dummies, eight region dummies, and indicators for central city and other MSA.

Table 5. Elasticity of hours worked with respect to number of children for single women[1] age 25–54, selected years, 1979–2009

Time period	All	More than 16 years of education	16 years of education	Less than 16 years of education	Younger than 35	35 and older	With children under age 6
Elasticity with respect to number of children younger than 6 years							
1979–81	–0.034	–0.007	–0.014	–0.040	–0.055	–0.013	–0.328
1984–86	–.035	–.003	–.016	–.044	–.058	–.013	–.295
1989–91	–.033	–.006	–.011	–.043	–.058	–.012	–.297
1999–2001	–.016	–.005	–.006	–.021	–.028	–.009	–.183
2007–09	–.016	–.006	–.011	–.020	–.033	–.007	–.116
Elasticity with respect to number of children age 6–17							
1979–81	–.051	–.010	–.023	–.060	–.045	–.054	–.086
1984–86	–.048	–.020	–.012	–.058	–.050	–.045	–.117
1989–91	–.032	–.010	–.017	–.037	–.044	–.022	–.057
1999–2001	–.011	–.006	–.014	–.009	–.012	–.011	–.052
2007–09	–.007	–.017	–.010	–.005	–.005	–.009	–.034

[1] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

NOTE: The coefficients used to calculate elasticity all were significant at the .01 level or higher. In all cases, elasticity was calculated by use of weighted means, based on March-supplement weights. Regressions included the following, where appropriate: age, age squared, four education dummies, and three race dummies for women and their husbands, as well as two year dummies, eight region dummies, and indicators for central city and other MSA.

close behind were married women with children under 6, the group that has been most often noted in the literature for a sharp increase in labor force participation in the 1980s.

For married women, the strongest force behind the increase in hours worked appears to have been their own wage (see line 1): the part of the increase attributable to that wage was 59.77 hours. The next-strongest force was increases in educational levels, which contributed 19.49 hours (line 6). Husbands' wages contributed as well, since husbands' average wage declined during this period, leading women to supply more hours. For single women, the

Table 6. Estimated changes in annual work hours for women age 25–54 in the 1979–91 period (estimated with the equations for 1989–91)

Measure	All	More than 16 years of education	16 years of education	Less than 16 years of education	Younger than 35	35 and older	With no children under 18	With children under age 6
Married women								
1. Natural log of own wage	59.77	87.92	104.24	24.27	28.11	82.86	56.20	61.50
2. Natural log of husband's wage	10.16	–15.15	–3.03	18.87	16.69	6.64	2.58	10.34
3. Nonwage income[1]	–1.44	–6.47	–2.15	–.40	–.90	–1.65	[2]–.92	[2]–.68
4. Age	.99	[2]–5.44	[2]–12.01	4.12	[2]–2.34	10.19	5.77	[2]–.74
5. Husband's age	[2]–.29	[2]7.62	[2]1.75	[2]–.39	[2]–.56	[2]–.72	[2].18	[2].49
6. Education	19.49			16.96	8.33	28.55	26.43	5.48
7. Husband's education	.41	[2].18	6.60	3.33	2.96	2.28	4.19	–1.16
8. Number of children	16.99	4.65	23.68	16.79	4.72	15.77		8.05
9. Race	[2].96	[2]–.82	[2]–2.82	1.99	–.52	2.36	–.60	.26
10. Husband's race	.39	[2].01	3.24	[2]–.19	–1.12	1.37	–1.42	.57
11. Region/MSA	–.36	3.07	–6.62	1.25	.19	–1.20	–2.10	–4.52
12. Change in total actual number of hours	276.42	180.93	292.70	261.70	246.42	294.67	234.01	287.15
13. Change in total number of explained hours	107.06	75.58	112.86	86.60	55.56	146.46	90.33	79.58
14. Change in total number of unexplained hours	169.36	105.35	179.84	175.10	190.86	148.21	143.68	207.57
Single women[3]								
15. Natural log of own wage	19.45	23.90	33.51	–8.14	–11.34	53.98	32.24	–32.04
16. Nonwage income[1]	–1.03	[2]–.09	–1.09	–.62	–1.26	–.67	–1.15	–.95
17. Age	4.24	22.95	3.30	4.90	[2]2.40	[2]7.28	2.66	[2]–.50
18. Education	36.42			32.90	15.58	49.97	39.41	20.19
19. Number of children	10.30	.48	10.37	6.43	2.80	12.13		9.89
20. Race	–1.20	–4.53	–3.74	–1.01	–2.93	–.26	–.80	3.38
21. Region/MSA	8.91	.65	–.22	12.34	3.01	14.74	6.73	4.86
22. Change in total actual number of hours	118.20	86.50	160.68	87.54	57.19	173.11	116.78	72.43
23. Change in total number of explained hours	77.08	43.10	42.13	46.82	8.27	137.17	79.09	31.89
24. Change in total number of unexplained hours	41.12	43.40	118.55	40.72	48.92	35.94	37.69	40.54

[1] Nonwage income comprises interest, dividends, and rent.
[2] Coefficient used to calculate the estimated effect was not statistically significant even at the .10 level.
[3] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

NOTE: All coefficients are statistically significant at .10 level or higher except for those indicated otherwise.

largest contribution to increased hours was made by rising levels of education, which brought about an estimated increase of 36.42 hours (line 18). For both married and single women, the children they had made a positive contribution to hours worked (lines 8 and 19), since fertility declined overall during this period.

However, overall, the estimated increases fall far short of the actual observed increases in hours worked (lines 13 and 23). This same phenomenon was observed by Blau and Kahn for this period: they found that measured factors accounted for at most 38 percent of observed increases, suggesting a marked shift to the right of the labor supply function during this period. In this analysis, the result is similar, with measured factors accounting for only 38.7 percent of the increase for married women, although the performance is better for single women, with measured factors accounting for 65.2 percent of the observed change. Thus, the shift appears to have been strongest among married women, probably because of the gradual acceptance of labor force participation among women with young children.

Table 7. Estimated changes in annual work hours for married and single women in the 1999–2009 period (estimated with the equations for 2007–09)

Measure	All	More than 16 years of education	16 years of education	Less than 16 years of education	Younger than 35	35 and older	With no children under 18	With children under age 6
Married women								
1. Natural log of own wage	21.06	–3.16	2.03	5.69	21.01	20.60	10.01	36.31
2. Natural log of husband's wage	–2.10	–.04	–3.96	5.37	–3.93	–1.18	4.04	–9.17
3. Nonwage income[1]	.64	[2]–1.34	2.37	[2].35	[2]–.51	.80	1.12	[2]–.13
4. Age	–4.24	7.29	[2]–1.32	–6.59	[2]–1.79	[2]–5.11	–4.60	1.52
5. Husband's age	1.04	[2]–10.65	[2]–.24	1.22	[2].58	[2]1.37	1.97	[2]–1.96
6. Education	13.76	. . .	. . .	–.72	18.74	11.39	10.51	14.64
7. Husband's education	–4.49	.60	.88	–.14	–8.26	–3.00	–.77	–14.70
8. Number of children	–6.80	–30.32	–11.66	–1.17	3.62	–3.07		–1.98
9. Race	[2].59	[2]3.48	[2]2.80	[2]–1.89	[2]–2.84	2.31	[2].04	3.41
10. Husband's race	–3.87	–13.00	–6.27	[2]–1.30	–14.19	.46	–8.58	–7.00
11. Region/MSA	–6.79	[2].72	–11.37	–6.80	–9.28	–6.58	–1.67	–10.43
12. Change in total actual number of hours	–13.46	–28.66	–51.88	–26.11	–6.19	–16.42	–37.24	–14.98
13. Change in total number of explained hours	8.79	–46.42	–26.74	–5.99	3.24	10.02	12.06	10.56
14. Change in total number of unexplained hours	–22.25	17.76	–25.14	–20.12	–9.43	–26.44	–49.30	–25.54
Single women[3]								
15. Natural log of own wage	–3.03	[2]–.42	–2.63	–9.38	.22	–6.46	–6.03	–1.57
16. Nonwage income[1]	.64	[2]1.57	[2]2.70	[2]–.24	[2].59	[2].67	[2]1.36	[2]–.12
17. Age	–5.61	–11.63	–7.14	–5.57	–3.771	–6.73	–4.82	–4.04
18. Education	13.54	. . .	. . .	9.93	17.52	11.33	13.91	7.49
19. Number of children	–3.21	–8.30	–6.77	–3.83	–6.04	–1.63	. . .	–2.47
20. Race	.94	[2]–7.89	–5.17	3.83	–.69	2.53	–1.12	4.64
21. Region/MSA	3.15	2.82	1.23	4.32	2.57	3.37	2.52	7.17
22. Change in total actual number of hours	–101.48	–99.56	–73.4	–122.15	–104.98	–99.21	–105.96	–84.28
23. Change in total number of explained hours	6.44	–23.86	–17.78	–.93	10.41	3.07	5.81	11.11
24. Change in total number of unexplained hours	–107.92	–75.70	–55.62	–121.22	–115.39	–102.28	–111.77	–95.39

[1] Nonwage income comprises interest, dividends, and rent.

[2] Coefficient used to calculate the estimated effect was not statistically significant even at the .10 level.

[3] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

NOTE: All coefficients are statistically significant at .10 level or higher except for those indicated otherwise.

The poorest performance in explaining increases in hours worked—indicating the greatest shift in the labor supply curve—was for women under 35, a demographic in which measured factors accounted for only 22.5 percent of observed changes for married women and 14.4 percent for single women. The best performance was for women 35 or older: 49.7 percent for married women, and 79.2 percent for single women.

Table 7 displays the results of a similar analysis for the 2000–09 period, an analysis based on the equation used for table 1. Whereas the unexplained portions of the increase in hours were positive in table 6 for all the groups of women in the table (lines 14 and 24)—indicating a rightward shift of the labor supply function—with one exception they are all negative in table 7 (again, lines 14 and 24). This, together with the estimated turnaround in elasticities for the 2000–09 period, suggests that the labor supply curve may have shifted back to the left during this period. This appears to be the case especially for single women, for whom the observed decline in hours worked

was the greatest (line 22). The overall change in hours for single women was a drop of 101.48, as compared with a decline of 13.46 hours for married women. The measured factors add up to a rise of 6.44 hours for single women, instead of the observed large decline.

The one exception to the apparent leftward shift in the labor supply curve in table 7 is married women with more than 16 years of education: for them, measured factors estimate an even larger decline in hours worked than what actually occurred. They also had the largest decline attributable to the number of children: 30.32 hours lost (line 8), which is very close to the observed overall drop of 28.66 in hours supplied (line 12). This is the only case in table 7 in which children might be thought responsible for women's reduction in hours worked in the labor market. For all other groups, the contribution made by children—despite the substantial rise in fertility—was fairly small (lines 8 and 19). As did married women with more than 16 years of education, single highly educated women, as noted earlier, exhibited a negative own-wage elasticity in the 1999–2001 period, and essentially bought back time for activities outside work because of their high wages.

In the 1999–2009 period, movements in women's own wages affected the number of hours spent at work much less than they did from 1979 to 1991 (lines 1 and 15). In fact, for single women in nearly every group, despite positive own-wage elasticities, wages had a negative effect on the number of hours worked (line 15). This is due to the fact that these women's imputed, instrumented average wages decreased during this period, as shown in the following tabulation:

Percent change in real imputed and instrumented wages for single women, 1999–2009

All single women	–1.0
With more than16 years of education	–1.8
With 16 years of education	–1.1
With less than 16 years of education	–2.6
35 years old or older	–1.1
With no children younger than 18	–1.6
With children younger than 6	–1.1

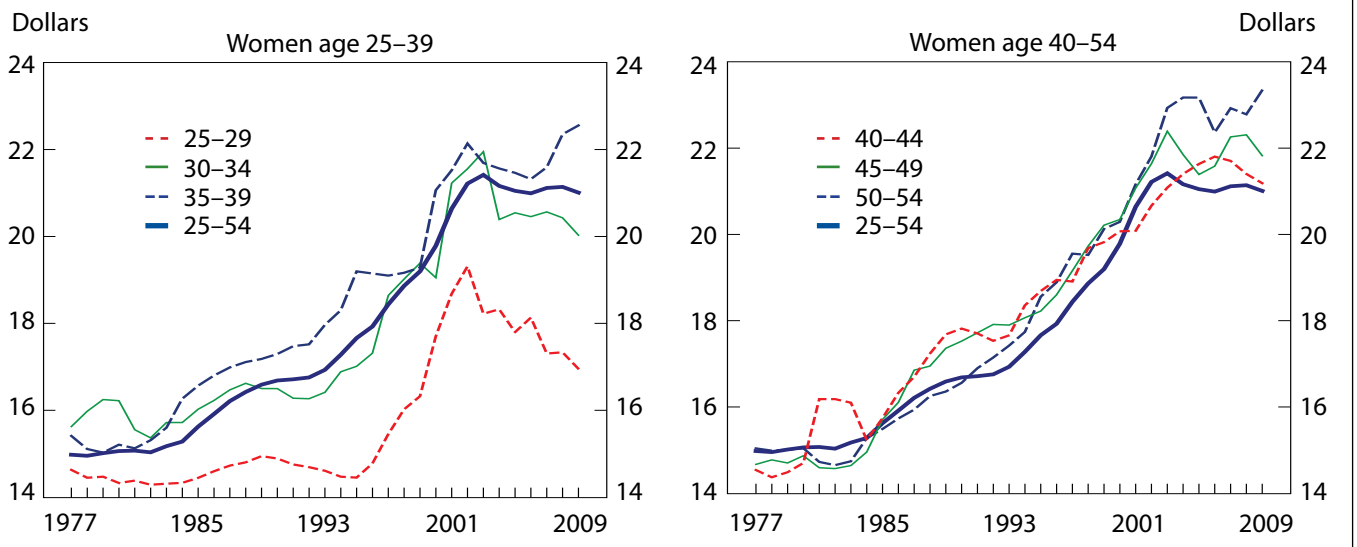
For single women without children under 18, part of this decrease in the average estimated wage was probably due to a decrease in the proportion of these women accounted for by those with more than 16 years of education: their share fell by 13 percent during the 1999–2009 period, (although this was nearly matched by a decrease of 11 percent in the share accounted for by those with less than 12 years of education during the same period). This decline in the share of single women without children under 18 accounted for by those with more than 16 years of education was not due to a decline in the overall share of more highly educated women: the share of women with more than 16 years of education among all married women aged 25–54 rose by 41 percent, while the corresponding share for single women rose by 12 percent (calculated with data from tables A-2 and A-3 of the appendix). Similarly, the share of highly educated women among single women with children rose by 29 percent. Thus, the women with the highest levels of education were marrying and having children in fairly high proportions during the 1999–2009 period. This is another feature of the period that attracted so many articles in the popular press.

The movement in the instrumented wages of single women follows the overall pattern that occurred during this period, shown in chart 4. The chart presents observed wages of women reporting positive hours worked and positive earnings in the period from 1977 to 2009 (for earnings in 1976–2008), as opposed to the imputed and instrumented wages used in the regressions. Chart 4 shows a period of substantial increase in women's average wages, in nearly all age groups, between 1980 and the early 2000s. For women 25–29 years old, this increase did not begin until the mid-1990s, which explains the smaller effect that these younger women's wages had on the hours they worked in the labor market during the 1980s. However, after the early 2000s women's wages decreased across the board, for all age groups. This was especially the case for women aged 25–29—which may be a reason, when taken together with the increased responsiveness of 25- to 29-year-old women to their own wage, for the significant reduction in the labor force participation of these women, shown in chart 3.

Women who leave the labor force

How do women who drop out of the labor force differ from those who remain—and have the characteristics of those who leave the labor force changed in recent years? Table 8 considers these questions, examining the two groups that have, overall, dropped out in the greatest numbers: single women, and women without any children younger than 18. The table presents, by level of education, some of the characteristics of women who were not in the labor force during the year in question but had been the previous year relative to the characteristics of women who remained in the labor force. Thus, for example, in the upper left corner, it can be seen that, in the periods before 1999 that were studied (1979–81, 1984–86, and 1989–91), single women with less than 16 years of education who dropped out of

Chart 4. **Mean observed hourly wages[1] of women aged 25–54, in 2008 dollars, annual data, 1977–2009**



[1] "Observed wages" refer to the wages of women who worked a positive number of hours and for whom wages are reported, as opposed to wages that were imputed or instrumented.

the labor force had worked only 49 percent as many hours during the year in which they were in the labor force as those who did not drop out worked during the same year. The pattern of women who left the labor force having worked fewer hours when they were in it than women who did not leave the labor force is common across years and levels of education, for both single women and childless women. However, it is also the case that, compared with before 1999, from 1999 onward the dropouts had worked slightly more relative to those who remained.

Similarly, in the periods before 1999 that were studied, single women and childless women who dropped out had, on average, earned less than 85 percent of the hourly wage of those who remained—but this percentage rose in all cases from 1999 on. In the 1999–2001 period, in all but one case they had earned *more* than those who had not dropped out. However before 1999, those who dropped out of the labor force and had more than 16 years of education had enjoyed more than 70 percent more nonwage income (interest, dividends, and rent) than those who remained—but in all cases this advantage dropped significantly after 1999.

And finally, except for those with more than 16 years of education, single women who dropped out had, on average, more children than those who did not drop out. But here again there was a shift beginning with the 1999–2001 period: the ratio of the number of children per single woman who dropped out of the labor force to the number of children per single woman who stayed in the labor force had dropped. The only instance in which the ratio rose was for single women with more than 16 years of education in the 1999–2001 period: those who had dropped out had 23 percent *more* children in that period than their counterparts who had not dropped out, after having had 8 percent *fewer* before 1999. This again is consistent with the "opting out" stories reported in the popular press.

Thus, as reflected in the shifts in elasticity reported in earlier tables, there were significant shifts in the characteristics of women who dropped out in 1999 or later: they on average had worked more hours, earned more per hour, enjoyed less nonwage income, and had fewer children.

MUCH OF THE RECEIVED WISDOM regarding women's labor force participation has been turned on its head in the last decade or so. Already widely noted has been the decline in labor force participation among highly educated married women with children under age 6, which appears to have begun in the mid-1990s. But what seems to have passed under the radar has been the significant change that has occurred among women without children under 18, especially those who are single. For women without children younger than 18, declines have been occurring since the early 1990s or even the late 1980s. Also notable have been the declines that have occurred in the 25–29 age group, for whom labor force participation

Table 8. Ratio of various characteristics of women who left the labor force[1] to the same characteristics of those who remained,[2] selected years, 1979–2009

Time period	Hours worked	Hourly wage	Nonwage income[3]	Number of children under age 6	Number of children age 6–17
Single women[4]					
Less than 16 years of education					
Average of 1979–81, 1984–86, and 1989–91	0.49	0.60	0.89	2.86	1.53
1999–2001	.52	.95	.77	2.00	1.27
2007–09	.54	.85	.66	2.16	1.23
16 years of education					
Average of 1979–81, 1984–86, and 1989–91	.57	.83	1.54	2.53	1.23
1999–2001	.52	1.03	.95	1.56	.79
2007–09	.51	.94	1.40	1.95	.84
More than 16 years of education					
Average of 1979–81, 1984–86, and 1989–91	.42	.80	1.73	.92	.95
1999–2001	.55	1.14	1.90	1.23	.24
2007–09	.59	.96	.39	.56	.78
Childless women					
Less than 16 years of education					
Average of 1979–81, 1984–84, and 1989–91	.47	.88	1.27	…	…
1999–2001	.53	.94	.98	…	…
2007–09	.55	.90	.90	…	…
16 years of education:					
Average of 1979–81, 1984–84, and 1989–91	.53	.86	2.21	…	…
1999–2001	.51	1.06	1.35	…	…
2007–09	.54	.92	1.14	…	…
More than 16 years of education:					
Average of 1979–81, 1984–84, and 1989–91	.50	.84	1.70	…	…
1999–2001	.55	1.09	1.26	…	…
2007–09	.56	1.09	.76	…	…

[1] A woman is defined as having left the labor force if she worked positive hours in year *t*–1 and was not in the labor force in year *t*.

[2] For example, on average for the years 1979–81, 1984–86, and 1989–91, the ratio of the average number of hours worked in year *t*–1 by single women who left the labor force to the average number of hours worked during the same year by single women who remained in the labor force was 0.49 (the statistic in the upper-left corner of the table).

[3] Nonwage income comprises interest, dividends, and rent.

[4] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

is lower today than it was in the late 1990s or even, in some cases, the late 1980s. In addition, women with more than 16 years of education have been marrying in large numbers, and both single and married women among the highly educated have been having children, with numbers of children increasing by more than 25 percent since 1999–2001. In some cases these trends have abated somewhat since about 2005, but for nearly all groups of women without children under 18, and for women with children and less than 16 years of education, the declines have continued through 2007–09.

This article has attempted to analyze these trends and others econometrically, and has found a number of other trends. Own-wage elasticities, which had been declining since the 1980s, have increased since 1999–2001 for both married and single women; cross-wage elasticities for married women, which had been declining in absolute value since 1979–81, have increased in absolute value since 1999–2001.

In addition, for nearly all groups of women, the negative elasticity of hours worked with respect to number of children has declined in absolute value continuously since 1979–81. The only exception to this rule has been married women with more than 16 years of education and married women with children under 6, for whom elasticity has increased marginally in absolute value since 1999–2001. Among single women, elasticity of hours worked with respect to the number of children under age 6 has declined continuously since 1979–81 for all groups except for that with exactly 16 years of education and that under

age 35. As regards elasticity with respect to the number of children aged 6–17, for single women with more than 16 years of education, the elasticity has increased very little in absolute value since 1999–2001.

Yet, for the most part, the observed changes in elasticity cannot explain the marked changes in the number of hours supplied to the labor market since 2000. The overall drop in mean annual hours supplied for single women was 101.48, but adding up measured factors results in an estimated rise of 6.44 hours. For married women, the actual drop was only 13.46 hours, but for them, summing measured factors results in an estimated rise of 8.79 hours. These differences suggest that, whereas the labor supply curve appeared to have shifted markedly to the right in the 1980s, and less markedly to the right in the 1990s, there was a leftward shift between 1999–2001 and 2007–09, which was most marked for single women.

The only exception to this trend was married women with more than 16 years of education, for whom measured factors add up to an even larger drop in hours worked than what actually occurred. This was largely due to their response to the presence of children. This was the only group for whom the decline in women's labor force participation might be attributed to the presence of children.

Thus, this analysis, unfortunately, leaves largely unexplained the sometimes dramatic shifts that have occurred in the labor market behavior of women—especially single women—since the 1990s. Perhaps, like the attitudinal shift in the 1970s and 1980s that made it more socially acceptable for a mother with children to enter the labor force, there currently exists an attitudinal shift towards accepting women's ability to choose between home and labor market. Further analysis could involve an examination of the sources of income and the living arrangements of those single women and childless women who have been choosing to withdraw from the labor force since the turn of the century. □

Notes

[1] Marisa DiNatale and Stephanie Boraas, "The labor force experience of women from 'Generation X,'" *Monthly Labor Review*, March 2002, pp. 3–15, on the Internet at **www.bls.gov/opub/mlr/2002/03/art1full.pdf** (visited Nov. 1, 2010).

[2] Chinhui Juhn and Simon Potter, "Changes in Labor Force Participation in the United States," *Journal of Economic Perspectives*, summer 2006, pp. 27–46.

[3] Sharon R. Cohany and Emy Sok, "Trends in labor force participation of married mothers of infants," *Monthly Labor Review*, February 2007, pp. 9–16, on the Internet at **www.bls.gov/opub/mlr/2007/02/art2full.pdf** (visited Nov. 1, 2010).

[4] Lisa Belkin, "The Opt-Out Revolution," *New York Times Magazine*, Oct. 26, 2003, on the Internet at **www.nytimes.com/2003/10/26/magazine/the-opt-out-revolution.html** (visited Nov. 1, 2010).

[5] Claudia Wallis and others, "The Case For Staying Home," *Time*, Mar. 22, 2004, on the Internet at **www.time.com/time/magazine/article/0,9171,993641,00.html** (visited Nov. 1, 2010).

[6] Katharine Bradbury and Jane Katz, "Women's rise: a work in progress," *Regional Review*, first quarter 2005, pp. 58–67, on the Internet at **www.bos.frb.org/economic/nerr/rr2005/q1/section5a.pdf** (visited Nov. 1, 2010).

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[9] Arland Thornton and Linda Young-DeMarco, "Four Decades of Trends in Attitudes Toward Family Issues in the United States: the 1960s through the 1990s," *Journal of Marriage and Family*, November 2001, pp. 1009–37.

[10] Saul D. Hoffman, "The changing impact of marriage and children on women's labor force participation," *Monthly Labor Review*, February 2009, pp. 3–14, on the Internet at **www.bls.gov/opub/mlr/2009/02/art1full.pdf** (visited Nov. 2, 2010).

[11] Marisa DiNatale, "Characteristics of and preference for alternative work arrangements, 1999," *Monthly Labor Review*, March 2001, pp. 28–49, on the Internet at **www.bls.gov/opub/mlr/2001/03/art2full.pdf** (visited Nov. 2, 2010); see pp. 47–49.

[12] Joan C. Williams, "The Opt-Out Revolution Revisited," *The American Prospect*, Feb. 19, 2007, on the Internet at **www.prospect.org/cs/articles?article=the_optout_revolution_revisited** (visited Nov. 2, 2010). See also Belkin, "The Opt-Out Revolution."

[13] Wallis and others, "The Case For Staying Home."

[14] Heather Boushey, "Are Women Opting Out? Debunking the Myth," (Washington, DC, Center for Economic and Policy Research, November 2005), on the Internet at **www.cepr.net/documents/publications/opt_out_2005_11_2.pdf** (visited Nov. 2, 2010).

[15] Abraham Mosisa and Steven Hipple, "Trends in labor force participation in the United States," *Monthly Labor Review*, October 2006, pp. 35–57, on the Internet at **www.bls.gov/opub/mlr/2006/10/art3full.pdf** (visited Nov. 2, 2010).

[16] Louise Story, "Many Women at Elite Colleges Set Career Path to Motherhood," *The New York Times*, Sept. 20, 2005, on the Internet at **www.nytimes.com/2005/09/20/national/20women.html** (visited Nov. 2, 2010).

[17] James P. Vere, "'Having It All' No Longer: Fertility, Female Labor Supply, and the New Life Choices of Generation X," *Demography*,

November 2007, pp. 821–28.

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[21] Francine Blau and Lawrence M. Kahn, "Changes in the Labor Supply Behavior of Married Women: 1980–2000," *Journal of Labor Economics*, July 2007, pp. 393–438.

[22] Bradley T. Heim, "The Incredible Shrinking Elasticities: Married Female Labor Supply, 1978–2002," *Journal of Human Resources*, fall 2007, pp. 881–918.

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[24] Julie L. Hotchkiss, "Changes in Behavioral and Characteristic Determination of Female Labor Force Participation, 1975–2005," *Economic Review*, Federal Reserve Bank of Atlanta, second quarter 2006, pp. 1–20, on the Internet at **www.frbatlanta.org/filelegacydocs/erq206_hotchkiss.pdf**; see p. 2.

[25] Boushey, "Are Women Opting Out?" p. 13.

[26] Outgoing rotation groups are groups of people who are in their fourth or eighth month as part of the sample.

[27] Hoffman, "The changing impact of marriage and children."

[28] Cohany and Sok, "Trends in labor force participation of married mothers of infants."

[29] "Married" is defined here, as it is in Blau and Kahn's 2007 article, as married with spouse present. "Single" comprises women in any of the following categories: married with spouse absent, divorced, separated, widowed, and never married.

[30] This refers to women who have at least one child younger than 6 years. There is also a category for women with at least one child age 6–17. Women who have both a child younger than age 6 and a child age 6–17 are classified only in the category for a child younger than age 6.

[31] Blau and Kahn, "Changes in the Labor Supply Behavior."

[32] People with "allocated" time worked are those for whom time spent at work was imputed because there was no time reported.

[33] Heim, "The Incredible Shrinking Elasticities."

[34] The Heim model for hours supplied (that is, hours worked) includes age, years of education, the unemployment rate (by State, age, and education group, calculated from the CPS), non-wage income (including husbands' earnings for married women), two year dummies, three race dummies, three region dummies, and two indicators of MSA status (as well as the inverse Mills ratio). The model for the natural log of the wage included the cubics of age and years of education, two year dummies, three race dummies, three region dummies, and two indicators of MSA status (and the inverse Mills ratio). The model for estimating the inverse Mills ratio included the cubics of age and education, two year dummies, the unemployment rate, the number of children under age 18 and an indicator of the presence of children under 6, three race dummies, metropolitan size, three region dummies, and two indicators of MSA status.

[35] Chinhui Juhn and Kevin M. Murphy "Wage Inequality and Family Labor Supply," *Journal of Labor Economics*, January 1997, issue 1, pt.1, pp. 72–97.

[36] Claudia Goldin, *Understanding the Gender Gap: An Economic History of American Women,* (New York, Oxford University Press, 1990), p. 135.

[37] Table 6 is based on the regression equation reported in table 1 for the period 1989–91. However, results based on the equations for other years produce very similar results. Similarly, although table 7 is based on the regression equation for 2007–09, similar results were obtained using equations from the other years. These other results are available on request.

Appendix A: Explanation of data

The data used in the analyses in this article were taken from the March Current Population Survey (CPS). (The microdata were compiled by Unicon Corporation.) For the graphs of labor force participation rates and average wages, the years 1977–2009 were used. These data are for all women aged 25–54 and were weighted by use of the March-supplement weights. Labor force participation was identified with the recoded responses to the question about employment status in the CPS. Annual wages were calculated as wage and salary income divided by the number of annual hours worked, which in turn was calculated as weeks worked in the year times usual hours worked per week.

For the econometric analyses, the years 1979–81, 1984–86, 1989–91, 1999–2001, and 2007–09 were used in order to attempt to reproduce and update results in Blau and Kahn's 2007 article,[1] with 1984–86 added in order to obtain more information about changes that occurred in the 1980s. The data cover women aged 25–54 and include the wages of the men aged 25–54 married to the women in the sample.[2] "Single" women in the analyses include married women with spouse absent, and divorced, separated, widowed, and never-married women. Husbands and wives were matched by use of the hierarchical structure of the CPS data files.

As in the Blau and Kahn article, people with allocated[3] hours or weeks worked were dropped from the data. In addition, people in the military have been excluded and, because Blau and Khan selected this age group in order "to abstract from issues of school and retirement for both husbands and wives," those who were retired were excluded as well. An attempt was made to exclude people enrolled in school, but it was determined that the data on this group are not consistent over the years covered. The number of people in each category that were dropped from

the data is indicated in table A-1 of the appendix.

The March-supplement weights were used in all analyses in this article, and, in order to ensure that each year is given equal weight in every group of 3 years, the weights were divided by the sum of weights in each year to make them sum to 1 in each year. Because the method of reporting educational attainment was changed beginning in 1992, David Jaeger's correspondence method[4] was used to determine the highest grade completed after that date.

All dollar figures are expressed in constant 2008 dollars. As in the Blau and Kahn article, topcoded wages were multiplied by a factor of 1.45. Income other than wage and salary income was calculated as the sum of income from interest, dividends, and rent. Following Blau and Kahn, wages were imputed for those who were self-employed, those who reported no income, and those whose hourly wage was calculated as falling outside the range of $2.50–$250 in 2008 dollars. The imputation process was based on regressions of reported valid wages. For those reporting less than 20 weeks worked per year, imputed wages were based on a regression using those with a valid wage who worked less than 20 weeks. For those reporting 20 or more weeks worked, imputed wages were based on a regression using those with a valid wage who reported 20 or more weeks worked. This process was carried out separately for married women with spouse present, single women, and husbands with a spouse present. The regressors used were age, age squared, five education categories (less than 12 years, 12 years, 13–15 years, 16 years, and 17 years or more), four race categories (White, Black, Hispanic, and other), eight region dummies, and metropolitan area indicators (central city, other MSA, and non-MSA).

Notes

[1] Francine Blau and Lawrence M. Kahn, "Changes in the Labor Supply Behavior of Married Women: 1980–2000," *Journal of Labor Economics*, July 2007, pp. 393–438.

[2] If a woman was 25–54 years of age but her husband was not, neither the woman nor the husband were included in the sample.

[3] People with "allocated" time worked are those for whom time spent at work was imputed because there was no time reported.

[4] David A. Jaeger, "Reconciling educational attainment questions in the CPS and the census," *Monthly Labor Review*, August 1997, pp. 36–40.

Appendix B: Supplementary tables

Table A-1. Tabulation of numbers of observations excluded from analysis

Category	1979–81	1984–86	1989–91	1999–2001	2007–09
Married women					
Military	1	0	0	0	0
Retired	16	28	26	60	32
Single women[1]					
Military	6	0	0	0	0
Retired	9	24	20	33	37
Married men					
Military	66	0	0	0	0
Retired	171	199	218	131	101
Observations remaining after exclusions					
Married women	63,167	57,742	55,005	34,955	44,876
Single women[1]	26,821	30,222	32,537	30,770	47,945

[1] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

Table A-2. Mean values of selected variables in the sample for married women age 25–54

Category	1979–81	1984–86	1989–91	1999–2001	2007–09
Annual hours worked (including zeroes)	958.781	1080.358	1235.199	1368.038	1354.574
Natural log of imputed own wages	2.494	2.524	2.587	2.726	2.779
Natural log of reported own wages	2.553	2.597	2.654	2.773	2.843
(observations)	(36,912)	(35,991)	(36,781)	(24,500)	(31,262)
Natural log of imputed husbands' wages	3.135	3.099	3.096	3.142	3.152
Natural log of reported husbands' wages	3.150	3.118	3.113	3.156	3.175
(observations)	(52,486)	(47,836)	(46,795)	(30,388)	(39,110)
Nonwage income[1] (in thousands)	2.082	2.609	2.864	3.767	3.004
Age	37.0	36.9	37.3	39.2	39.5
Percent with less than 12 years of education	19.1	14.5	12.1	9.7	8.1
Percent with 12 years of education	47.3	46.2	43.7	33.2	27.3
Percent with 13–15 years of education	17.3	20.0	21.3	28.6	27.8
Percent with 16 years of education	10.8	12.4	14.8	20.0	24.8
Percent with more than 16 years of education	5.5	7.1	8.0	8.5	12.0
Percent whose husband has less than 12 years of education	21.2	16.4	13.5	10.4	8.8
Percent whose husband has 12 years of education	36.3	36.8	36.7	30.7	28.7
Percent whose husband has 13–15 years of education	17.5	19.2	20.6	25.2	26.7
Percent whose husband has 16 or more years of education	24.9	27.6	29.1	31.7	35.9
Number of children younger than 6 years	.420	.449	.449	.388	.418
Number of children age 6–17	1.139	.973	.913	.915	.896
Number of observations	63,167	57,742	55,005	34,955	44,876

[1] Nonwage income comprises interest, dividends, and rent.

Table A-3. Mean values of selected variables in the sample for single women[1] age 25–54

Category	1979–81	1984–86	1989–91	1999–2001	2007–09
Annual hours worked (including zeroes)	1401.042	1440.73	1519.24	1615.781	1514.305
Natural log of imputed own wages	2.534	2.547	2.569	2.668	2.658
Natural log of reported own wages	2.601	2.626	2.657	2.626	2.706
(observations)	(19,973)	(22,326)	(24,221)	(23,750)	(35,582)
Nonwage income (in thousands)[2]	1.371	1.726	1.662	1.871	1.157
Age	36.88	36.30	36.69	38.37	38.69
Percent with less than 12 years of education	26.0	19.9	17.8	12.1	10.5
Percent with 12 years of education	38.6	39.5	38.7	32.0	30.4
Percent with 13–15 years of education	17.5	19.6	21.1	30.1	31.1
Percent with 16 years of education	10.1	12.5	13.4	18.4	19.7
Percent with more than 16 years of education	7.8	8.5	9.0	7.4	8.3
Number of children younger than 6 years	.164	.175	.189	.148	.171
Number of children age 6–17	.714	.590	.529	.506	.501
Number of observations	26,821	30,222	32,537	30,770	47,945

[1] Comprises divorced, widowed, and never-married women, as well as those with spouse absent.

[2] Nonwage income comprises interest, dividends, and rent.