



# Gender-specific differences in labor market adjustment patterns: Evidence from the United States



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## ABSTRACT

Do men and women behave differently while adjusting labor supply over the business cycle? Using data from the United States, we show that women are significantly more likely to adjust along the intensive margin (number of hours), while men adjust more along the extensive margin (employment). Older, single, and divorced/widowed adjust predominantly along the extensive margin.

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## 1. Introduction

The labor supply in the United States has experienced a substantial change over recent decades. While with the change in the US labor force generally holds hours worked as a function of sex and marital status, it is particularly true for the female labor supply. Findings from Jones, Manuelli and McGrattan (2003) show that hours worked by married women increased by roughly 30% over the time period from 1950 to 2000, while supply by married men decreased slightly over the same period. Moreover, hours worked by single women and single men remained almost constant over this time period. These trends have important and persistent economic and social effects. The progress in understanding factors behind female and family labor supply does not only require analysis of the gender wage gap, changes in the fertility rate, decrease in marriage and increase in divorce rates, and changing social norms, it also requires understanding of the business cycle response

of men and women to adjustments in the labor market.

The latter has, to the best of our knowledge, been neglected in the labor economics literature so far. The objective of this study is to assess the question whether men and women behave differently within the labor market adjustment process over the business cycle and to close this gap in the literature. Adjustments along the extensive margin are adjustments in the number of workers, while adjustments along the intensive margin are adjustments in the number of hours worked. It is important to distinguish between these two margins, because knowledge of the quantitative importance of the extensive and intensive margins is needed for economic models and policy. The relative strength of a margin alters the effects of policy reforms concerning the effects of taxes, labor market adjustments, and other policy changes related to female and family labor supply decisions. It is documented that many countries established policy programs to increase the participation rate of women in the way of tax benefits, increased child-care, or extended paid maternity leave, which includes for husbands as, for example, shown in Ray,

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Gornick and Schmitt (2009) or discussed in the “International Review of Leave Policies and Related Research” of the Department of Business (2007)<sup>i</sup>. Along this line, it is important to separate the extensive–intensive margin for men and women, as income taxes from benefit reforms that may have larger disincentive effects when the intensive margin is more important, which would increase labor supply elasticity.

Three patterns are clear. First, our results indicate that men and women in the age group 16–19 have the same ratio of extensive vs. intensive margin. When they grow older, we find that men tend to adjust more often along the extensive margin (0.74), while women adjust more often along the intensive margin (0.66). Second, we find that the extensive–intensive margin split depends on the marital status of agents. The extensive margin of married men and women is roughly 0.65, while it increases for singles to roughly 0.74. Third, we observe large differences across occupations. For example, individuals employed in the service sector adjust almost equally likely along the intensive and the extensive margin. In contrast, employees in the management sector almost entirely adjust along the extensive margin (0.80). Further, while the importance of the extensive margin across occupations stays rather constant for men, it varies more strongly for women.

The study by Blundell, Bozio and Laroque (2011) decomposes the total change of hours worked into individual contributions from men and women across different age groups. This is different from our analysis, since we investigate the role of extensive versus intensive margin for the adjustment within a given age group over the business cycle. Furthermore, a technical difference is that they decompose the change in hours between periods by assuming the change is driven by a structural factor and the intensive and extensive margins. As an alternative, our analysis refrains from econometric or causal assumptions, and in contrast, solely uses the statistical properties of the time series.

In an earlier paper, Merkl and Wesselbaum (2011) provide evidence for the relative importance of the two margins for business cycle dynamics using a data set for the United States and Germany. They show that the extensive margin in both countries is the primary margin of adjustment. However, their study uses highly aggregated data, and does not allow for gender differences.

## 2. Data manipulation and decomposition

We use monthly data for individual hours worked and employment from January 1977 to December 2011 (420 observations) for the United States provided by the Current Population Survey of the Bureau of Labor Statistics (BLS). According to the NBER recession dates, this time span covers five recessions, therefore, provides sufficient variation in the time series for decomposition. In particular, we compare women and men’ extensive and intensive

margins along five different age groups: 16 years and over, 16–19 years, 16–17 years, 18–19 years, and 20–24 years. Three different marital statuses are considered for ages 16 years and over: married, other including divorced and widowed, and single/never married. Five different occupations are considered for management, service, sales, construction, and production. We use data from January 2000 to December 2011, which includes 144 observations provided by the BLS.

The reader should note that data for other age groups are either not available or only covers shorter time periods. Furthermore, to draw conclusions for differences across age, marital status, and occupation, the remaining five age groups cover working age groups. For example, the average age married and birth age lie in the interval [24, 25]. Therefore, we expect differences in the extensive–intensive margin split when agents move from single to married and from a single utility function maximizer to joint utility function maximizers.

Using time series for individual hours,  $h$ , and employment,  $n$ , we construct a series of aggregate hours,  $t = h \times n$ . All time series are then expressed in logarithmic scale and filtered using the Baxter and King (1999) Band-pass filter to identify the business cycle component. We set the lower cycle period to 18 months, the high cycle period to 96 months, with 36 leads/lags in accordance with Baxter and King (1999). Therefore, the sample size is 348 observations. Total hours in log-linearized form is

$$\hat{t} = \hat{h} + \hat{n},$$

We write the variance of total hours as

$$\begin{aligned} \text{Var}(\hat{t}) &= \text{Var}(\hat{h}) = \text{Var}(\hat{n}) + 2\text{Cov}(\hat{h}, \hat{n}) \\ &= \text{Cov}(\hat{t}, \hat{n}) + \text{Cov}(\hat{t}, \hat{h}) \end{aligned}$$

The latter equality follows from the covariance term that gives the variability explained by variations in the respective margins, both directly and through correlations. Following Fujita and Ramey (2009), the proportion of the intensive margin,  $\vartheta^{INT}$ , of total variation is given by

$$\vartheta^{INT} = \frac{\text{Cov}(\hat{t}, \hat{h})}{\text{Var}(\hat{t})}$$

and the extensive margin,  $\vartheta^{EXT}$ , is

$$\vartheta^{EXT} = \frac{\text{Cov}(\hat{t}, \hat{n})}{\text{Var}(\hat{t})}$$

## 3. Results

As defined above, Figs. 1 and 2 present the men and women filtered time series for hours, employment, and total hours for different ages and marital statuses. Visual inspection indicates that employment follows total hours closely over the cycle. Furthermore, we deduce that individual hour variance is smaller compared to the variance of employment and total hours, which holds for all series.

<sup>i</sup> Further evidence is presented in the “Making work pay” report of the European Commission (2005) or in the report for the Department of Labour (2006).

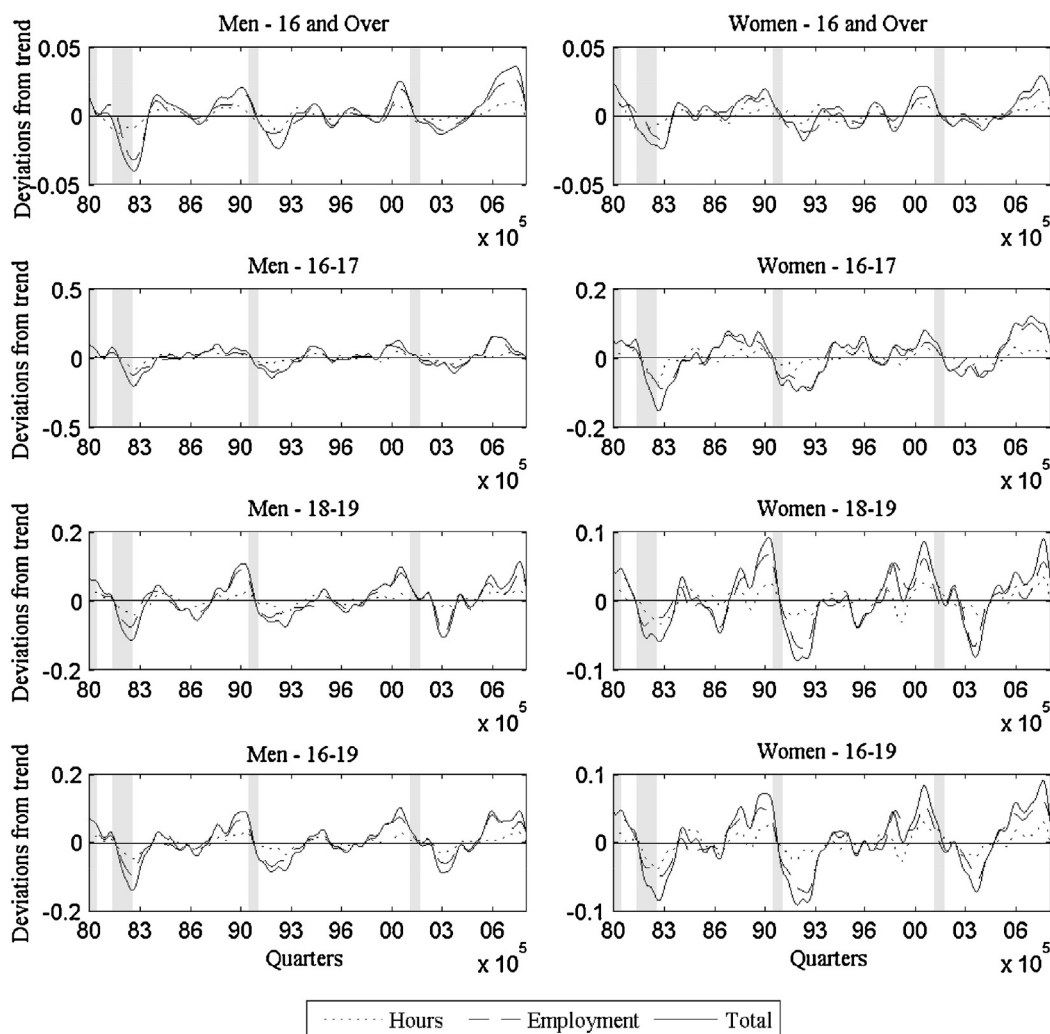


Fig. 1. Business cycle decomposition 1980–2008.

Source: Own computations. Notes: Shaded areas indicate NBER recessions.

Source: own computations

First, for age, we find that while women and men age 16–19 have the same ratio of extensive versus intensive margins, when they grow older; men adjust more along the extensive margin, while women's adjustment occurs along the intensive margin (Table 1). For men, the share of the extensive margin increases by three percentage points from 0.71 to 0.74, when we move from the 18–19 group to the 20–24 group. The extensive margin for the share of women simultaneously decreases from 0.71 to 0.66. If we compare 16–17 year olds with 20–24 year olds, it implies that women undergo a larger change in their adjustment behavior over time and are almost twice as large as the change for men.

Second, there was a strong state-dependence of adjustment on marital status. Single men are seven percent more likely to adjust along the extensive margin than married men. Similarly, but less strongly, single women adjust more along the extensive margin, 0.65–0.70. From single

to married, there is an increase in the intensive margin for men by seven percent and women by five percent. Even more dramatic is the increase in the extensive margin when moving from married to other status. For men, this results in an increase of the extensive margin from 67% to 83%. For women, the change is smaller, increasing only from 65% to 76%.

Third, the extensive margin for different occupations is stable at roughly 80% for men; the only occupational exception is service with almost 60%. However, this is different for women. The extensive margin for women varies between 50% for service occupations and 99% for construction, indicating that women in services are equally likely to adjust along the employment and the hours worked dimension, while women in construction occupations almost never adjust the number of hours worked.

Therefore, women are more likely to adjust along the intensive margin, while men adjust more along the extensive margin. Older, single, and divorced/widowed are significantly more likely to adjust along the extensive

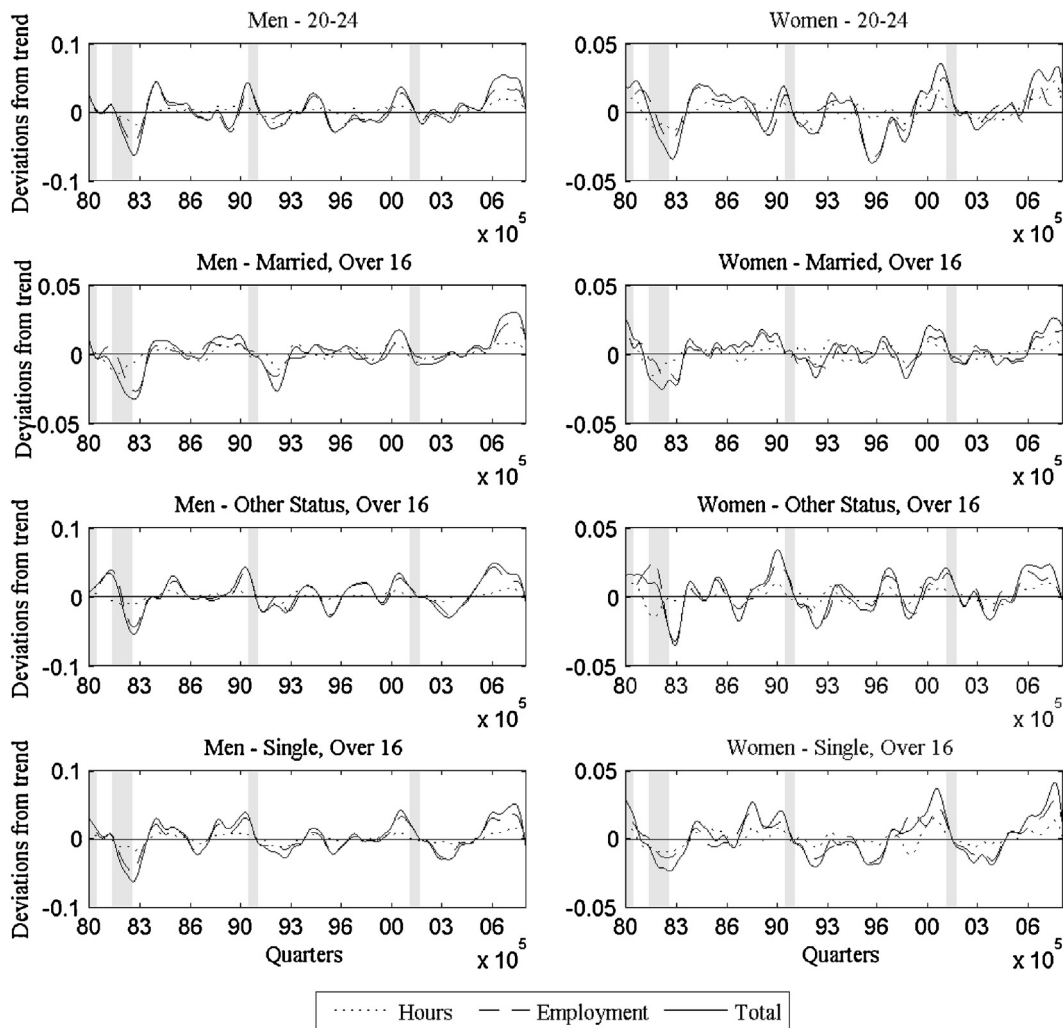


Fig. 2. Business cycle decomposition 1980–2008.

Source: Own computations. Notes: Shaded areas indicate NBER recessions.

**Table 1**  
Decomposition of extensive and intensive margin variation as a share of total variation.

	Extensive margin		Intensive margin	
	Men	Women	Men	Women
16 years and over	0.71	0.65	0.29	0.35
16–19	0.71	0.7	0.29	0.29
16–17	0.71	0.74	0.29	0.26
18–19	0.72	0.71	0.28	0.29
20–24	0.74	0.66	0.26	0.34
Married	0.67	0.65	0.33	0.35
Other status	0.83	0.76	0.17	0.24
Single	0.74	0.70	0.26	0.30
Management/professional	0.80	0.77	0.20	0.23
Service	0.59	0.50	0.41	0.50
Sales and office	0.78	0.73	0.22	0.27
Construction/maintenance	0.79	0.99	0.21	0.01
Production/transportation	0.77	0.84	0.23	0.16

margin. The extensive–intensive margin separation for women crucially depends on occupation and varies heavily. Alternatively, the extensive margin for men is stable.

#### 4. Implications

The average woman in the United States gives birth to 1.9 children, her average age at first birth is 25 years old and according to the CDC marries at an average age of 24.8. The unitary model of the household due to Samuelson (1956) implies that wife and husband jointly maximize a common utility function, and the transformation from single to married and married towards divorced or widowed implies that economic agents face a common, individual utility function. This likely gives different solution for an agent's utility maximizing decision and helps explain the state-dependence of labor market adjustment patterns.

Moreover, from a game-theoretic vantage point, bargaining models of marriage show that women have a lower bargaining power, since their prospects outside the marriage with lower wages (time allocated to children reduces experience and human capital) are worse. This implies that women are forced to take jobs in which adjustments along the intensive margin are more likely and pay lower wages.

Our results have several implications for the design of economic policy. Recall that the intensive margin is more important for women. It follows that labor tax reforms, labor market reforms, reforms related to an aging economy, and reforms that increase female labor force participation have larger effects on women than on men, and female labor supply elasticity is greater. Therefore,

policy makers should take into account that reforms most likely have asymmetric effects across age and occupation.

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