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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 for the United States we show that women are significantly more likely to adjust along the intensive margin (number of hours), while men adjust more often along the extensive margin (employment). Older, single, and divorced/widowed adjust predominantly along the extensive margin.

Our findings have crucial implications for the design of policy reforms, especially as governments desire to increase female labor force participation while facing demographic challenges.

Keywords: Extensive Margin, Intensive Margin, Male and Female Labor Supply.

JEL codes: E32, J10, J20.

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1 Introduction

Labor supply in the United States experienced a substantial change over the past decades. While this generally holds for hours worked as a function of sex and marital status, it is particularly true for female labor supply. The findings from Jones et al. (2003) show that hours worked supplied by married women increased by roughly 30 percent while supply by married men decreased slightly. Further, hours worked by single women and single men remained almost constant. These trends have important and persistent economic and social effects. The literature tried to explain these stylized facts and made progress in understanding labor supply decisions, in particular for women. The progress in understanding the factors driving (female or family) labor supply not just only requires to analyze the changes in the gender wage gap, changes in the fertility rate, decrease in marriage and increase in divorce rates, or changing social norms, it also requires to understand the business cycle labor market adjustment patterns of men and women. The latter has, to the best of our knowledge, been almost neglected so far. The only exception is Blundell et al. (2011). However, they decompose the total change of total hours into individual contributions from men and women across different age groups. This is different from our analysis, since we are interested in the role of extensive vs. intensive margin for the adjustment within a given age group over the business cycle. Further, a technical difference is that they decompose the change in hours between periods by assuming that this change is driven by a structural factor and the intensive and extensive margin. Therefore, our analysis refrains from econometrical or causal assumptions and, in contrast, solely uses the statistical properties of the time series.

Our aim is to assess the question whether men and women behave differently within the labor market adjustment process over the business cycle and to make a first attempt to close this gap in the literature.

For this purpose, we use labor market data for the United States and isolate the business cycle component, i.e. we decompose the adjustment over the cycle in extensive (the number of workers) and intensive margin (the number of hours worked). Therefore, we are able to assess the preferred margin of adjustment for men and women across different age groups, marital statuses, and occupations.

Three main findings stand out. First, along the age dimension, we find that while women and men age 16-19 do have the same ratio of extensive vs. intensive margin, when they grow older men tend to adjust more likely along the extensive margin, while women's adjustment appears to occur more often along the intensive margin.

Second, our results indicate a strong state-dependence of adjustment on marital status. Third, while the extensive margin for different occupations is quite stable for men, there is a dramatically different, unstable pattern for women.

The policy dimension of our analysis is far-reaching. It has been documented that many countries established policy programs to increase the participation rate of women, e.g. tax benefits, increased child-care, or extended paid maternity leave (also for husbands). Along this line, it is important to consider the split of the extensive-intensive margin as income taxes or benefit reforms may have larger disincentive effects when the intensive margin is more important, which would increase the labor supply elasticity.

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 main margin of adjustment. However, this study uses highly aggregated data, not allowing for gender differences.

2 Data Manipulation and Decomposition

For our empirical analysis, we use monthly data for individual hours worked and employment from 1977:M1 to 2011:M12 (420 observations) for the United States provided by the Current Population Survey of the *Bureau of Labor Statistics* (BLS, for short). According to the NBER recessions dates, this time span covers five recessions and therefore gives us enough variation in the time series to be exploited by our decomposition. In particular, we compare extensive and intensive margin for women and men along five different age groups (16 years and over, 16 to 19 years, 16 to 17 years, 18 to 19 years, and 20 to 24 years), three different marital statuses (married, other - including divorced and widowed - and single/never married all for 16 years and over), and five different occupations (management, service, sales, construction, and production). For the analysis along the occupation dimension, we use data from 2000:M1 to 2011:M12 (144 observations) provided by the BLS.

The reader should notice that data for other age groups is either not available or does only cover much shorter time periods. Further, it is our belief that the remaining five age groups cover the important working age groups to draw conclusions for the theories of male and female labor supply discussed later on. For example, average marriage age and average birth age lie in the interval [24,25]. Therefore, we expect to observe differences when agents move from single to married and, as discussed later, turn from a single utility function maximizer to a joint utility function maximizer.

Using time series for individual hours, H , and employment, N , we construct the series of aggregate (or total) hours, $T = H \times N$. All time series are then written in logarithmic scale and are filtered using the Baxter-King (1999) Band-pass filter to identify the business cycle component. To be precise, we set the lower cycle period to 18 month, the high cycle period to 96 month with 36 leads/lags. Therefore, the effective sample size is 348 observations (72 for occupation). Writing total hours in log-linearized form,

$$\hat{t} = \hat{h} + \hat{n}, \tag{1}$$

we can write the variance of total hours as

$$Var(\hat{t}) = Var(\hat{h}) + Var(\hat{n}) + 2Cov(\hat{h}, \hat{n}), \tag{2}$$

$$= Cov(\hat{t}, \hat{n}) + Cov(\hat{t}, \hat{h}). \tag{3}$$

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

$$\vartheta^{INT} = \frac{Cov(\hat{t}, \hat{h})}{Var(\hat{t})}, \tag{4}$$

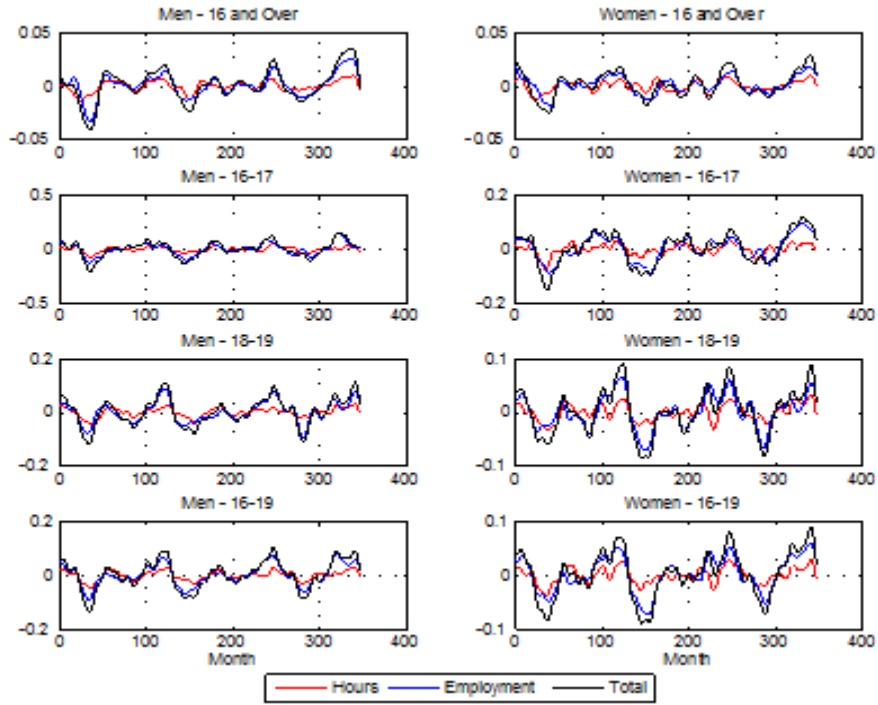


Figure 1: Business Cycle Decomposition using Baxter-King Band-pass filter.

and the extensive margin, ϑ^{EXT} , is

$$\vartheta^{EXT} = \frac{Cov(\hat{t}, \hat{n})}{Var(\hat{t})}. \quad (5)$$

3 Results and Implications

We start our discussion by describing some descriptive statistic results. Figures 1 and 2 present our filtered time series for men, women respectively for different ages and marital statuses, as defined above. The visual inspection indicates that employment follows total hours very closely over the cycle. Further, we can deduce that the variance of individual hours is smaller compared to the variance of employment and total hours, which holds for all series at hand. The results for the extensive-intensive margin decomposition of labor market adjustment are presented in Table 1.

We observe some interesting patterns. First, along the age dimension, we find that while women and men age 16-19 do have the same ratio of extensive vs. intensive margin, when they grow older men tend to adjust more likely along the extensive margin, while women's adjustment appears to occur more often along the intensive margin. For men, the share of the extensive margin increases by three percentage points from 0.71 to 0.74. Simultaneously, the extensive margin share of women decreases from 0.71 to 0.66, if we compare the 16-17 with the 20-24 group. The numbers also imply that women undergo a larger change in their

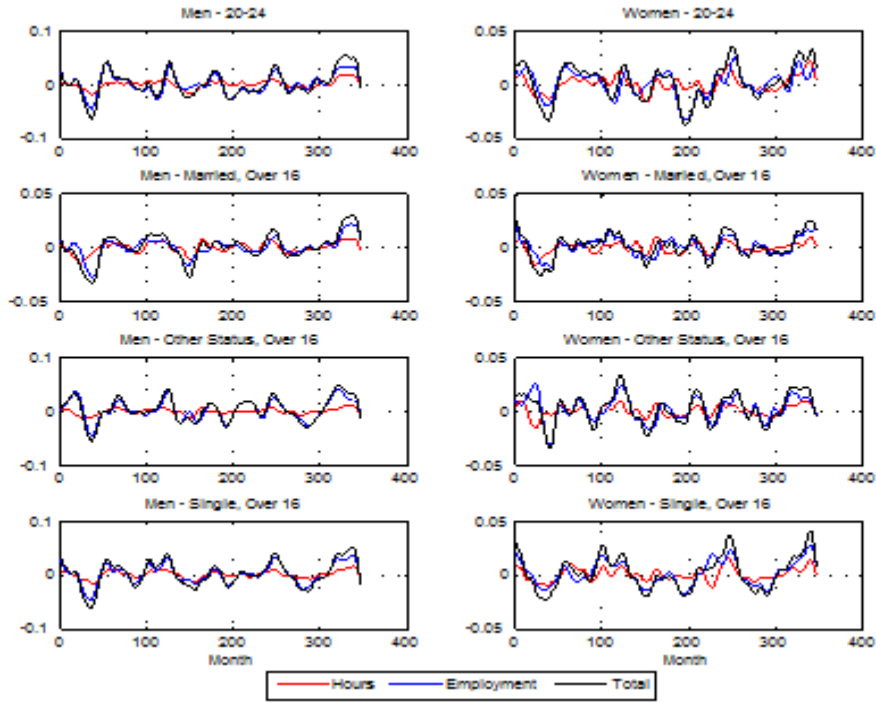


Figure 2: Business Cycle Decomposition using Baxter-King Band-pass filter.

adjustment behavior over time, being almost twice as large as the change observed for men.

Second, our results indicate a strong state-dependence of adjustment on marital status. We find that single men are much more likely (by seven percentage points) to adjust along the extensive margin than married men. Similarly, but less strongly, single women adjust more often along the extensive margin (compare 0.65 to 0.70). Changing states, from single to married, will go in hand with an increase in the intensive margin for men (by seven percentage points) and women (by five percentage points). Even more dramatic is the increase in the extensive margin when moving from married to other status. For men, this will result in an increase of the extensive margin from 67 percent to 83 percent. For women, the change is slightly smaller, increasing from 65 percent to 76 percent.

Third, the extensive margin for different occupations is quite stable at roughly 80 percent for men, the only exception is service with almost 60 percent. However, we find a dramatically different pattern for women. We observe that the extensive margin varies between 50 percent (service) and 99 percent (construction) for women. This implies that women in the service state are equally likely to adjust along the employment and the hours worked dimension, while women working in the construction state almost never adjust the number of hours worked.

We can draw the conclusion, that women are more likely to adjust along the intensive margin, while men adjust more often along the extensive margin. Older, single, and di-

Table 1: Extensive vs. Intensive Margin.

	Extensive		Intensive	
	Men	Women	Men	Women
16 years & over	0.71	0.65	0.29	0.35
16 - 19	0.71	0.71	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

divorced/widowed are significantly more likely to adjust along the extensive margin. The extensive-intensive margin split for women does crucially depend on the occupation and varies heavily. On the flipside, for men the extensive margin is fairly stable.

Finally, the observed patterns might be explained by demographic facts and household decision making. The average women in the United States gives birth to 1.9 childs, the first at an average age of 25 years and marries with an average age of 24.8 according to the CDC. Further, the unitary model of the household due to Samuelson (1956) implies that wife and husband jointly maximize a common utility function. Then, the transformation from single to married and married towards other status (divorced, widowed) would imply that the economic agents face a common, individual utility function, respectively. This per se is likely to give a different solution for the agent's utility maximization problem and explain the state-dependence of labor market adjustment patterns. Therefore, our results support the view that married households will solve a joint maximization problem that creates different incentives compared to a "single" optimization problem, as we observe a drop in the extensive margin for the age group of 20-24 as well as the described marital status state-dependence. Along this line, from a game-theoretic viewpoint, bargaining models of the marriage show that women might have a lower bargaining power, as prospects outside the marriage are poor since potential market wages are lower (gender-wage gap), as the time allocated to the children will reduce experience and hence human capital. This implies that, on average, women might be forced to take jobs in which adjustments along the intensive margin are more likely and which pay lower wages. Observe that in our sample 38 (33) percent of women (men) worked in the management state, 35 (17) percent worked in the sales state and 20 (13)

percent worked in the service state. Only six (18) percent worked in construction and roughly one (18) percent worked in production. This result is in line with the above implication that the solution to the households joint optimization problem implies that women might (self-) select into jobs that allow for more flexibility along the intensive margin, while we do not control e.g. for gender-specific productivity.

Our results have several implications for the design of policy reforms. We observe that the intensive margin is more important for women which implies that labor tax reforms or benefit reforms, just to mention two, will have a larger effect on women than on men, as the reaction of female labor supply elasticity will be larger. Hence, given the effort to increase the participation rate of women in the labor market, policy makers should take into account the asymmetrically working effects and choose instruments ensuring that multiple goals can be achieved.

Moreover, because fertility is a choice variable that will depend on various factors including perspectives on the labor market, policy actions that affect female labor supply inevitably will impact fertility. Hence, the relationship between fertility and labor supply adds complexity to the policy problem from an intergenerational viewpoint, particularly in an aging economy.

Policy reforms that aim at a specific occupation will have nearly identical effects for men, as the extensive margin is stable across occupations, with the exception being service. For women, however, this does not hold and the extensive-intensive margin split does largely depend on the given occupation. Therefore, policy reforms that aim at women in all occupations will have different effects within each occupation.

Lastly, as we have seen, economic agents in a marriage jointly solve a common maximization problem which implies that isolated changes for one of the partners are likely to affect the other partner as well, through substitution and income effects.

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