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Sex and the Business Cycle*

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Abstract

This paper reconsiders the differences between the sexes in the depths, lengths, timing, and overall effects of recessions in the United States. I find that, prior to the mid-1980s, female employment was in recession less frequently than male employment, but that the opposite has been true since then. Also, monthly employment growth forgone because of recession was roughly the same for women and men prior to the mid 1980s, but was substantially greater for men afterwards. Accounting for the sex-specific timing of recessions, as well as for forgone employment growth, (1) the negative effects of recessions on both female and male employment are much larger than is usually found, (2) male employment is hit relatively harder by recessions, and (3) the difference between the sexes in the employment effects of recession is much smaller than the previous literature indicates.

[JEL Codes: J16, E32]

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1 Introduction

This paper estimates and examines differences in the aggregate employment patterns of men and women over the business cycle. The economics literature has long recognized that fluctuations in the business cycle can have different aggregate effects on men and women.[1] Raw calculations of the effects of recessions on employment suggest that recessions affect male employment many times more than female employment, which has led to the portmanteau "man-cession." For example, Table 1 provides the percentage change in female and male payroll employment for the seven US recessions between 1969 and 2009. According to these calculations, male employment fell an average of 8.5 times more than female employment from the start of a recession until employment bottomed out. They also indicate that female employment actually *rose* during four of the recessions, and was only harmed seriously by the Great Recession of 2008-09.

I address three shortcomings of conventional calculations like those in Table 1. First, although jobless recoveries are usually accounted for, the fact that job losses sometimes occur well after the official recession begins usually is not. Thus, I estimate the timing of employment recessions as separate from the output recessions they are associated with. Second, rather than assuming that the timing of recessions was the same for female and male employment, I allow them to have different peaks and troughs and, therefore, different lengths.[2] Third, I account for the different long-term trends in female and male employment by measuring employment loss relative to what would have happened in the absence of the recession, rather than relative to peak employment. Once these shortcomings are addressed, the difference in the effects of recessions on female and male employment are much smaller than presented in Table 1 and elsewhere.

Previous papers comparing female and male employment during recessions include Engemann and Wall (2010) and Hoynes, Miller, and Schaller (2012). Both papers use household employment for the US to calculate the changes in employment between the peaks and troughs of recessions for several

[1] Rubery (2001) goes further and argues that the effects of the business cycle can differ by gender, but that the shape of the business cycle can be driven by gender differences.

[2] Specifically, I use a Markov-switching model to separate aggregate female and male employment growth into sex-specific recession and expansion phases. Relatedly, using VARs, Peiro, Belaire-Franch, and Gonzalo (2012) and Bredemeier and Winkler (2017) showed how the effects of shocks are stronger and more-persistent for male unemployment and employment, respectively.

demographic categories, and both apply the same peaks and troughs to all categories.[3] Their results are typical: According to Engemann and Wall (see their Table 2), the average employment loss across the six recessions between 1974 and 2009 was 2.9 percent for men and 0.7 percent for women. For the Great Recession of 2007-2009, the employment declines were 6.4 percent for men and 2.6 percent for women. It should be noted that the COVID-19 recession of 2020 was unique in in that affected female employment much more than male employment in the US and most other countries (Albanesi and Kim, 2021; Bleudorn, et al., 2021). The COVID-19 recession is not included in my analysis because it stands alone as different from the usual business cycle.

Several papers have focused specifically on the relative the effects of the Great Recession. Rubery and Rafferty (2013) looked at the UK, paying particular attention to the relative effects of the policy responses following the recession. Fodor and Nagy (2014), Nyberg (2014), and Duvvury and Finn (2014) looked at Central and Eastern Europe Sweden, and Ireland, respectively. Christensen (2015) took issue with the entire notion that the recession was worse for men in the US if other factors, such as occupational placement, relative wages, and financial responsibilities for children, are considered. Recent papers also have looked beyond the raw calculations of the employment effects of recessions on men and women. Razzu and Singleton (2016), for example, examined how the flows among the three labor-market states—employment, unemployment, and out of the labor force—are affected by recessions.

Following Rubery (1988), the literature has tended to focus on three hypotheses to explain how the business cycle might affect men and women differently. Under the *buffer hypothesis*, because women are not as attached to the labor force as men, they will tend to be the first to leave employment when a recession hits, and will be rehired first during recovery. Consequently, the effects of recession on female employment growth should be worse relative to male employment, but recovery from the recession should be stronger. According to the *segmentation hypothesis*, differences in female and male employment growth during recessions are driven by their respective representation across industries and occupations (Razzu and Singleton, 2018). For example, because men tend to be concentrated in

[3] Engemann and Wall use a Markov-switching model applied to aggregate employment to determine the beginnings and ends of the six recessions between 1974 and 2009. Hoynes, Miller, and Schaller use the local maximums and minimums of aggregate employment for the dual-recession period starting in 1980 and the Great Recession of 2007-09.

recession-sensitive industries such as manufacturing, male employment should be hit harder by a recession. Finally, according to the *substitution hypothesis* the employment of women workers can rise during recessions as firms seek out lower-cost types of labor or through an *added worker effect* through which (usually) married women enter the labor force following their partners' job losses (Bryan and Longhi, 2017).

Of course, all three of these hypotheses can hold at the individual level and all affect aggregate female employment at the same time. In addition, governments tend to have vigorous policy responses to recessions and these policies can affect female and male employment differently (Bredemeier, Juessen, and Winkler, 2017). In any event, it is beyond the scope and data limitations of this study to separate the various effects from one another. My present purposes are to document the relative experiences of aggregate employment growth for men and women during their recessionary phases, and to provide new calculations of the relative costs of recessions in terms of lost employment. Nevertheless, I do examine the potential role of the segmentation hypothesis.

2 Recession Dating

Figures 1 and 2 motivate my approach using seasonally adjusted data from the Current Employment Survey of payroll employment for January 1964 through December 2019. Figure 1 presents quarterly growth of total employment over the period relative to the occurrence of official NBER recessions.[4] Two characteristics of the data are of most interest presently: NBER recessions are associated with periods of negative employment growth that sometimes lag the starts of recessions; and, beginning with the 1990-91 recession, total employment growth does not turn consistently positive until at least a few quarters after the end of the recession (i.e., "jobless" recoveries).

While it is well-know that the peaks and troughs of employment growth have not always lined up with official recessions, it has not been recognized that the peaks and troughs of female and male employment recessions differ from those of official recessions in their own ways. Figure 2 presents quarterly employment growth rates for males and females relative to NBER recessions. Note that for most quarters, whether during recession or expansion, employment grew faster for females than for

[4] Note that NBER dates are very closely aligned with the occurrence of negative real GDP growth.

males and the gap between the two was larger prior to 1990 when female labor force participation was rising steadily. Since then, however, the two growth rates have differed substantially only during recessions.

Something not obvious from Figure 2 is the extent to which the timing in upturns and downturns has differed between men and women. For this I turn to the Markov-switching model of Hamilton (1989).[5] Put simply, the Markov-switching model is a way to filter a time series into recession and expansion phases by estimating the average growth rates during the two phases. By comparing the observed growth rate to the estimated expansion and recession growth rates, the model determines for each period the probability that the series is in recession. With distinct enough phases, the probability of recession will periodically switch from being close to 0 to being close to 1 (from expansion to recession), and vice versa.

In the Hamilton model, cyclical phases arise as the data series switches over time between recession and expansion, each with its own mean growth rate.[6] Let μ_0 be the mean growth rate of employment when the series is in expansion, and let μ_1, which is normalized to be negative, be the difference between the mean growth rates. In general, therefore, the growth rate of employment, y_t, is

$$y_t = \mu_0 + \mu_1 S_t + \varepsilon_t. \quad (1)$$

In equation (1), the switching between recession and expansion is governed by a state variable, $S_t = \{0,1\}$, and deviations from the mean growth rates are due to the stochastic disturbance, $\varepsilon_t \sim N(0, \sigma_\varepsilon^2)$. When S_t switches from 0 to 1, the growth rate switches from μ_0 to $\mu_0 + \mu_1$ (from expansion to recession), and vice versa.[7]

I estimate the model using the multi-move Gibbs-sampling procedure for Bayesian estimation of Markov-switching models implemented by Kim and Nelson (1999) and apply the Markov-switching model independently to the monthly growth rates of total employment, female employment, and male employment.[8] Because of the aforementioned differences between the first and second halves of the

[5] See Chauvet and Piger (2013) for a discussion of aggregate employment cycles and Markov-switching.

[6] See Piger (2009) for a discussion of the basic Markov-switching models and their extensions.

[7] Assume that the process for S_t is a first-order two-state Markov chain so that the probability process driving S_t is captured by the transition probabilities That is, the value of S_t summarizes any persistence from the previous period.

[8] See Chauvet and Piger (2013) for a full description of the estimation procedure.

time period, I use a version of the model that selects one endogenous break between 1979 and 1990 for each series.[9]

3 Empirical Results

3.1 Growth Rates and Structural Breaks

For each series, the estimation results that are relevant for present purposes are the break dates and the expansionary and recessionary growth rates for the pre- and post-break periods. Look first at the results for total employment in the first column of results in Table 2. A structural break is found to have occurred in January 1985, and the sample mean growth rates before and after this date are 0.205 and 0.109, respectively. During the pre-break period the estimated expansion growth rate was 0.276 and the recession growth rate was -0.224, indicating that recessions typically meant about a half-point drop in monthly employment growth (i.e., a "Recession gap" of 0.5). Post-break, the expansionary and recessionary growth rates were, respectively, 0.160 and -0.137, for a recession gap of about 0.3. In short: recessionary growth, expansionary growth, and the recession gap moderated dramatically after the mid-1980s break.

Underlying the performance of total employment growth are the very different experiences for female and male employment. Note first that the structural break in male employment growth occurred four years before the break in total employment, whereas the break in female employment growth occurred five years after it, which is coincident with the slowdown of women's entry into the labor force. In addition, the pre-break average growth rate for female employment was about 2.4 times that for male employment. Following their breaks, however, average female and male employment growth did not differ nearly as much.

The most important drivers of the changes in the sample averages across the breaks are the changes in expansion growth rates: Monthly expansionary growth for female employment fell from 0.38 percent to 0.13 percent, while that for male employment fell from 0.21 percent to 0.13 percent. In contrast, the post-break recessionary growth rates were slightly higher for both sexes: female employment

[9] It has been typical to find breaks during the mid-1980s for a number of macroeconomic time series, usually associated with the so-called Great Moderation that meant lower variance in growth during the post-break period.

growth rose from -0.13 percent to -0.08 percent, and male employment growth was basically unchanged. In other words, female and male employment growth differed only during recessions. Note also that the post-break recession gaps were much smaller for both sexes after the break, falling by more than half for female employment, and by about a sixth for male employment. In sum, relative to the pre-break period, employment growth in both phases moderated for both sexes. In addition, the female recession gap shrank considerably and became much smaller than that for male employment.

3.2. Recession Timing and Frequency

Monthly growth rates tell only part of the story because there were also significant differences between the sexes in the timing of the peaks and troughs of recessions. Recall that the switching model compares the actual monthly growth rate to the estimated phase growth rates and assigns a probability that the month is recessionary. That is, if the actual growth rate is close to or below the estimated recessionary growth rate, the model will determine that the probability of recession is approaching or equal to 1. Note that this probability accounts for persistence as well as the level of growth, so it doesn't move nearly as much as the growth series itself. Figures 3 and 4 provide the resulting recession probabilities over the sample period for total employment, female employment, and male employment, respectively. Note that the model works very well to separate all three series into the two phases of their cycles, i.e., the probability of recession is usually very close to, or equal to, 0 or 1.

Figure 3 shows how the overall employment cycle has tended to follow the general business cycle. The probability of recession rises rapidly around the same time as the overall economy switches into recession, although not for the two recessions in the 1970s, and falls rapidly some time later. Most prominently, the "jobless recoveries" since 1990 are indicated by the lag between the ends of the NBER recessions and the return of the employment recession probability to zero. Figure 4 shows how this pattern differs between female and male employment, with the most notable differences occurring during the post-break period. Note in particular that the probability of recession for female employment fell much later than for male employment, indicating longer jobless recoveries for women.

The model assumes that the business cycle has distinct phases and the convention is that a recession is indicated by a recession probability greater than 0.5. These phases are summarized by Figure 5 by assigning each month of recessionary eras as either expansionary or recessionary for each

of total employment, female employment, and male employment. In the figure, a lightly shaded month is one for which the economy is in an NBER recession, whereas a darkly shaded month is one for which the respective employment series is, by my calculation, in recession. In terms of pre-break recession timing, the obvious takeaway from Figure 5 is that employment recessions usually began a few months after the start of an NBER-designated official recession, although recovery tended to begin within a month or two after the recovery began for the economy as a whole. The most notable pre-break difference between female and male recessions was during the 1973-75 recession, when male employment was in recession for twice as many months as was female employment.

The post-break picture is, in many ways, the reverse of the pre-break one. Total employment tended to go into recession at or about the same time as the overall economy, but tended to remain in recession long after the ends of NBER recessions (i.e., there were jobless recoveries). And, unlike the pre-break period, there were very large differences between the female and male employment cycles. That is, although female and male employment recessions began within a month of each other, female employment stayed in recession longer. Following the 2001 recession, female employment didn't enter into expansion until 18 months after male employment had, and following the 2008-09 recession, female employment experienced eight additional months of recession. To a large extent, therefore, the jobless recoveries following the two most recent recessions have been a more significant feature of the female employment cycle.

The differences in the timing and lengths of female and male employment recessions, illustrated by Figure 5, add up to significant differences in the overall frequency of recessions. As summarized by Table 3, recession was much more frequent before 1985 than they have been since: The economy was in an official NBER recession 19.5 percent of the time during 1964-1984, but only 9.6 percent of the time from 1985-2015. Because of jobless recoveries during the latter period, however, employment recession was much more frequent: 14.7 percent versus 20 percent of the time. The differences in frequency between female and male employment recessions were even starker: Prior to 1985, male employment was in recession more frequently than female employment (16.7 percent vs. 13.1 percent of the time). Since 1985, however, female employment recession has been much more common, occurring for 19.4 percent of the months versus only 12.7 percent of the months for male employment.

4 The Role of Sectoral Representation of Women and Men

As noted previously, according to the segmentation hypothesis, the differences in the average business cycle experiences between men and women are driven by the differences in the representation of the sexes across sectors of the economy: Men are much more prevalent in manufacturing and other hyper-cyclical sectors, whereas women prevail in less-cyclical sectors such as education and health. To check the relevance of the segmentation hypothesis, I reapply the model to sex-specific employment series trimmed of their most sex-dominant sectors. Specifically, trimmed female employment excludes Education and Health and Local Government, and trimmed male employment excludes Mining and Forestry, Construction, and Manufacturing.[10] If the business cycle patterns of the trimmed series differ from their untrimmed counterparts, we can conclude that segmentation plays a role. The results will not, however, indicate the precise importance of this role as they are simply a composition effect for sectors at a very high level of aggregation. Within the sectors are subsectors and industries with their own employment compositions and business cycle patterns, and the causal impacts of industry or sectoral shocks most certainly cross industry and sector boundaries.

The Markov-switching results for the trimmed series are provided by Table 4. Note first that for the pre- and post-break periods, trimmed female employment has a similar average growth rate than its untrimmed counterpart, whereas trimmed male employment grew about one-third faster than untrimmed male employment. That is, female-intensive sectors had roughly average growth while male-intensive sectors had lower-than-average growth. Note, however, that these are averages across business cycle phases and that the differences in average growth rates between trimmed and untrimmed employment are almost entirely due to differences in recession growth rates. Correspondingly, trimmed female employment has larger recession gaps than untrimmed female employment, and trimmed male employment has smaller recession gaps than untrimmed male employment. Put another way, female-intensive sectors have shallower-than-average recessions but male-intensive sectors have deeper-than-average recessions. We can conclude, therefore, that the segmentation hypothesis has a role in explaining the differences between females and males in the per-period effects of recessions.

[10] Men accounted for 75 percent of employment in Mining and Forestry, Construction, and Manufacturing. Women accounted for 66 percent of employment in Education and Health and Local Government. For each sex the trimmed sectors accounted for about 30 percent of employment, on average.

Segmentation plays a role in determining the timing of peaks and troughs also, as is evident from the probabilities of recession of the trimmed and untrimmed series provided by Figures 6 and 7. For female employment, the untrimmed series has several idiosyncratic spikes during the 1960s that are due to inadequate seasonal adjustment of the Local Government sector (public school teachers) rather than to any real cyclical events. More important are the divergences between female trimmed and untrimmed employment during the post-break period. For male employment, the differences in recession probabilities for trimmed and untrimmed employment are obvious only during the pre-break period.

The differences between the trimmed and untrimmed series are more apparent in Figure 8, which shows how the months are divided into the distinct phases of the cycle. For men, much of the pre-break recessionary experience was accounted for by the male-intensive sectors: Trimmed employment did not experience recession at all in 1970 and it saw many fewer months of recession during 1973-75. This feature was absent post-break, however. For female employment, the segmentation effect became prominent only after 1990. Female-intensive sectors shortened the 1990-91 and 2001 recessions, but lengthened it by a year and a half following the Great Recession. A likely explanation is that local government revenues were particularly hard pressed in the wake of the Great Recession so this sector suffered longer than others.

5 Calculating the Employment Costs of Recessions

Because of the differences in the timing, length, and depths of female and male employment recessions, the usual comparisons of the effects of recession on the sexes are inadequate because they don't account for the large differences in the frequency of recession months or for the employment growth that would have happened if the economy had stayed in expansion. To summarize the key findings:

- Employment recession was less frequent (and sometimes began later) than NBER recession prior to the break, but became more frequent after the break.
- Prior to the break, male employment was in recession more frequently than female employment, but the opposite was true for post-break period.

- Before the break, female employment grew much faster than male employment during both recession and expansion. After the break, employment growth moderated substantially for female expansion, female recession, and male expansion, but monthly male employment losses during recession were roughly as deep as they were before the break.
- Female and male employment had comparable recession gaps prior to the break, but the recession gap was much larger for male employment after the break.

To quantify these findings, Table 5 presents three sets of calculations that deal sequentially with the shortcomings of conventional calculations of the employment effects of recession summarized in the Introduction. The first two sets differ according the the peaks and troughs that are used: from total-employment recessions and from sex-specific recessions, respectively. The third set combines the peaks and troughs from the sex-specific recessions with the expansionary growth rates to calculate forgone employment—the percentage difference between actual employment at the trough and what would have occurred in the absence of recession.

Using the peaks and troughs of recessions in total employment from Figure 5: (1) female employment was reduced by the recession for all but one case, and (2) on average, the effects of recessions on male employment was 3.8 times that on female employment. Recall that conventional calculations in Table 1 indicated that female employment losses were not the norm and that male employment losses averaged 8.5 times female employment losses. The larger part of this reduction in relative employment losses was from accounting for the late start to the 1970s employment recessions.

The next step in moving from the traditional calculations is to use peaks and troughs that are more appropriate for each series. Thus, the second set of calculations in Table 5 uses the sex-specific peaks and troughs provided by Figure 5. These calculations are more accurate because they are better at matching the sexes to the true peaks and troughs of their respective employment growth series. There are some changes from the previous results, but the overall lesson does not change much because the various adjustments tend to cancel each other out. That is, for a specific recession the relative effects on female and male employment can differ significantly, but the average relative effect changes very little. Using sex-specific peaks and troughs, average male employment losses were 3.7 times average female employment losses.

A shortcoming common to all three sets of calculations described so far is that they ignore the employment growth that would have occurred if there hadn't been a recession. That is, they assume implicitly that there would have been no growth from the pre-recession employment levels had the economy remained in expansion. To address this problem, I use the estimated expansion growth rates for female and male employment from Table 2 to estimate potential employment levels. The effects of recession on employment are then the difference between the potential and actual employment levels at the trough of a recession, which I refer to as "forgone" employment. This method will obviously lead to higher numbers for the effects of recessions on employment. More relevant presently, however, is that the method will affect the calculations for men and women differently because employment growth during expansion is higher for women than for men. As such, the large differences between men and women in the aggregate effects of recessions obtained using traditional calculations are reduced considerably.

As shown in the final columns of Table 5, the effects of recessions in terms of forgone employment are substantially larger than those in terms of the simple percent change in employment, and the bigger adjustments are for the effects on women. As with conventional calculations, recessions tend to be more costly in terms of male employment lost, but male employment losses average only 1.4 times those for women. Also, note that the 2001 recession was an exception in that it was worse in the aggregate for women because female employment was in recession for an extra year and a half.

6 Conclusions

This paper is a reassessment of the relative effects of recessions on the aggregate employment of women and men. By allowing the sexes to have different employment cycles I obtain a new picture of how the business cycle can affect female employment at different times and strengths relative to male employment. These differences between the sexes are partly due to the relative distribution of men and

women across sectors: Female-intensive sectors have tended to have relatively shallow recessions, whereas male-intensive sectors have tended to have relatively deep recessions.

The key results are:

- Female employment recession was less frequent than male employment recession in the pre-break period. This tendency reversed after the break.
- The per-month decrease during recession has been much greater for male employment than for female employment.
- The average male job loss during recessions was 3.7 times average female job loss, which is less than half the rate using conventional peaks and troughs.
- After accounting for forgone employment, the effects of recessions are substantially larger for both sexes, and average male employment losses were about 1.4 times those of average female employment losses.

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Table 1. US Man-Cessions, 1969-2009

		Female	Male
Official NBER Recession	1969-70	0.5	-2.1
	1973-75	1.4	-3.7
	1980	0.2	-1.7
	1981-82	-0.4	-5.1
	1990-91	0.1	-2.4
	2001	-0.9	-2.9
	2008-09	-3.9	-8.5
Mean		-0.4	-3.8

Percentage changes in payroll employment between the peak and trough. Peaks are official NBER peaks. Troughs are the when employment bottomed out.

Table 2. Estimation Results: Breaks and Monthly Growth Rates

		Total Employment	Female Employment	Male Employmcnt
Structural-break date (month)		1985.1 (1984.8, 1985.9)	1989.03 (1988.12, 1989.5)	1981.1 (1979.6, 1985.1)
Pre-Break	Sample average	0.205	0.337	0.143
	Expansion (μ_0)	0.276 (0.26, 0.30)	0.379 (0.36, 0.40)	0.206 (0.18, 0.24)
	Recession ($\mu_0+\mu_1$)	-0.224 (-0.28, -0.17)	-0.128 (-0.19, -0.07)	-0.315 (-0.39, -0.23)
	Recession gap (μ_1)	-0.501	-0.507	-0.521
Post-Break	Sample average	0.109	0.114	0.078
	Expansion (μ_0)	0.160 (0.15, 0.17)	0.157 (0.15, 0.17)	0.134 (0.12, 0.15)
	Recession ($\mu_0+\mu_1$)	-0.137 (-0.17, -0.11)	-0.077 (-0.11, -0.05)	-0.305 (-0.35, -0.25)
	Recession gap (μ_1)	-0.297	-0.235	-0.439

The numbers in parentheses are the extremes of the 95 percent confidence bands.

Table 3. Recession Frequencies

	NBER	Total Employment	Female Employment	Male Employmcnt
Recession frequency, 1964-1984	0.195	0.147	0.131	0.167
Recession frequency, 1985-2019	0.096	0.200	0.194	0.127

Recession frequency is the number of recessionary months divided by the total number of months.

Table 4. Estimation Results: Breaks and Monthly Growth Rates for Trimmed Employment

		Trimmed Female Employment	Trimmed Male Employment
Structural-break date (month)		1989.2 (1988.4, 1989.5)	1979.9 (1979.10, 1980.9)
Pre-Break	Sample average	0.331	0.194
	Expansion (μ_0)	0.390 (0.37, 0.41)	0.211 (0.18, 0.24)
	Recession ($\mu_0+\mu_1$)	-0.240 (-0.31, -0.17)	-0.214 (-0.33, -0.12)
	Recession gap (μ_1)	-0.630	-0.425
Post-Break	Sample average	0.078	0.112
	Expansion (μ_0)	0.148 (0.13, 0.16)	0.155 (0.14, 0.17)
	Recession ($\mu_0+\mu_1$)	-0.197 (-0.23, -0.17)	-0.156 (-0.19, -0.12)
	Recession gap (μ_1)	-0.345	-0.312

Trimmed female employment is total female employment net of Education and Health and Local Government. Trimmed male employment is total male employment net of Mining, Construction, and Manufacturing. The numbers in parentheses are the extremes of the 95 percent confidence bands.

Table 5. Effects of Sex-Specific Employment Recessions

Peak/Trough		Total Employment		Sex-Specific		Sex-Specific	
Effect Type		% Change		% Change		% Forgone	
Sex		Female	Male	Female	Male	Female	Male
Official NBER Recession	1969-70	-0.1	-2.1	0.0	-2.1	-1.5	-3.7
	1973-75	-1.6	-3.1	-1.3	-3.5	-3.5	-5.4
	1980	-0.4	-2.0	-0.3	-2.0	-1.4	-2.8
	1981-82	-0.4	-5.1	-0.7	-4.9	-6.1	-8.0
	1990-91	0.4	-2.7	0.1	-2.4	-1.7	-3.9
	2001	-0.8	-3.0	-1.0	-2.5	-5.3	-4.0
	2008-09	-3.9	-8.6	-4.0	-8.6	-7.9	-11.3
Mean		-1.0	-3.8	-1.0	-3.7	-3.9	-5.6

Employment changes are calculated using the peaks and troughs of each recession type. "% Change" is the simple percent change between the relevant peak and trough. "% Forgone" is the percent difference between actual employment and employment that would have been realized in the absence of recession, calculated at the trough.

Figure 1. Quarterly Growth of Payroll Employment, 1964-2019

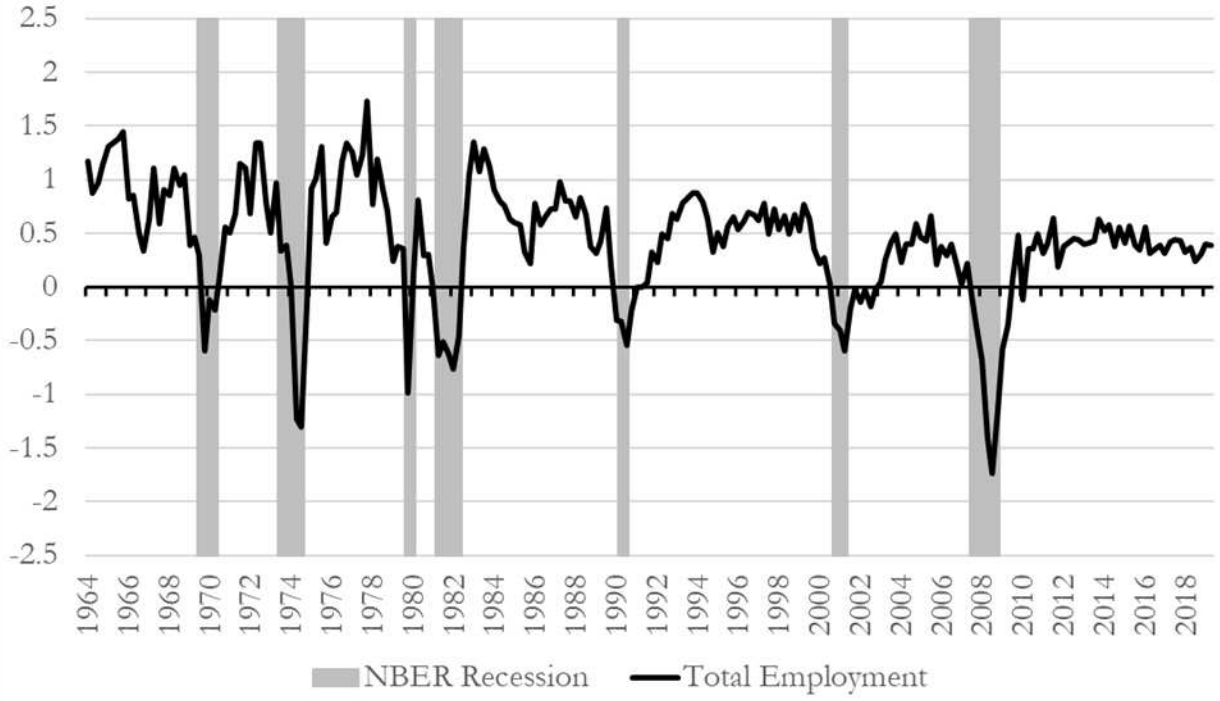


Figure 2. Quarterly Growth of Payroll Employment by Sex, 1964-2019

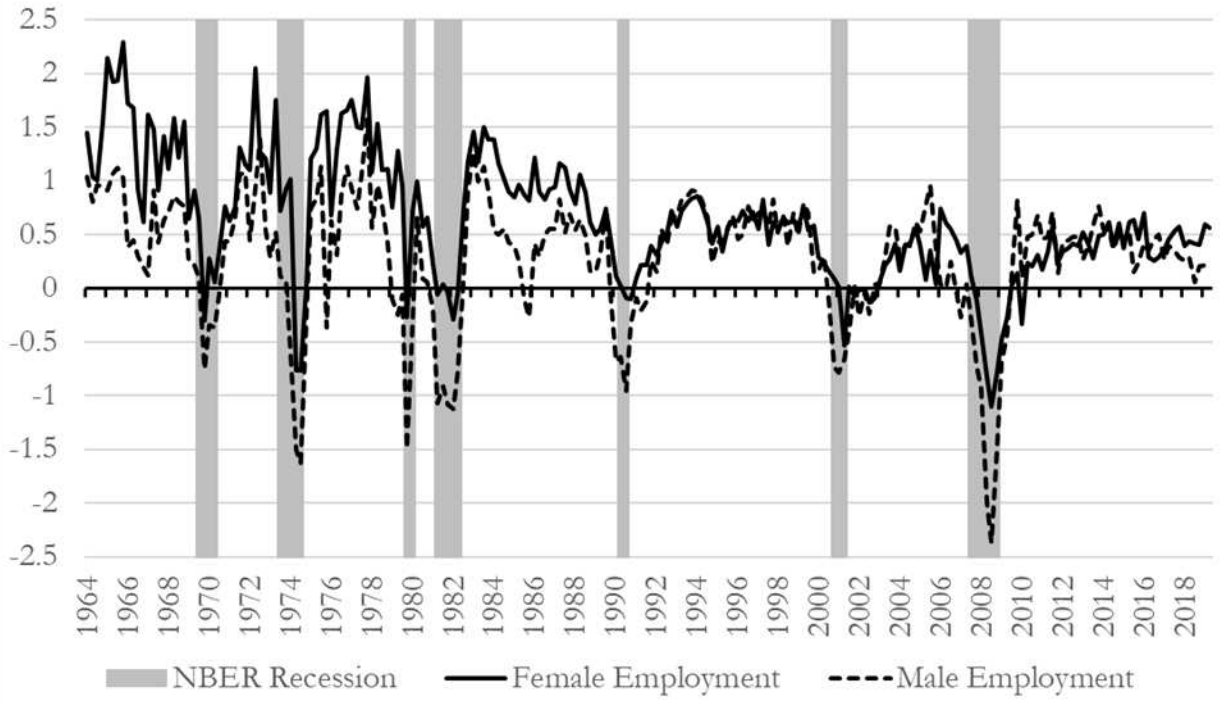


Figure 3. Employment-Recession Probability vs. NBER Recessions

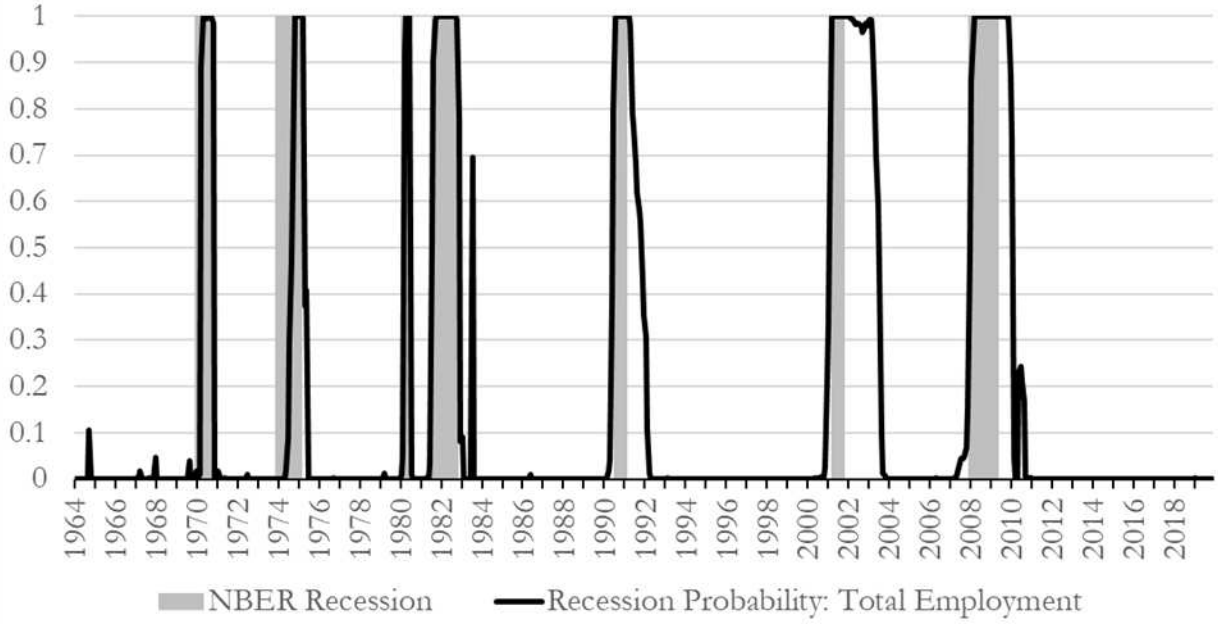
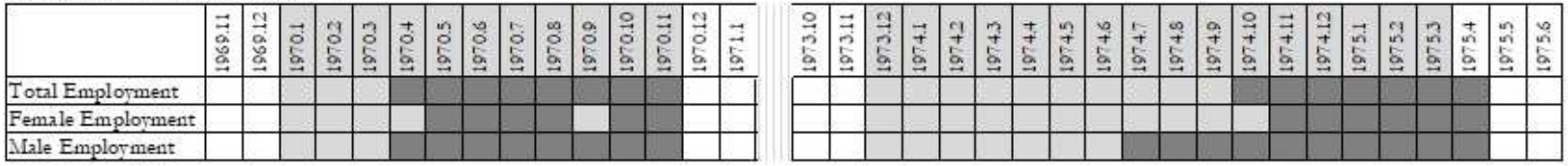


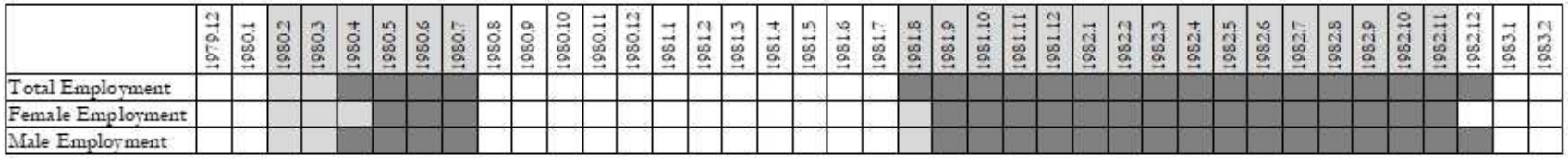
Figure 4. Male & Female Recession Probabilities

Figure 5. Employment Recessions Associated with NBER Recessions: Total vs. Female vs. Male
(NBER recessions are indicated by a light gray background. An employment recession is indicated by dark gray)

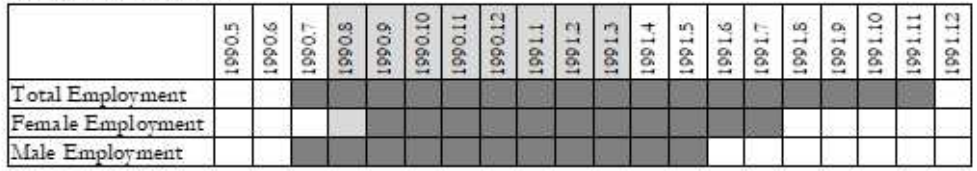
1970 and 1973-75 Recessions



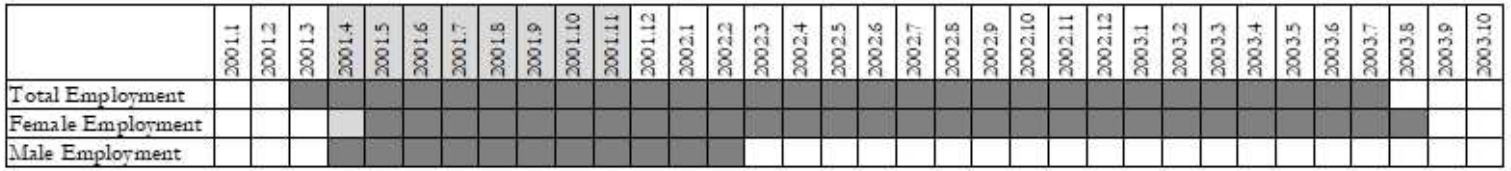
1980 and 1981-82 Recessions



1990-91 Recession



2001 Recession



2008-2009 Recession

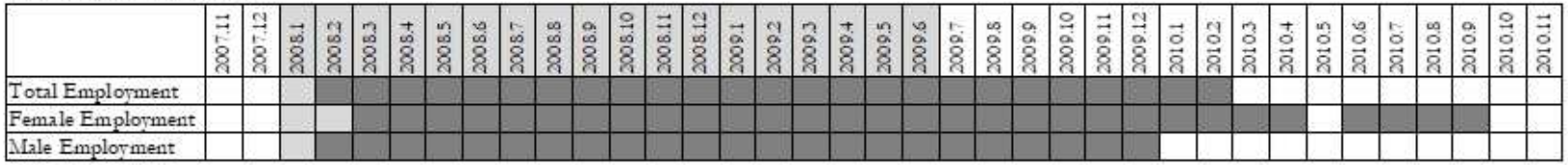


Figure 6. Female Recession Probability, Total vs. Trimmed

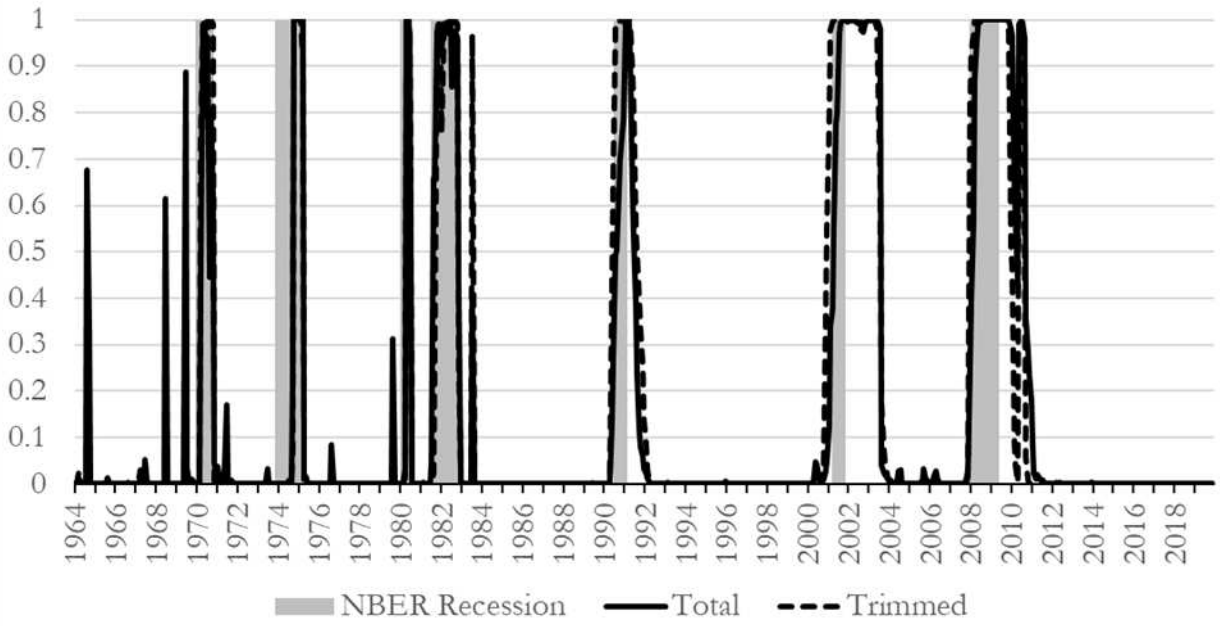


Figure 7. Male Recession Probability, Total vs. Trimmed

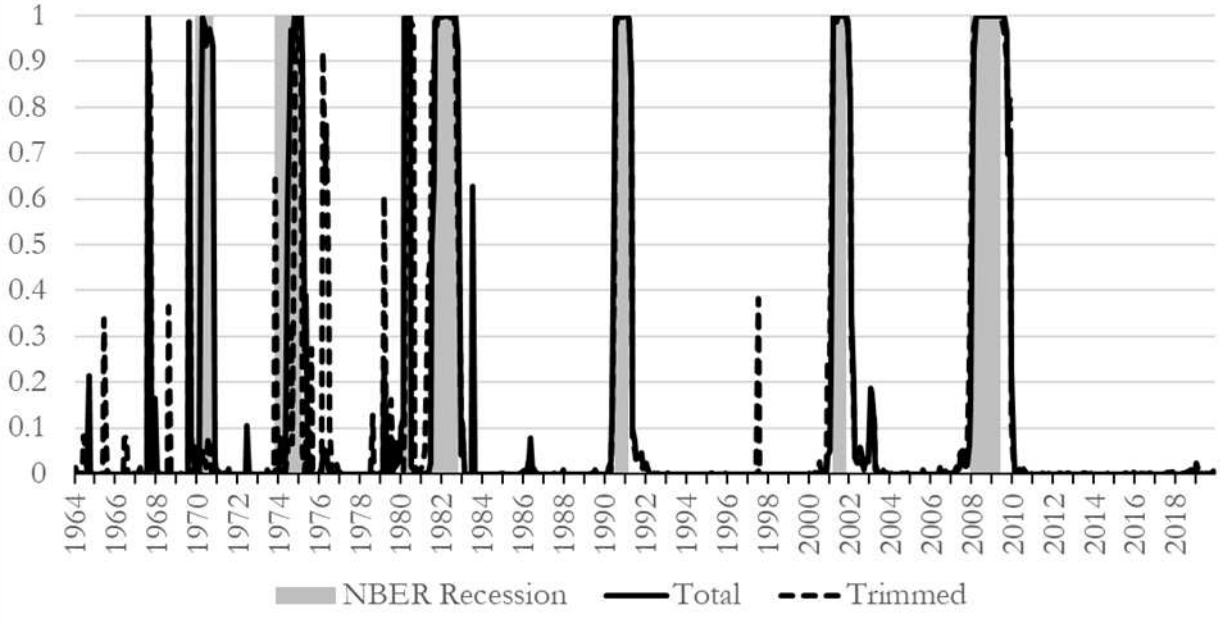
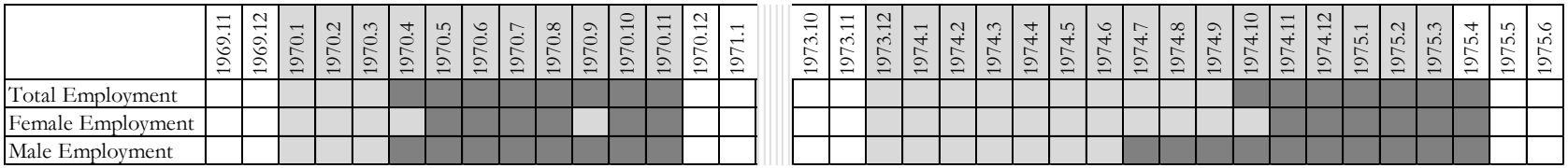
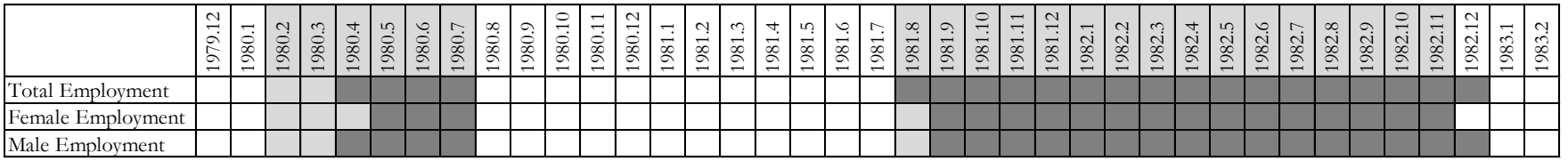


Figure 5. Employment Recessions Associated with NBER Recessions: Total vs. Female vs. Male
(NBER recessions are indicated by a light gray background. An employment recession is indicated by dark gray)

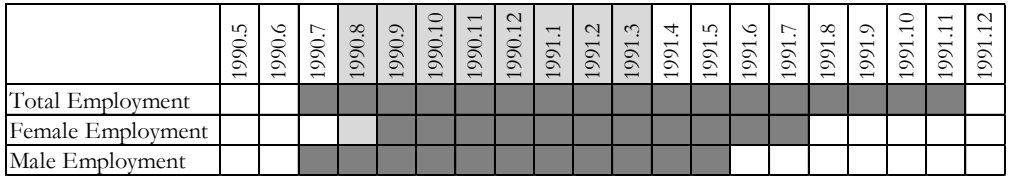
1970 and 1973-75 Recessions



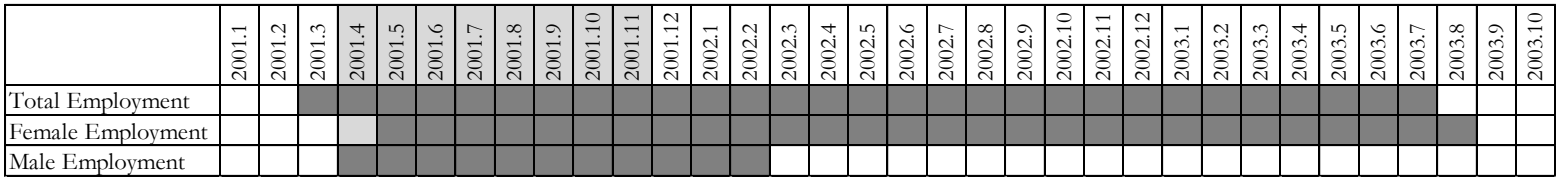
1980 and 1981-82 Recessions



1990-91 Recession



2001 Recession



2008-2009 Recession