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**A Targeted Safety Net:
Work and Dependence for Single Mother Families in the 2007–09 Recession**

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Abstract

Research shows the U.S. safety net was generous to single mother households in the Great Recession of 2007–09. However, research has also suggested the safety net failed to sufficiently target single mother households. This raises the question: Did the Recession differentially impact single mother households, and how did the safety net respond? I use survey data for 2005–2010 from the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) to investigate how the dependence on the safety net and the employment of single mother households transformed in the Recession. Using a difference-in-differences approach and after correcting the data for misreporting, I find that compared to married households, single mother households in the Recession disproportionately lost employment and became more dependent on government transfers for income. My results suggest that in the Recession, social programs additionally targeted single mother households and were an increasingly instrumental income source. Further research may investigate specific program expansions to better understand the behavioral impacts of increasingly targeting single mother households.

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1 Introduction

Low-income single mothers have long been identified as an at-risk demographic. From lower levels of education (Harris, 1993; Kiernan et al., 2020) to children in single mother households having higher risk of negative psychiatric outcomes (Lipman & Boyle, 2002), low-income single mothers and the families they head are at higher risk of losing work and experience inequality in opportunity. Simultaneously, single mothers are an incredibly salient demographic group. 8.7 million families in the United States are headed by single mothers as of 2022, comprising almost a quarter (23%) of all families with children (U.S. Census Bureau, 2022). The unique circumstances and increasing prevalence of single mother families make these families a crucial target for U.S. social policy.

Simultaneously, the U.S. welfare reform of 1996 dramatically altered the benefits available to low-income single mothers. The new safety net was overwhelmingly work-based, replacing unconditional cash transfers with work requirement (Waring & Meyer, 2020). Families of all types were incentivized to work, including single mother families, who began to depend less on social programs and more on earned income (Maria et al., 2002). Yet this newly work-based safety net faced a major test in 2007: the Great Recession. The 18-month global economic decline, which began in December 2007 and lasted until June 2009, brought unemployment rates as high as 10% (U.S. Bureau of Economic Analysis, 2023b) and was exactly the type of adverse event that a safety net hopes to insure against.

Having previously relied on one income rather than up to two (Waring & Meyer, 2020), single mother households had the potential to be particularly impacted by a work-based safety net in the Great Recession. Indeed, considerable research has studied how work and welfare receipt transformed in the Recession years (Eamon & Wu, 2013; Hardy et al., 2018; Waring & Meyer, 2020). Like other families, single mother families lost employment and earnings (Waring & Meyer, 2020), a major precondition of the new safety net. When they found employment, jobs were lower-paid and clocked fewer hours than before (Hardy et al., 2018). Moreover, single motherhood is considered a common risk for women's non-employment (Brady et al., 2017; Zagel, 2013). Together, these studies suggest that single mother households were adversely impacted by the Recession.

In this study, I ask if single mother households were particularly impacted by the Great Recession in terms of employment or labor force participation as compared to married households. If they were, I then ask whether single mother households depended more on the safety net, with dependence defined as proportion of income received from transfers as opposed to market sources. I use a difference-in-differences and year-by-year approach to examine differential outcomes for single mothers more broadly and on a yearly basis.

Given the lower education and fewer resources available to single mothers (Kiernan et al., 2020), I hypothesize they on average lost employment more in the Recession than married heads. If this is the case, and if single mothers also depended more on transfers, this would indicate the Recession-era safety net met some of their additional need. However, if single mothers were more impacted by unemployment yet depended on transfers no more than married heads, it could indicate that even in economic downturn, the work-based nature of the safety net prevailed and further disadvantaged single mother households.

Few studies on single mother outcomes in economic downturn have focused on this particular comparison of single mother against married households. However, not only is this comparison a common one in the general literature on single mothers (Brandon & Hofferth, 2002; Daryanani et al., 2017; Thompson et al., 2001), this comparison is also crucial to contextualizing the challenges of single mother households for social policy. Married households, which made up 72% of families with children in 2022, represent the single largest family type, both overall and among families earning under \$50,000/year (U.S. Census Bureau, 2021, 2022), and as such are often used as a benchmark when designing social policy. Thus, comparing the outcomes of single mothers in economic downturn to married households offers a straightforward and highly informative benchmark for whether single mothers are in any greater need than other family types. (Comparison with single fathers, an interesting but rarer demographic group, is left for later study.) In the context of the Recession, this comparison also naturally compares the single-income nature of single mother households against the potential dual-income nature of married households.

My paper differs from existing literature on single mothers and Recession in two more key ways. First, I use a different data set, the Current Population Survey Annual Social and Economic Supplement (CPS ASEC), which is the U.S. government's official source on poverty statistics. To my knowledge, no

study has specifically used the CPS to examine the differential impacts of the Recession on single mother households at a national level. Second, I also correct my data set for underreporting, a phenomenon in which households increasingly fail to report their government benefits in surveys such as the CPS, understating the importance of social programs over time (Meyer et al., 2015a). By using adjusted data, my results should more closely reflect the true impact of the Recession on single mother households over time than other studies that do not account for this phenomenon (Mittag, 2019).

This study finds that indeed, compared to married heads, single mothers disproportionately lost employment in the Recession. The effect can be explained by underlying demographic differences. Single mother households also became more dependent on government transfers than married households, a result which holds even after accounting for underlying demographic differences. Thus, the safety net was an additionally instrumental source of income for single mother households in the Recession.

As policymakers must contend with future economic downturns, examining differential outcomes of single mother households in the past offers directions for future policy. To advance our understanding of the employment and dependence of single mother households in economic downturn, this study is organized as follows. In section 2, I summarize existing literature on how the Great Recession impacted single mother households. In section 3, I provide background on social programs most relevant to this analysis. In section 4, I describe my data set, then explain the difference-in-difference estimation strategy and method for correcting the data for underreporting. In sections 5 and 6, I present and discuss my results respectively. Finally, section 7 explores policy implications of my study, which include continuing to target single mother households in economic downturns.

2 Existing Literature

Extensive literature has studied how economic downturns impact the employment and government transfers of single mother headed households in the United States. The literature shows economic downturns have adverse impacts on single mother and other single parent headed households (Eamon & Wu, 2013). The Recession in particular led single mothers to have higher unemployment rates than both married mothers and childless women (Eamon

& Wu, 2013; Mattingly et al., 2011). In the Recession, single mothers rarely left the workforce, but rather faced a higher risk of unemployment in the form of involuntary job gaps (Eamon & Wu, 2013). Such job gaps, as well as unemployment and underemployment, remain particular issues for single mothers (Chang & Wu, 2021). The literature is divided about whether these additionally adverse impacts on employment operate through selection—that single mothers tend to be lower-educated than married households—or particular disadvantages of working as a single parent. For instance, the low-wage jobs that many single mothers rely on tend to lack benefits and flexibility, which can place retaining employment in direct conflict with their children’s needs.

Evidence supports that the safety net was generous to single mothers in the Recession (see Table 1 for relevant programs that comprise the safety net). Moffitt (2013) found expansions in safety net programs were shared across single parent and married families, with average SNAP, EITC, and UI expenditures increasing by 55% (111%) from 2004 to 2010 for single parent (married) families (Moffitt, 2013, p. 162). This is consistent with single mother households having a higher need for benefits in the Recession and contemporaneous expansions in program eligibility and benefits by the 2009 American Recovery and Reinvestment Act (U.S. Congress, 2009). Although evidence is not available at the national level, a Wisconsin-specific study using panel data also found safety net expansions to first-time single mothers in the Recession were generous enough that even as earnings and child support income for the households fell, their total income was 0.03 standard deviations higher (Waring & Meyer, 2020).

Yet there may have been disparities in the safety net. First, during the Recession, the safety net did not lift children from single parent households out of poverty as much as children from married households (Bitler et al., 2017). This could be attributed to several reasons, including the increased work-based welfare system (Bitler & Hoynes, 2016), lower take-up rates, or systematic barriers to eligibility. Some literature has found take-up rates as the issue in the form of single mother households experiencing disconnection from both work and welfare (Chang, 2020; Chang & Wu, 2021). They also could be eligibility barriers: for example, some single mothers faced challenges in qualifying for UI in the Recession due to either having held only short-term employment or citing caring for family as the reason for termination (Chang,

2020; Hartmann et al., 2010). Overall, the effects could be further investigated with accounting for the phenomenon of underreporting (Meyer et al., 2015a).

Second, literature shows single mother households faced ongoing impacts on employment and poverty after the official end of the Recession in mid-2009. Chang and Wu (2021) found single mothers to have unstable employment trajectories after the Great Recession, a trend exacerbated for older and low-educated single mothers (p. 14). Damaske et al. (2017) used the American Community Survey (ACS) to find that white, Black, and Hispanic single mother households had about 5% higher odds of being in poverty in 2010 than in 2000. Part of this effect could be attributed to lingering impacts of the Recession in 2010: In June 2010, the unemployment rate remained at 5.6%, higher than the 4.5% in the same month of 2000 (U.S. Bureau of Economic Analysis, 2023b). The ongoing effect on income for single mothers could also come from underreporting, a phenomenon in which single mothers underreport the government benefits that they actually received in surveys like the ACS and CPS (Gathright & Crabb, 2014; Meyer et al., 2015a). Overall, this higher risk of unemployment and potentially higher risk of poverty after the official end of the Recession raises the question of whether transfers during the Recession were high enough and simply underreported, or in some need of expansion.

Third, the same study that found safety net expansions were shared by single and married households also found that Recession-era expansions in the safety net targeted households near the poverty line more than those at the bottom of the income distribution, where there are more single mother households (Moffitt, 2013). This trend of concentrating government benefits toward households closer to the poverty line is consistent with the U.S. work-based welfare reform in the 1990s that gradually replaced unconditional cash transfers with work requirement-based programs like the EITC (Corinth et al., 2022). The same study found that despite the work-based welfare reform, the incidence of poverty for single parent households fell 62% from 1995 to 2016 (Corinth et al., 2022). The literature finds the same long-run trend: for single parent households, poverty fell, employment increased, and overall well-being increased after the work-based welfare reform (Corinth et al., 2022; Meyer & Rosenbaum, 2001). However, this long-run trend between two periods of economic upturn does not necessarily capture potential differential impacts of a work-based safety net on single parent households during a recession.

Altogether, these potential impacts of an increasingly work-based safety net in downturn make my study of the Great Recession particularly worth pursuing as a key post-reform economic downturn.

Also relevant to my study is understanding which program expansions most served single mother households in the Recession. Existing research on which social programs were most impactful generally in reducing poverty found the largest safety net expansions were in SNAP, EITC, UI, and Medicaid, with EITC and SNAP having the largest effects (Meyer & Wu, 2018; Moffitt, 2013). Other studies have found that for working families in the Recession, UI and SNAP provided the most income (Bitler & Hoynes, 2010, 2016; Moffitt, 2013). For single parent households specifically, Bitler and Hoynes (2016) found the EITC transferred less to single parent households. Due to high unemployment in the Recession, UI was another crucial poverty reduction program of the period (Meyer & Wu, 2018; Moffitt, 2013). In this study, I include most of these key programs—SNAP, EITC, and UI—in examining how single mother households depended differently on the safety net.

By focusing on the differential employment and government transfer income of single mother and married households, I hope to build an understanding of how single mother households were differentially impacted in the Great Recession. Did they disproportionately lose employment, and was the safety net correspondingly supportive?

My study also contributes to an ongoing discussion of whether single parent households face systematic disadvantages over married households, or whether differential outcomes derive from underlying differences between women who become single as opposed to married mothers. The underlying differences are many: at first birth, single mothers on average are younger, have lower levels of education, and are less likely to be employed (Harris, 1993; Kiernan et al., 2020). They are expected on average to have worse outcomes—a phenomenon readily observed (Brady et al., 2017; Harkness, 2022; Page & Stevens, 2002). Some literature has found these worse outcomes can be attributed to underlying characteristics (Brady et al., 2017), while other literature finds systematic disadvantages (Harkness, 2022; Harkness & Waldfogel, 2003; Schmidt & Sevak, 2008). While my study cannot address the mechanisms behind this phenomenon, my difference-in-differences approach allows me to control for underlying differences between single mother and married households and offer suggestive evidence for whether single mother

headed households were systematically disproportionately impacted by the Recession.

3 Background

My study examines income from eight different U.S. government transfer programs asked about in the Current Population Survey (TANF, SNAP, OASI, DI, SSI, UI, WC, and the EITC), and incorporates a ninth program, Women, Infants, and Children (WIC), in adjusting for underreporting. Together, these nine programs comprise a wide swath of the social safety net.

The aims of the U.S. safety net are twofold, and as such, these transfer programs are of two main types: social insurance and means-tested transfers. Social insurance programs insure those who experience adverse circumstances such as unemployment, disability, injury, or old age, and require individuals to pay into the programs at some point to receive benefits later on. By contrast, means-tested transfers disburse cash or ‘in-kind transfers’—cash-like benefits such as food stamps or housing—to low-income individuals and do not require any paying in.

The largest social insurance program is Social Security (OASDI), which is comprised of two subprograms of Old-Age and Survivors Insurance (OASI) and Disability Insurance (DI). Although single mother and married households rarely receive Social Security, it is by far the largest program of the safety net, with \$615 billion in expenditures in 2008—twelve times larger than the next largest program—and crucial to include when studying government transfers (Meyer & Wu, 2018). Another relevant social insurance program is Unemployment Insurance (UI), which pays cash benefits to unemployed individuals actively seeking work. UI requires recipients to have been previously employed and have paid into the program. Importantly, UI disburses benefits to individuals at some proportion of their previous earnings, meaning that single mothers—who tend to have lower earnings than married heads—may receive lower UI transfers on average in the Great Recession. Other social insurance programs in this study are Workers’ Compensation (WC), which provides cash to injured workers, and Supplemental Security Income (SSI), which provides cash to disabled children and adults. Medicare, a very large social insurance program which provides healthcare to the elderly, is excluded from this study due to the difficulty in quantifying the benefits

Table 1: U.S. Government Transfer Programs in This Study

Acronym	Program Name	Description
TANF	Temporary Assistance for Needy Families	Cash transfers targeted at single mothers and others. Eligibility based on income and work.
SNAP	Supplemental Nutrition Assistance Program	In-kind food stamps targeted toward general low income families. Eligibility based on income.
WIC	Women, Infants, and Children	In-kind food stamps for pregnant women and young children. Eligibility based on income.
SSI	Supplemental Security Income	Cash benefits for blind and disabled individuals, targeted toward disabled adults and children. Eligibility based on income, asset test, and physical exam.
EITC	Earned Income Tax Credit	Tax credits proportional to income from work up to a certain level, targeted at families with children and others. Eligibility based on income and work.
OASI	Old-Age Social Security	Cash benefits to retired workers, targeted at the elderly. Eligibility based on age, history of work, and history of tax payment.
DI	Disability Insurance	Cash benefits to those unable to work due to disability, targeted toward disabled adults. Eligibility based on disability, history of work, and history of tax payment.
WC	Worker's Compensation	Cash and medical benefits for work-related injury. Eligibility based on injury.
UI	Unemployment Insurance	Cash benefits targeted at the unemployed. Eligibility based on unemployment status and previous work.

and because I exclude the elderly from my sample.

Meanwhile, the largest means-tested transfer program is the Earned Income Tax Credit (EITC), which reimburses paid taxes to families with children. Generally, means-tested programs transfer the most benefits to those in the greatest need and gradually phase out as earnings increase. However, the EITC is unique in that up to a certain amount of earned income (\$18,740 for married households with two children in 2008; Congressional Research Service, 2008), the transfer *increases* with earnings before ultimately phasing out. Consequently, the EITC incentivizes work where other means-tested transfers discourage it. Changes to the design of the EITC drove much of the work-based welfare reform of the 1990s. Since the EITC is targeted toward families with children, it is also particularly salient in my study comparing

single mother and married households.

Another key means-tested transfer programs in this study is Temporary Assistance for Needy Families (TANF). Dating back to 1935, TANF is one of the oldest U.S. social programs and was originally established to provide unconditional cash to needy children with unemployed or deceased parents (U.S. Department of Health and Human Services, [n.d.](#)). The work-based welfare reform in the 1990s significantly reduced TANF benefits and added work requirements so that the program was less prominent by the time of my analysis. However, the shrinking of the TANF program over time—including during the Great Recession—makes it important to account for in my analysis which compares across years. Finally, two more means-tested transfer programs are the Supplemental Nutrition Assistance Program (SNAP) and Women, Infants, and Children (WIC). SNAP provides food stamps to low-income households who also have low assets, and WIC provides food stamps and other in-kind benefits to low-income households with pregnant women or young children.

This study excludes several more social programs that were not directly asked about in the CPS, including Veterans' benefits, the Child Tax Credit, school lunch programs, housing assistance, and Medicaid, which provides health insurance to low-income individuals. Ultimately, the nine programs in this study capture a large portion of the U.S. safety net, including the programs most relevant to single mother and married households in the Great Recession.

4 Data and Methods

4.1 Data

To study the employment and dependence on government transfers of single mother households in the Recession, I use the Current Population Survey, Annual Social and Economic Supplement (CPS ASEC). The CPS ASEC is a nationally representative survey of about 100,000 U.S. households administered annually in March. Responses are collected by phone and by mail. The CPS is the U.S. government's official source of poverty statistics and asks households to report detailed data on annual employment and income from specific government programs, wages, self-employment, interest,

dividends, and rents at the individual level. Household IDs allow me to link individuals from the same household for analysis at the resource-sharing unit level, and household weights allow me to generalize results to the U.S. population. Detailed demographic data also allows me to segment the population for analysis. I access the CPS ASEC from IPUMS, an organization that stores and lightly cleans data for use by researchers.

My sample focuses on six years: 2005–2010. I consider 2005–2007 as pre-Recession years and 2008–2010 as Recession years. This differs slightly from the official duration of the Recession, which is December 2007 to June 2009 (U.S. Bureau of Economic Analysis, 2023b). I choose to consider 2008 the first Recession year due to the Recession being declared so late in 2007. Furthermore, I choose to include 2010 as a Recession year for two reasons. First, unemployment, a key outcome I study, remains high into 2010. (At the end of the year, the unemployment rate was 9.3%, not much lower than the peak of 10% in October 2009 and higher than unemployment rates for about half of the official Recession; U.S. Bureau of Economic Analysis, 2023a). Second, government benefits for UI, one of the most prominent programs for addressing the economic downturn, did not peak until January 2010 and remained high all through 2010 (U.S. Bureau of Economic Analysis, 2023a). Thus, it is reasonable to include 2010 as a year of the Recession. This also allows more years for analysis.

My sample includes about 1.7 million observations at the individual level. Relevant to my analysis, the CPS also assigns each household a head, which I use to identify whether a household is headed by a single mother or a married adult. I use the household IDs to collapse the data to the household level and restrict the sample to 2 household types: single mother and married head households. I code single mother households as those with at least one child under age 18, headed by a female nonmarried adult aged 18–54. I code married households as those with at least one child under age 18, headed by a married adult aged 18–54. I include the age restriction on the head to avoid capturing as many multi-generational households with children in which the head is a grandparent.

In the following analysis of how the Recession differentially impacted single mother and married households, the interpretation would be complicated if the Recession significantly induced or prevented divorces, causing households to shift from single mother to married type or vice versa. To investigate if

Table 2: Characteristics of Single Mother Households Before vs. After Onset of Recession

	Before Recession	Recession	Total
<i>Income</i>			
% in 1st Quintile for Market Income	0.17	0.19	0.18
% in 2nd Quintile for Market Income	0.38	0.36	0.37
% in 3rd Quintile for Market Income	0.27	0.26	0.26
% in 4th Quintile for Market Income	0.13	0.13	0.13
% in 5th Quintile for Market Income	0.05	0.06	0.06
<i>Education</i>			
% with Less Than High School Education	0.17	0.16	0.16
% with High School Education	0.57	0.56	0.57
<i>Children</i>			
Mean Children in HH	1.82	1.81	1.81
Mean Children Under 5 in HH	0.54	0.55	0.54
<i>Demographics</i>			
% Black	0.31	0.31	0.31
% Hispanic White	0.16	0.18	0.17
Mean Age of Head	36.17	36.09	36.13
% Female Head	1.00	1.00	1.00
<i>Reported Programs</i>			
% Reported SNAP in CPS	0.29	0.37	0.33
% Reported TANF in CPS	0.08	0.08	0.08
% Reported UI in CPS	0.04	0.08	0.06
Observations	39372		

this phenomenon is rare, Table 2 summarizes characteristics of single mother households before the Recession (2005–2007) compared to during the Recession (2008–2010). The results confirm that the income quintile, education level, number of children, race-ethnicity, and head age of single mother households are very similar before and during the Recession. This suggests the Recession did not significantly alter the makeup of single mother households, allowing me to proceed with the analyses.

Notably, the variables I use from the CPS (employment status, receipt of government transfers, and dollars received in government transfers) are

self-reported by households, typically the household head answering the survey. A growing literature has found that individuals commonly fail to report receiving government transfers or underreport the dollar amount they receive (Gathright & Crabb, 2014; Meyer & Mittag, 2019; Meyer et al., 2015a). This phenomenon of underreporting is particularly severe in the CPS, where Meyer et al. (2015b) found that 39% of dollars that were paid out in SNAP benefits in 2008 according to federal agencies were missing from the survey. Similar trends are found for UI and other transfers crucial in economic downturns. Moreover, underreporting has worsened over time (Meyer et al., 2015a), making it important to account for the missing benefits when comparing groups across time as my study does. To mitigate these concerns, I apply a data adjustment before conducting the main analyses on the differential impacts of the Recession on single mother households. This adjustment is detailed in the following section.

4.2 Methods

To examine differential impacts of the Recession on single mother and married households, I use two difference-in-difference (DID) models. Before analysis, I adjust the data to account for households underreporting government benefits in the CPS ASEC.

4.2.1 Underreporting Adjustment

Underreporting of government benefits is extremely widespread in the CPS (Meyer & Mittag, 2019; Meyer et al., 2015a). Past research linking respondents of the CPS to their private government administrative records confirms that individuals consistently fail to report receiving programs that they do receive in actuality (Meyer & Mittag, 2019). Moreover, individuals who correctly report receiving transfers still underreport how many dollars they receive (Meyer & Mittag, 2019). This phenomenon persists across almost all programs asked about in the CPS, including but not limited to TANF, SNAP, UI, SSI, WIC, and Social Security (Meyer et al., 2015b). Without access to data that links individual respondents to their government records, it is impossible to perfectly correct the answers of individual CPS respondents to match reality. However, I can adjust the data using estimation.

Drawing from the methodology of Scholz et al. (2009) and related studies (Congressional Budget Office, 2013; Moffitt & Scholz, 2009), I use the demographic characteristics of individuals who *did* report receiving a program in question—for instance, UI—to predict, identify, and assign new individuals, who have similar demographic characteristics, as also UI recipients. Because my adjustment aims to bring CPS data on certain programs closer to reality, I also apply scaling at various points so that after the adjustment, the total numbers of participants and dollars paid out in the CPS match the “true” number of program participants and dollars according to government sources. These government sources include various annual social agency reports and tables in Meyer et al. (2015b) and are described in Appendix B.

Due to time and data constraints, I correct data for only three programs: SNAP, TANF, and UI. These programs were among the the most instrumental in reducing poverty in the Recession (Chang & Wu, 2021; Meyer & Wu, 2018; Moffitt, 2013) and were received by a high proportion of single mother households (see Appendix Table 14). Although TANF was a shrinking program at the time, it was still received by about 10% of single mother households. SNAP, TANF, and UI also had very high underreporting rates in the Recession, with 51%, 49%, and 26% of the true dollar totals respectively missing from the CPS in 2008 (Meyer et al., 2015b). My correction should bring the data much closer to reality. Because I implement the adjustments separately for each year, the adjusted data set also offers a more accurate comparison of income from government programs over time as the Recession proceeded.

In the rest of this section, I detail the implementation of the underreporting adjustment for UI in 2008. (The same process applies for all other combinations of programs and years.) First, I use the demographic characteristics of individuals who self-reported UI in 2008 to generate, for every other respondent of the 2008 CPS, a probability between 0 and 1 that they also received UI. To generate these probabilities, I run the following probit model:

For each year and program:

$$\begin{aligned}
Z_{it} = & \alpha + \beta_0 \text{MARKETINC}\bar{\text{QUINTILE}}_{it} + \beta_1 \text{EDUC}_{it} \\
& + \beta_2 \text{NUMCHILD}_{it} + \beta_3 \text{RACE}\bar{\text{ETH}}_{it} + \beta_4 \text{AGE}_{it} \\
& + \beta_5 \text{NUMCHILDUNDER5}_{it} + \beta_6 \text{FEMALE}_{it} \\
& + \beta_7 \text{REGION}_{it} + \beta_8 \text{MARRIED}_{it} \\
& + \beta_9 \text{REPORTEDOTHERPROG}_{it} + \varepsilon_{it}
\end{aligned}$$

with $P(\text{REPORTEDRECEIPT}_{it} = 1 \mid X_{it}) = \Phi(Z_{it})$ where $\Phi(\cdot)$ denotes the cumulative standard normal distribution.

A probit model is a regression in which the dependent variable, here self-reported receipt of UI in 2008, can only take on two values: reported or not reported. I use the model to estimate how each demographic characteristic predicts receipt. Then, I use the coefficients (β_0 through β_9) to generate for each individual in the 2008 CPS a predicted probability, $\Phi(\hat{Z}_{it})$, of being a UI recipient in 2008.

I use roughly the same demographic predictors as Scholz et al. (2009). *MARKETINC* $\bar{\text{OMEQUINTILE}}$ are indicators for market income quintile, defined as the sum of wages, self-employment, interest, dividends, and rent. *EDUC* are indicators for less than high school, high school, and college degree or higher education. *RACE* $\bar{\text{ETH}}$ are indicators for Black, Hispanic white, non-Hispanic white, Asian/Hawaiian/Pacific Islander, and American Indian. *REGION* are indicators for residence in the Northeast, Midwest, South, or West. *REPORTEDOTHERPROG* is an indicator for whether the individual reported receiving any non-UI program among SNAP, TANF, WIC, OASDI, and SSI. I also use as predictors age, gender, marital status, number of children, and number of children under age 5. (Since UI and TANF are social programs received by individuals, I use these characteristics at the individual level. When I perform the adjustment for SNAP, which is received by households, I use characteristics at the household level, with age, gender, race, marital status, and education being that of the head.)

Once the raw probabilities are generated, I scale the raw probabilities by a scaling factor (θ) so that after the adjustment is completed, the number of 2008 UI recipients in the CPS will match the “true” number of 2008 UI recipients as according to the U.S. Department of Labor. I calculate a different

scaling factor for each year and program. For example, the “true” number of 2008 UI recipients was 12.6 million according to the U.S. Department of Labor. Meanwhile, there were 8.1 million self-reported recipients in the CPS (see Appendix Table 12). This means that **12.6 – 8.1**, or 4.5 million UI recipients, were missing from the CPS. My raw probabilities from the probit model were expected to generate 7.4 million new 2008 UI recipients, but I only wanted to assign 4.5 million new recipients in order to ultimately match the “true” number of recipients. To ensure that I instead assigned 4.5 million new recipients, I scaled down all the raw probabilities of being a 2008 UI recipient by a factor of $\frac{4.5}{7.4}$, or **0.62**. Across all programs and years, the scaling factors are between 0.32 and 0.83.

Next, I use the scaled probabilities to randomly assign new 2008 UI recipients. For instance, an individual with a scaled probability of 0.8 would have a 0.8 chance of being assigned as a new UI recipient. According to Mittag (2019) which examined public-use SNAP data, randomly assigning recipients in this manner produces data more reflective of real reciprocity distributions than alternative approaches that assign reciprocity to only the most likely households or set an arbitrary cutoff probability for receipt. After completing this part of the adjustment, I confirm in Appendix Tables 8, 10, and 12 that for all programs and years, my total recipients after the adjustment are very close to the “true” number of recipients, with percent errors within $\pm 2\%$.

Finally, for simplicity, I assign each new recipient the same number of dollars in benefits received so that after the adjustment, the total dollars paid out in the CPS should match the “true” total dollars. Again, Appendix Tables 8, 10, and 12 verify that for all programs and years, my total dollars after the adjustment are very close to the “true” dollars, with percent errors within $\pm 0.5\%$.

There are several limitations to this underreporting adjustment method. The greatest is that this method identifies new recipients based on the demographic characteristics of those who self-reported. This assumes that each true recipient is equally likely as any other to self-report receiving a program. If this assumption is violated, and single mother and married households are differently likely to report receiving transfers, then it would be concerning to use this adjusted data to compare single mother and married households. However, the literature has been mixed on this fact. Celhay et al. (2021) find single parent households were more likely than married

households to underreport (p. 49), but Meyer et al. (2022) find the opposite (p. 1622), and neither effect was statistically significant. Thus, it is reasonable to proceed with my analyses using this adjusted version of the CPS. Overall, this adjustment should improve comparisons of program receipt across time as the Recession proceeded.

4.2.2 Estimating Differential Impacts of Recession on Single Mother and Married Households

To examine differential impacts of the Recession on single mother and married households, I use two difference-in-difference (DID) models. I restrict the sample to only single mother and married households, defined as having at least one child under age 18, and examine three outcomes of interest: employment, labor force participation, and dependence. I run the following model:

(1)

$$\begin{aligned}
 Y_{it} = & \beta_1 \mathbf{SINGLEMOTHER}_{it} \\
 & + \sum_{t=2005}^{2010} \beta_{2t} \mathbf{1}(YEAR = t) \\
 & + \beta_3 (\mathbf{SINGLEMOTHER}_{it} \times \mathbf{AFTER}_{it}) + \varepsilon_{it}
 \end{aligned}$$

The three outcomes of interest Y are **EMPLOYMENT**, **INLABORFORCE**, and **DEPENDENCE**. **EMPLOYMENT** is an indicator for whether the household head was employed, and **INLABORFORCE** is an indicator for whether the head was employed or seeking employment. **DEPENDENCE** is a continuous variable that I define as the proportion of income that the household receives from government transfers (the sum of TANF, SNAP, OASDI, SSI, UI, WC, and EITC) as opposed to self-reported market income (the sum of wages, self-employment, interest, dividends, and rent). My definition of dependence follows that of Burkhauser et al. (2019), who used dependence to study the impacts of the work-based safety net.

SINGLEMOTHER is an indicator for whether the household is a single mother household. The set of year indicators controls for year-fixed effects in employment, dependence, labor force participation, and program receipt respectively. Finally, *AFTER* is an indicator for whether the year is within 2008–2010, after the onset of the Recession. The coefficient of interest, β_3 , represents the differential impact on single mother households compared to married households after the onset of the Recession. In addition to model (1), I also run a related DID model of the following form:

$$\begin{aligned}
 Y_{it} = & \sum_{t=2005}^{2010} \beta_{2t} 1(YEAR = t) \\
 & + \sum_{t=2005}^{2010} \beta_{3t} (SINGLEMOTHER_{it} \times 1(YEAR = t)) + X'_{it} + \varepsilon_{it}
 \end{aligned}
 \tag{2}$$

Again, the outcomes are *EMPLOYMENT*, *INLABORFORCE* and *DEPENDENCE*. X'_{it} denotes the control variables of household head age, race–ethnicity, and education level. These broad factors capture many of the underlying differences between single mother and married households while retaining simplicity and were also the controls used by Han et al. (2021) in their analysis of single mother household consumption.

Overall, model (2) estimates the gaps in outcome between single mother and married households, β_{3t} , for each of the years 2005–2010. Unlike model (1), which pools years into before and after onset of the Recession, graphing the β_{3t} coefficients of model (2) allows visual examination of how the gaps in employment, labor force participation, and dependence of single mother and married households changed on a year-by-year basis throughout 2005–2010. Together, these two models examine the overall and year-by-year differential impacts of the Recession on the employment status and dependence of single mother versus married households.

I also examine how controlling for underlying differences between single mother and married households impacts my results by adding controls one-by-one to model (1) for household head age, race–ethnicity, education level, and number of children. This shows how these underlying characteristics

of single mother versus married households drove the differential impacts on proportion employed, proportion in labor force, and average dependence. Finally, all my analyses for dependence are run on a version of the CPS ASEC that I correct for the well-studied phenomenon of households underreporting their government benefits. I detail this adjustment in the next section.

4.2.3 Identifying Assumptions

Difference-in-differences is an analytical approach that estimates the impact of a policy change on the outcomes of a treated as opposed to control group. It works by exploiting two differences: the change in outcome over time and the difference in outcome between a treated versus control group. Here, I use DID models to examine the impact of the onset of the Recession on the employment, labor force participation, and dependence on government transfers of single mother households (the treatment) as opposed to married households (the control). The resulting estimates reveal how the Recession differentially impacted the outcomes of single mother households compared to their married head counterparts.

Several identifying assumptions are necessary to draw causal conclusions from the DID models about the impact of the Recession. First, the allocation of treatment must be unrelated to the outcome. In other words, being a single mother or a married household should not be determined by one's employment status or dependence on government transfers. This assumption is reasonable to make because I do not expect a significant number of household heads to divorce or marry based primarily on their employment status or dependence level in a given year. As seen in Table 2, even a major shock to employment and dependence like the Recession did not dramatically alter underlying characteristics of single mother households such as race, age, or education level. Thus, I assume employment and dependence do not alter marriage and divorce choices, and thus treatment is unrelated to the outcomes.

The key assumption is parallel trends: that in the absence of the Recession, the difference in employment, labor force participation, and dependence on government transfers of single mother and married households would have remained constant in 2008–2010. There is no statistical test for this assumption, as it relies on an unobservable counterfactual. However, visual inspection of trends in the outcomes of single mother and married households supports the assumption. Figure 1a shows single mother and

married households having parallel trends in proportion employed in the pre-period. Figure 1b shows the groups diverged in labor force participation in the pre-period, but still I am unable to reject that the gap between labor force participation of single mother and married households was the same in every year of the pre-period at the $\alpha = .05$ level (see Appendix Table 6). Concerningly, Figure 3 displays a diverging trend in the dependence of single mother and married households in the pre-period. This suggests a potential violation of parallel trends in the absence of Recession. If the gap in dependence of single mother and married households would have continued to diminish after 2007 in the absence of the Recession, then my estimate would *understate* the impact of the Recession on the increased dependence of single mother households. This bias is therefore made less concerning because it should not generate significant results where there are none. I proceed to run the model for dependence with this caveat in mind.

Beyond visual inspection, parallel trends can also be violated by macroeconomic effects differentially impacting the treatment and control. This concern does not apply to these models because their specifications purposefully examine the differential macroeconomic effects and corresponding social policy changes of the Recession. However, my specifications notably cannot differentiate the macroeconomic impacts of Recession from the government welfare response.

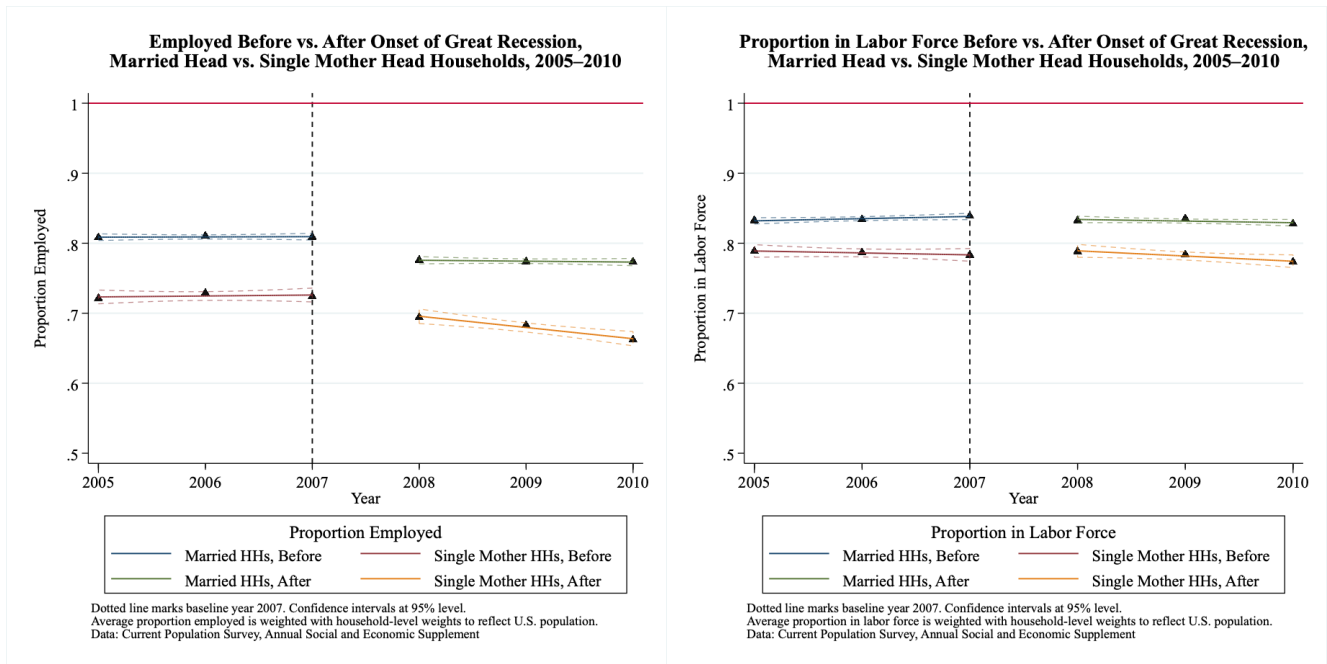
5 Results

My results proceed in two parts. First, I present results from models (1) and (2) examining how the employment, labor force participation, and dependence on government transfers of single mother and married households changed as the Recession proceeded. Model (1) examines the gaps in outcome between single mother and married households before and after the onset of the Recession, while model (2) examines the gaps year by year. Second, I examine how adding controls one by one for head age, education level, race-ethnicity, and number of children changes my primary results.

5.1 Differential Impacts of Recession on Single Mother and Married Households

Figure 1 plots the employment and labor force participation trends of single mother and married households. First, to draw conclusions from the first difference-in-difference model (1), I must assume that in the absence of the Recession, single mothers and married heads would have followed parallel trends in proportion employed. Figure 1a provides support for this assumption for proportion employed, as the trend in employment appears parallel before the Recession. Figure 1b shows a slight diverging trend for labor force participation, with the married heads in the labor force increasing relative to single mothers. This diverging trend indicates that for labor force participation, the year-by-year model (2) would be more informative.

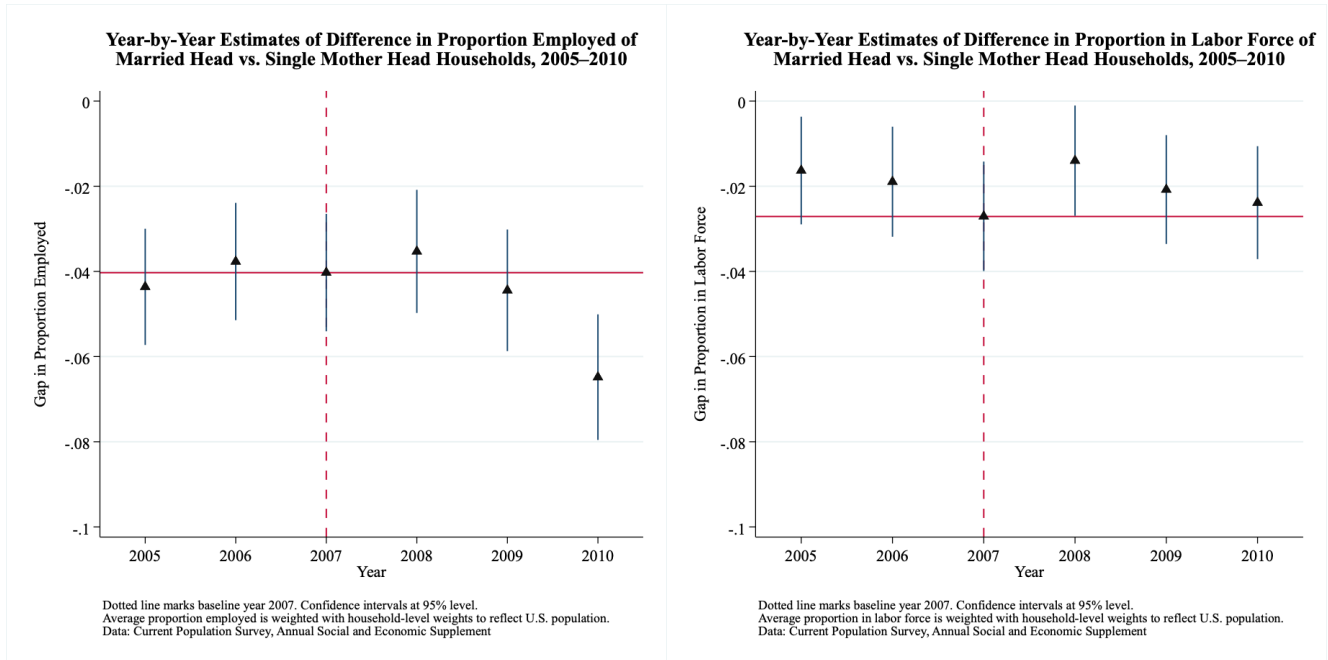
Figure 1a also shows that before the Recession, there was no major change in proportion employed for either groups, with single mothers employed



(a) Employed

(b) In Labor Force

Figure 1: Proportion Employed and Proportion in Labor Force Before vs. After Onset of Great Recession, Single Mother vs. Married Households (No Controls).



(a) Employed

(b) In Labor Force

Figure 2: Year-by-Year Gaps in Proportion Employed and Proportion in Labor Force, Single Mother vs. Married Households (Controls).

on average 8.4 percentage points less than married heads. However, upon the onset of the Recession, single mothers were employed an additional 1.1 percentage points less than married heads. This differential decrease in employment for single mothers was statistically significant (see Appendix Table 5).

Figure 1b shows that before the Recession, single mothers were in the labor force 4.9 percentage points less than married heads (see Appendix Table 5). Upon the onset of the Recession, the proportion of single mothers in the labor force did not change any differently from the proportion of married heads in the labor force. Together, the fact that single mothers were differentially less employed in the Recession, but no more out of the labor force, imply that compared to married heads, single mothers were increasingly unemployed in the Recession. This is all without controlling for underlying differences between the two demographics.

Figure 2 plots the gap in proportion employed and proportion in labor

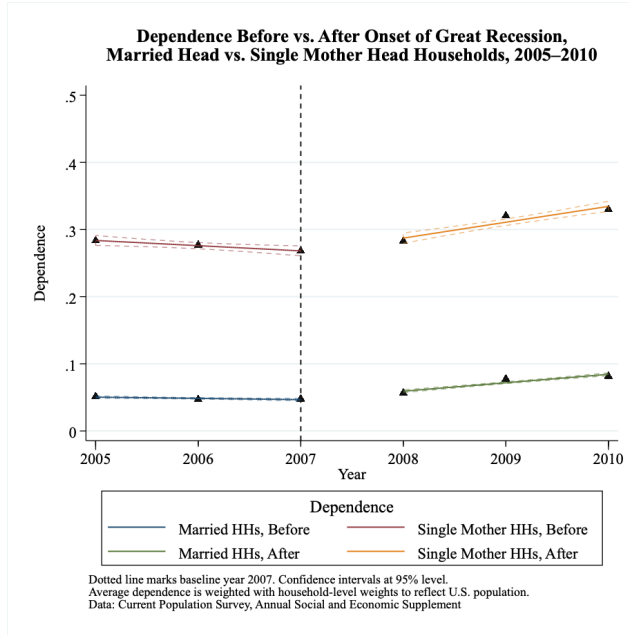


Figure 3: Dependence Before vs. After Onset of Great Recession, Single Mother vs. Married Households (Adjusted Data, No Controls).

force between single mother and married heads for each year of 2005–2010, examining the same trends as Figure 1 but on a year-by-year basis. Figure 2a shows that the result that single mothers differentially left employment was primarily driven by 2010, when single mothers were employed 6.5 percentage points less than married heads (a gap that is 63% larger than in 2007 immediately before the Recession; see Appendix Table 6). That single mothers were significantly less employed than married heads in 2010 is also consistent with previous literature. Meanwhile, Figure 2b confirms that after the Recession, there is no additional gap in proportion in labor force between single mothers and married heads. During the Recession from 2008–2010, the gap increased, indicating a progressively smaller proportion of single mothers than married heads in the labor force; however, this finding is statistically insignificant.

Figure 3 plots the trends in dependence, or the proportion of income received from government transfers as opposed to market sources, for single mother and married households before and after the onset of the Recession. Single mother households have consistently higher dependence, receiving on

Table 3: Dependence on Government Transfers Before vs. After Onset of Great Recession for Single Mother vs. Married Households

	(1)	(2)	(3)	(4)
	Dependence	Dependence	Dependence	Dependence
Single Mother Head	0.214*** (0.0028)	0.177*** (0.0027)	0.227*** (0.0029)	0.188*** (0.0027)
Single Mother Head \times After	0.0122*** (0.0041)	0.0110*** (0.0039)	0.0118*** (0.0042)	0.0106*** (0.0040)
Observations	165283	165283	165653	165653
R^2	0.331	0.387	0.343	0.402
Year-Fixed Effects?	Yes	Yes	Yes	Yes
Adjusted Data?			Yes	Yes
Controls?		Yes		Yes
Married HH Mean, 2007	0.047	0.047	0.047	0.047

Notes: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. This table shows results from linear regressions of the continuous variable of dependence. I define dependence as the proportion of total household income received from government transfers as opposed to reported income from market sources including wages, self-employment earnings, interest, dividend, and rents. The sample is restricted to single mother and married households. Columns (2) and (4) include controls for household head age, education, and race-ethnicity. Columns (3) and (4) are performed after adjusting for underreporting of government programs. All regressions include year-fixed effects and are weighted by household weights reflective of the U.S. population.

average 21.4 percentage points more of their income from government transfers as opposed to market sources (see Table 3).

Again, drawing conclusions from this model (1) requires the assumption that in the absence of the Recession, single mother and married households would have followed parallel trends in dependence level. Notably, Figure 3 shows that the gap in dependence of single mothers and married households appeared to be narrowing in the pre-period, potentially providing support against the parallel trends assumption in the absence of the Recession. Thus, model (1) may *understate* the differential impact of the Recession on increasing the dependence of single mother households (also see Section 4.2.3 for a longer discussion of the parallel trends assumption for dependence). Overall, Figure 3 shows that in the post-period, the dependence of both single mother and married households increased. However, dependence for single mother households appeared to increase more steeply. Table 3, which looks more closely at this differential trend, confirms that in the Recession, after adjusting

for underreporting, single mother households were overall 1.18 percentage points additionally dependent on government transfers for income.

Table 3 also shows that after adding controls for age, education, and race-ethnicity, single mother households were still 1.06 percentage points additionally dependent on government transfers than married households. This gap in dependence is statistically significant at the $\alpha = .01$ level. In terms of magnitude, the estimate suggests that in the Recession, a single mother household could be transferred an additional roughly \$400 per year (estimate based on Appendix Figure 8a) compared to a married household that otherwise had similar head age, race-ethnicity, and education level. Whether this impact is due to other underlying demographic differences, systemic barriers to making more market income, or increased targeting of the safety net to single mothers, single mother households were significantly additionally dependent on the safety net during the Recession.

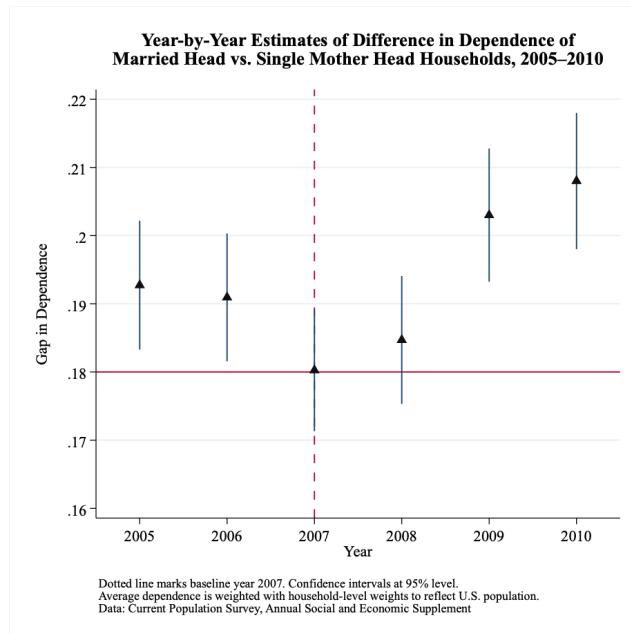


Figure 4: Year-by-Year Gaps in Dependence, Single Mother vs. Married Households (Adjusted Data, Controls).

Figure 4 plots the gap in average dependence between single mother and married heads for each year of 2005–2010, examining the same trends as Figure 3 but on a year-by-year basis. The figure shows that my result of

additionally greater dependence of single mother households on government transfers after the onset of the Recession is driven by years 2009 and 2010. The gap in dependence of single mother and married households for 2009 and 2010 (20.3 and 20.8 pps respectively) is greater and statistically different from the gap in 2007 right before the Recession (18.0 pps; see Appendix Table 7). This is similar to my earlier finding that the gap in employment was also driven by impacts late in the Recession in 2010. As the Recession wore on, single mother households faced more additional employment loss and higher dependence on government transfers.

5.2 Controlling for Underlying Demographic Characteristics

I next examine how controlling for underlying demographic differences between single mother and married households changes my primary results on how the Recession differentially impacted single mother households. Table 4 runs model (1) again for proportion employed, proportion in labor force, and dependence, with each column adding an additional control for age, education level, race–ethnicity, and number of children in the household.

For proportion employed, I find in Table 4 that underlying characteristics drive the result that the single mothers disproportionately lost employment in the Recession (were 1.05 pps less employed), which was significant at the $\alpha = .1$ level. Adding just one control for age eliminates any differential impact of the Recession on the employment of single mother versus married households. As more controls are added, the effect remains negative but insignificantly; we cannot say single mothers differentially lost employment after controlling for underlying characteristics.

In terms of adding each control, the controls for age and education level reduce the magnitude of differential impact of the Recession on single mothers from 1.05 pps to 0.78 pps and 0.78 pps to 0.75 pps respectively. However, the controls for race–ethnicity and number of children together increase the gap from 0.75 pps back to 0.84 pps. This indicates that splitting single mother and married households into race–ethnic and number of children cells identifies *more* disparities in employment loss. Although adding these controls does not necessarily produce results statistically significant from each other, the directions of the effects indicate could indicate that age and education level,

Table 4: Proportion Employed, Labor Force Participation Rate, and Dependence Before and After Onset of Great Recession for Single Mother vs. Married Households

Panel A: Employment					
	(1)	(2)	(3)	(4)	(5)
	Employment	Employment	Employment	Employment	Employment
Single Mother Head	-0.0844*** (0.0042)	-0.0669*** (0.0041)	-0.0474*** (0.0040)	-0.0405*** (0.0041)	-0.0461*** (0.0041)
Single Mother Head \times After	-0.0105* (0.0060)	-0.00782 (0.0060)	-0.00753 (0.0059)	-0.00780 (0.0058)	-0.00838 (0.0058)
Observations	166577	166577	166577	166577	166577
R^2	0.772	0.775	0.781	0.781	0.782
Year-Fixed Effects?	Yes	Yes	Yes	Yes	Yes
Age Control?		Yes	Yes	Yes	Yes
Education Controls?			Yes	Yes	Yes
Race-Ethnicity Controls?				Yes	Yes
Number of Children Controls?					Yes
Married HH Mean, 2007	0.809	0.809	0.809	0.809	0.809
Panel B: ILF					
	(6)	(7)	(8)	(9)	(10)
	ILF	ILF	ILF	ILF	ILF
Single Mother Head	-0.0489*** (0.0038)	-0.0349*** (0.0038)	-0.0212*** (0.0038)	-0.0207*** (0.0038)	-0.0260*** (0.0038)
Single Mother Head \times After	-0.00100 (0.0055)	0.00111 (0.0054)	0.00131 (0.0053)	0.00115 (0.0053)	0.000599 (0.0053)
Observations	166577	166577	166577	166577	166577
R^2	0.822	0.824	0.827	0.827	0.827
Year-Fixed Effects?	Yes	Yes	Yes	Yes	Yes
Age Control?		Yes	Yes	Yes	Yes
Education Controls?			Yes	Yes	Yes
Race-Ethnicity Controls?				Yes	Yes
Number of Children Controls?					Yes
Married HH Mean, 2007	0.839	0.839	0.839	0.839	0.839
Panel C: Dependence					
	(11)	(12)	(1)	(14)	(15)
	Dependence	Dependence	Dependence	Dependence	Dependence
Single Mother Head	0.227*** (0.0029)	0.220*** (0.0029)	0.203*** (0.0027)	0.188*** (0.0027)	0.193*** (0.0027)
Single Mother Head \times After	0.0118*** (0.0042)	0.0107** (0.0041)	0.0104*** (0.0040)	0.0106*** (0.0040)	0.0112*** (0.0039)
Observations	165653	165653	165653	165653	165653
R^2	0.343	0.348	0.395	0.402	0.409
Year-Fixed Effects?	Yes	Yes	Yes	Yes	Yes
Age Control?		Yes	Yes	Yes	Yes
Education Controls?			Yes	Yes	Yes
Race-Ethnicity Controls?				Yes	Yes
Number of Children Controls?					Yes
Married HH Mean, 2007	0.048	0.048	0.048	0.048	0.048

Notes: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. This table shows results from linear regressions of employment, in labor force, and dependence. The sample is restricted to single mother and married households. Each column adds a new control for age, education, race-ethnicity, and number of children. As controls are added, the result that single mothers faced disproportionate employment loss in the Recession become insignificant, although the direction is still negative. As controls are added, the estimate of the Recession having no differential impact on the labor force participation of single mothers remains insignificant and small in magnitude. Finally, as controls are added, the Recession still disproportionately increased the dependence of single mother households. After adding all controls, the magnitude of the estimate decreases only by 5%, although the estimate itself had a small magnitude to begin with (1.18 pp). All regressions include year-fixed effects and are weighted by household weights reflective of the U.S. population. Data is adjusted for underreporting.

not race–ethnicity or family size, could be driving the small but significant differential employment loss of single mothers

I find similar impacts of underlying demographic differences for the results on labor force participation. At baseline, the Recession had no differential impact on the labor force participation of single mother heads. As controls are added, the differential impact remains statistically significant and small in magnitude (less than 0.1 pps), suggesting single mothers did not additionally leave the workforce in the Recession. However, interestingly, adding controls for age and education level flip the direction of the (small and insignificant) gap in labor force participation. At baseline, the direction implied that single mothers relatively exited the labor force upon the onset of Recession, but after accounting for age and education, they may have relatively *entered* the labor force. This change is both insignificant and small in magnitude (from -0.1 pps to 0.1 pps). However, it is interesting that like for employment, controlling for age and education level produced estimates that indicate less disadvantage in the labor force for single mother households, while controlling for race–ethnicity and number of children exacerbated the disadvantages.

Finally, my primary result that single mother households were 1.18 percentage points additionally dependent during the Recession is robust to controls for age, education, race–ethnicity, and number of children. As controls are added, the estimate remains significant at the $\alpha = .01$ level and stays similar in magnitude (1.04–1.12 pps). This suggests that the differential increased dependence of single mother households during the Recession is not driven by underlying demographic differences in age, education level, race–ethnicity, or family size. The differential impact could be attributed instead to other underlying demographic differences, systemic barriers to making more market income, or increased targeting of the safety net to single mothers.

Each control has a similar impact on dependence as on employment and labor force participation. Again, controls for age and education level somewhat explain the additional gap in dependence between single mother and married households (decreasing the gap by 0.1 and 0.04 pp respectively). Meanwhile, controls for race–ethnicity and number of children exacerbate the gap (increase the gap by 0.02 and 0.05 pp respectively), indicating that demographic differences in race–ethnicity and number of children may exacerbate existing disparities between single mother and married households.

My results about the explanatory effects of age and education and the exacerbatory effects of race–ethnicity and family size should be treated with caution given their low statistical significance and lack of additional statistical tests conducted. However, these underlying demographic differences represent interesting directions for future research.

6 Discussion

This study used the CPS ASEC to examine how single mother households were differentially impacted by macroeconomic changes and social program expansions in the Great Recession of 2007–09. My analysis focuses specifically on their employment status and dependence compared to married households. I also investigated to what extent the differential impacts can be explained by underlying demographic differences between single mother and married households. To my knowledge, this study is the first to use an underreporting-adjusted version of the CPS ASEC to examine differential impacts of the Recession on single mother households at a national level.

With regard to employment, I find single mothers were employed an additional 1.05 percentage points less than married heads during the Recession than before, but did not disproportionately exit the labor force. This effect was driven by a particularly large gap in employment (6.5 pps, compared to 4.0 pps in 2007) between single mothers and married heads in 2010. However, the gap in the employment of single mothers and married heads disappears with a simple control for age, indicating that underlying characteristics, particularly age and education level, could drive this effect. With regard to dependence, single mother households became 1.18 percentage points more dependent on government transfers during the Recession than before. (A back-of-the-envelope calculates this as an additional \$400/year in transfers.) This effect was driven by single mother households being particularly additionally dependent on transfers in 2009 and 2010. This greater gap in dependence remains statistically significant even after controlling for head age, education, race–ethnicity, and number of children. Thus, the Recession led single mother households to depend additionally more on the safety net for income than married households.

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In the context of existing literature, my first results for employment conform to research that single mothers had higher unemployment than married mothers and unstable employment trajectories after the Recession (Chang & Wu, 2021; Eamon & Wu, 2013; Mattingly et al., 2011). However, my study differently suggests that the additional employment loss of single mothers is explained by demographic differences like age and education level. One reason for this difference from the literature may be that my analysis is limited by the annually collected nature of the data set. The CPS ASEC is conducted only in March and cannot capture the employment dynamics faced by single mothers and married heads on a monthly basis, especially as short time frames matter when analyzing economic downturn. It is possible that the sparser time window of my study hides variation, allowing age and

education level to explain the additional employment loss of single mothers. Regardless, my overall finding holds that single mothers disproportionately lost employment in the Recession, with greater disparities as the Recession wore on.

My second result that single mothers did not differentially exit the labor force in the Recession is especially interesting when situated in the context of the 1990s work-based welfare reform. Long-run studies have found that between 1995 and 2016, single parent households became more employed (Corinth et al., 2022). My study found that in this post-reform economic downturn, single mothers also did not leave the workforce any more than married heads. This could be partially due to the work-based safety net via behavioral change to receive Unemployment Insurance (the proportion of single mother households receiving UI doubled between 2005 and 2010; see Appendix Table 14). It could also be due to single mothers needing more to maintain an income regardless as the sole household head. Notably, my null result for labor force participation is subject to the same sparse time window issue and should be interpreted as a potential over-generalization.

My third result that single mother households were more dependent on the safety net must be carefully interpreted. Although in the Recession single mother households were 1.18 percentage points additionally more dependent than married households, this does not necessarily mean social programs transferred more to single mother households. Rather, single mother households had lower market income to begin with and additionally lost employment in the Recession. To facilitate interpretation of this dependence result, I examine the issue of government transfer income more closely in Appendix Figure 7 and confirm that indeed, the differential result of higher dependence in 2009 and 2010 seems to correspond with single mother households receiving not only higher transfers proportional to their income, but higher transfers in dollar terms than married households. My result conforms to the literature that single mother households were reached by Recession-era social program expansions (Moffitt, 2013). Moreover, not only did social programs increase in importance for single mother households, each marginal dollar of government transfer was probably more valuable, meaning my dependence coefficient may still understate the value of social program expansions.

There are two more important caveats to interpreting dependence. First,

the potential parallel trends violation may still understate the increased dependence of single mother households (see Section [4.2.3 Identifying Assumptions](#)). Second, this result should only be interpreted as social programs becoming more instrumental to single mother households than married households in the Recession. My analysis of dependence cannot suggest the safety net successfully met the needs of single mother households because dependence is a relative measure calculated with respect to total income. More direct measures of well-being would be consumption, as studied by Meyer and Wu (2018), or the number of single mother households raised above the poverty line, as studied by Bitler et al. (2017). My study leaves much work to be done in analyzing how well Recession-era social programs addressed the material hardships of single mother households.

My fourth result—that age and education level explain the disparities of single mother households in employment and dependence, while race–ethnicity and number of children appear to exacerbate estimates of disparities—should be interpreted with much caution given the lack of statistical significance and lack of additional tests conducted. However, the result would fit into a literature that is mixed on the extent to which underlying characteristics as opposed to systemic disadvantages drive disparities in outcomes between single mother and other households (Brady et al., 2017; Harkness, 2022; Harkness & Waldfogel, 2003; Schmidt & Sevak, 2008). The underlying characteristics represent interesting directions for future research. Especially, if race–ethnicity and number of children indeed exacerbate estimates of the gap in employment outcomes, then social programs may aim to increasingly reach disadvantaged race–ethnic groups through expanding access.

Finally, this study was also novel in applying an underreporting adjustment before running the models for dependence. Because the adjustment selected new recipients on the basis of their demographic characteristics, the model ultimately had a different probability of assigning benefits to single mother and married households. Appendix Tables 9, 11, and 13 show that for all three programs of SNAP, TANF, and UI, the recipients who are imputed are more often married households and less often single mother households. This disproportionate assignment of benefits to married households is not unreasonable given that literature on underreporting has not had definitive conclusions on whether single mother or married households tend to underreport benefits more (Celhay et al., 2021; Meyer et al., 2022).

Future research might conduct a more accurate data adjustment by using a more complex model that allows demographic groups to have different probabilities of underreporting whether they receive social programs, as they do in reality (Meyer et al., 2022). A future study may also adjust for individuals underreporting their market income, which could bias the dependence results in this study if single mother and married households differently reported their market income (Meyer & Sullivan, 2003).

Overall, from a data perspective, further work can improve on this study by: 1) using a monthly data source to capture more granular changes employment during downturn; 2) applying underreporting adjustments to other key programs like EITC and WIC; 3) adjusting for individuals underreporting market income, and 4) improving the adjustment by allowing different groups to have different probabilities of self-reporting programs.

Ultimately, this study investigated how the employment status and dependence on government transfers of single mother households was differentially impacted by the Great Recession of 2007–09. Ultimately, I found that in the economic downturn, single mothers additionally lost employment compared to married heads despite not additionally leaving the labor force and depended more on social programs for income.

7 Policy Implications

This study proposes three main policy implications: 1) the safety net was justified in transferring additionally to single mother households in the Recession; 2) policymakers should consider maintaining social programs for single mothers longer into economic recessions; and 3) social programs can address disparities faced by single mothers by targeting younger and lower-educated heads.

First, my study indicates the safety net was justified in transferring additionally to single mother households. I find single mothers disproportionately lost employment in the Recession despite not additionally exiting the labor force more than two-parent households; for good reason, they depended more on transfers for income. This higher dependence of single mother households could have operated through deliberate policy choices to expand eligibility and benefit amounts to single mother households, or through self-selected higher take-up. My study cannot say which is the case, nor

if the safety net sufficiently addressed the *well-being needs* of single mother households. But it is evident the safety net was a justified and increasingly instrumental source of income—a sign that policymakers invested in single mothers and their children should continue to expand eligibility or encourage take-up to ensure they are adequately targeted in future economic downturns.

Second, my study shows that policymakers should consider maintaining social program expansions for single mothers longer into economic recessions. My study finds that as the Recession proceeded into 2009 and 2010, single mothers increasingly fared worse in returning to employment than married heads. They also justifiably depended more on the safety net. Policymakers invested in the employment trajectories of single mothers should study and weigh extending program expansions after downturn to address lingering employment disparities. Ideas include extending the time duration of benefits, increasing benefit amounts for single parents, or streamlining application processes to facilitate single mothers taking up existing benefits. Any of these changes would require research into behavioral impacts, but would ultimately be worth considering to address any lingering employment disparities.

Third, my study suggests social programs can alternatively address the disparities faced by single mothers by targeting young and low-educated heads. This is possible because Recession-era employment disparities of single mother households can be fully explained by head age and education. Policymakers more interested in mediating employment disparities for young and low-educated households may consider implementing or expanding work training programs; facilitating student loans to incentivize educational investment; or increasing the program take-up of young parents by streamlining application processes and adding case workers geared specifically to young parents. Policymakers could also consider adding age exceptions to limits on program receipt duration. In the long run, policymakers might consider how to reduce the incidence of young and low-educated single mothers in the U.S., who appear at the greatest disadvantage. This task is not a simple one, but neither is any of social policy.

To extend this study, follow-up studies can: 1) examine the consumption of single mother households to directly measure their well-being and 2) use other data to investigate disparities in employment within cells for age, education, race–ethnicity, and number of children to verify which characteristics explain versus exacerbate disadvantages faced by single parent

households. Future work can also 3) leverage one-time changes in program eligibility to quantify well-being and behavioral impacts of expanding specific benefits to single mother households. Further work may 4) compare other single parent demographic groups such as single father households to isolate how gender as opposed to being a single head creates disadvantages in economic downturn. Finally, a natural continuation of this study would 5) compare the differential impacts faced by single mothers in the Great Recession against the COVID-induced economic downturn in 2020 to generalize policy implications.

Ultimately, I recommend policymakers in the next economic downturn to closely examine if single mothers again disproportionately lose employment, and if so, how they can be served by expansions in social programs. Policymakers invested in single mothers should also track lingering disparities in their well-being even after other demographic groups have recovered. Future-minded policy makers might consider how to reduce the incidence of young and low-educated single mothers. With these lessons in mind, policy can better address the well-being of the 8.7 million and growing single mother households in the United States in future recessions.

8 Conclusion

Using DID models, this study showed that compared to married heads, single mothers disproportionately lost employment in the Recession of 2007–09. This disproportionate employment loss can be explained by head age and education level. Single mother households also became more dependent on government transfers than married households, a result which holds even after accounting for underlying demographic differences. Thus, the safety net increasingly reached single mother households in the Recession by supplying a greater proportion of their total income.

In conversation with existing literature, my study confirms research that single mothers had higher rates of unemployment than married mothers in the Recession (Eamon & Wu, 2013; Mattingly et al., 2011). My study also contextualizes research that the safety net lifted children from married households out of poverty more than those from single parent households in the Recession (Bitler et al., 2017). Although program expansions may not have targeted single mother households enough to additionally lift them over

the poverty line, the safety net provided an increasingly important source of income for single mother households as the Recession wore on.

My study recommends several policy actions. First, the disproportionate loss in employment of single mother households shows social policy was justified in expanding benefits to single mothers in the Recession. Single mother households can and should be targeted in economic downturn, whether directly or by targeting younger and lower-educated family heads. Finally, the limitations of my study underscore the necessity for further research. My focus on the metric of dependence rather than metrics of transfer income or consumption means my study could not directly measure how the safety net performed in meeting the needs of single mother households. A follow-up study should examine the consumption of single mother households in the Recession to more directly measure their well-being and create a template for addressing the needs of single mother households in the next economic downturn.

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A Recession and Single Mother Households

The following tables report the full results from the figures in Section 5 Results.

Table 5: Proportion Employed and Proportion in Labor Force Before and After Onset of Great Recession for Families with Children

	(1)	(2)	(3)	(4)
	Employed	Employed	ILF	ILF
Single Mother Head	-0.0844*** (0.0042)	-0.0405*** (0.0041)	-0.0489*** (0.0038)	-0.0207*** (0.0038)
Single Mother Head \times After	-0.0105* (0.0060)	-0.00780 (0.0058)	-0.00100 (0.0055)	0.00115 (0.0053)
YEAR=2005	0.807*** (0.0029)	0.418*** (0.0087)	0.834*** (0.0027)	0.542*** (0.0081)
YEAR=2006	0.811*** (0.0029)	0.419*** (0.0087)	0.834*** (0.0027)	0.541*** (0.0082)
YEAR=2007	0.809*** (0.0030)	0.415*** (0.0087)	0.837*** (0.0028)	0.542*** (0.0082)
YEAR=2008	0.779*** (0.0031)	0.384*** (0.0088)	0.834*** (0.0028)	0.537*** (0.0082)
YEAR=2009	0.775*** (0.0032)	0.379*** (0.0088)	0.835*** (0.0028)	0.538*** (0.0082)
YEAR=2010	0.769*** (0.0033)	0.372*** (0.0089)	0.826*** (0.0029)	0.529*** (0.0083)
Observations	166577	166577	166577	166577
R^2	0.772	0.781	0.822	0.827
Year-Fixed Effects?	Yes	Yes	Yes	Yes
Controls?		Yes		Yes
Married HH Mean, 2007	0.809	0.809	0.839	0.839

Notes: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. This table corresponds to Figure 1 and estimates model (1) for proportion employed and proportion in labor force. The sample is restricted to single mother and married households. Columns (2) and (4) include controls for age, education, and race-ethnicity. All regressions are weighted by household weights reflective of the U.S. population.

Table 6: Year-by-Year Estimates of Gap in Proportion Employed and Gap in Proportion in Labor Force for Married vs. Single Mother Households

	(1)	(2)
	Employed	ILF
YEAR=2005 × Single Mother Head	-0.0436*** (0.0070)	-0.0163** (0.0064)
YEAR=2006 × Single Mother Head	-0.0377*** (0.0070)	-0.0189*** (0.0066)
YEAR=2007 × Single Mother Head	-0.0403*** (0.0070)	-0.0271*** (0.0066)
YEAR=2008 × Single Mother Head	-0.0353*** (0.0074)	-0.0140** (0.0066)
YEAR=2009 × Single Mother Head	-0.0444*** (0.0073)	-0.0208*** (0.0065)
YEAR=2010 × Single Mother Head	-0.0648*** (0.0075)	-0.0239*** (0.0068)
YEAR=2005	0.419*** (0.0087)	0.541*** (0.0082)
YEAR=2006	0.418*** (0.0088)	0.540*** (0.0082)
YEAR=2007	0.415*** (0.0088)	0.544*** (0.0082)
YEAR=2008	0.381*** (0.0089)	0.536*** (0.0083)
YEAR=2009	0.378*** (0.0089)	0.538*** (0.0083)
YEAR=2010	0.376*** (0.0090)	0.530*** (0.0084)
Observations	166577	166577
R²	0.781	0.827

Notes: Standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01. This table corresponds to Figure 2 and estimates model (2) for proportion employed and proportion in labor force. The sample is restricted to single mother and married households. All regressions include controls for age, education, and race-ethnicity and are weighted by household weights reflective of the U.S. population.

Table 7: Year-by-Year Estimates of Gap in Dependence on Government Transfers for Married vs. Single Mother Households

	(1)	(2)
	Dependence	Dependence (Adjusted)
YEAR=2005 × Single Mother Head	0.184*** (0.0048)	0.193*** (0.0048)
YEAR=2006 × Single Mother Head	0.180*** (0.0047)	0.191*** (0.0048)
YEAR=2007 × Single Mother Head	0.168*** (0.0045)	0.180*** (0.0046)
YEAR=2008 × Single Mother Head	0.175*** (0.0047)	0.185*** (0.0048)
YEAR=2009 × Single Mother Head	0.194*** (0.0050)	0.203*** (0.0050)
YEAR=2010 × Single Mother Head	0.196*** (0.0051)	0.208*** (0.0051)
YEAR=2005	0.286*** (0.0049)	0.308*** (0.0050)
YEAR=2006	0.282*** (0.0049)	0.305*** (0.0050)
YEAR=2007	0.284*** (0.0049)	0.306*** (0.0050)
YEAR=2008	0.294*** (0.0050)	0.316*** (0.0050)
YEAR=2009	0.319*** (0.0051)	0.337*** (0.0051)
YEAR=2010	0.323*** (0.0051)	0.342*** (0.0052)
Observations	165283	165653
R^2	0.387	0.402

Notes: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. This table corresponds to Figure 4 and estimates model (2) for dependence, before and after adjusting for underreporting. The sample is restricted to single mother and married households. All regressions include controls for age, education, and race-ethnicity and are weighted by household weights reflective of the U.S. population.

B Underreporting Adjustment

The following tables verify the underreporting adjustment. Tables 8, 10, and 12 summarize the various steps of performing the underreporting adjustment for SNAP, TANF, and UI respectively. Tables 9, 11, and 13 compare the characteristics of self-reporting vs. newly assigned households (or individuals) for the same programs. Table 14 lists the percentage of single mother and married households who receive each government transfer in a given year, before and after adjusting the data.

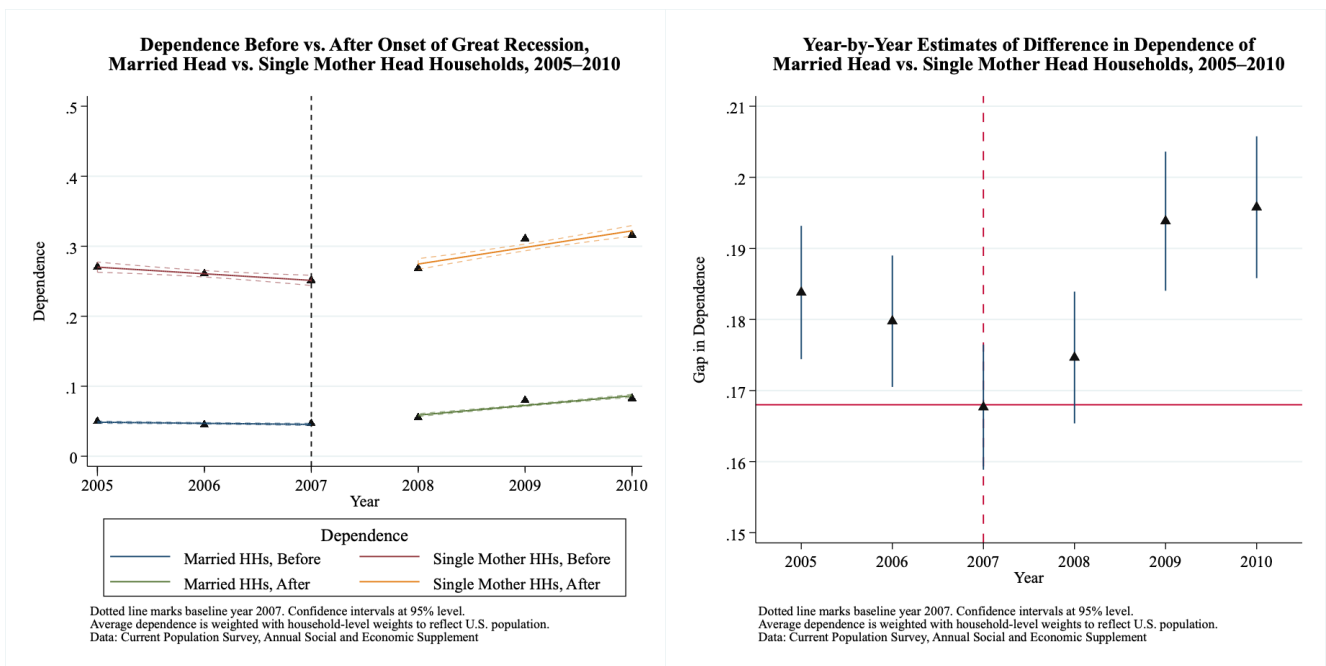
Meanwhile, Figures 5a and 5b are versions of the figures on dependence, but performed on adjusted data. Comparing Figure 5a against Figure 3, the trends in dependence are almost indistinguishable with and without the adjustment. Likewise, comparing Figure 5b against Figure 4, the underreporting adjustment estimates a smaller gap in dependence of single mother and married households. However, the overall trend in gap in dependence remains the same. Overall, these figures show that while the adjustment likely produced more accurate dependence levels, it did not significantly alter the trends in dependence between single mother and married households.

Government Data Sources

As discussed in Section 4.2.1 [Underreporting Adjustment](#), the adjustment relies on “true” totals of recipients and dollars, for each of SNAP, TANF, and UI for each year in 2005–2010. I use as sources:

- *SNAP*: I access totals for both SNAP recipients and dollars from the appendix of Meyer et al. (2015b). Meyer et al. calculate recipient totals from the [Annual Reports to Congress on Indicators of Welfare Dependence](#) published by the U.S. Department of Health and Human Services. Meyer et al. calculate dollar totals from the [SNAP Data Tables](#) published by the U.S. Department of Agriculture.
- *TANF*: I access totals for both TANF recipients and dollars from the appendix of Meyer et al. (2015b). Meyer et al. calculate these totals from the [State TANF Data Reports, Caseload and Financial Data](#), published annually by the U.S. Department of Health and Human Services.

- *UI*: I access totals for UI dollars from the appendix of Meyer et al. (2015b). Meyer et al. calculate these total dollars from various online data tools maintained by the U.S. Department of Labor. I calculate totals for UI recipients using the [ET Financial Data Handbook](#) maintained by the U.S. Department of Labor. Specifically, for each year of 2005–2010, I sum the number of first payments for three UI programs—Federal-State Extended Benefits, Federal Extended Programs, and Taxable and Reimbursible Claims Data—across all states. These are the same three programs Meyer et al. (2015b) used to calculate total UI dollars.



(a) Before vs. After Onset of Recession (No Controls)

(b) Year-by-Year Gap (Controls)

Figure 5: Dependence on Government Transfers, Single Mother vs. Married Households, Before and After Onset of Great Recession (Non-Adjusted Data).

Table 8: Verification of Underreporting Adjustment for SNAP in the Current Population Survey, 2005–2010

Year	Matching Recipients					Matching Dollars			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Recipient HHs, Administrative, MMS (thousands)	Recipient HHs, CPS (thousands)	Recipient HHs, after Imputation (thousands)	% Difference (After Imputation vs. Administrative)	Scaling Factor (θ)	Dollars, Administrative, MMS (million \$)	Dollars, CPS (million \$)	Dollars, after Imputation (million \$)	% Difference (After Imputation vs. Administrative)
2005	11,463	7,690	11,641	1.55%	0.696	29,540	16,132	29,540	0.00%
2006	11,570	7,282	11,687	1.01%	0.827	29,440	15,878	29,440	0.00%
2007	11,905	7,628	11,923	0.15%	0.796	30,988	16,905	30,988	0.00%
2008	13,160	9,064	13,172	0.09%	0.677	37,085	22,195	37,085	0.00%
2009	16,077	11,140	16,112	0.22%	0.690	54,711	32,589	54,711	0.00%
2010	19,298	12,855	19,295	-0.02%	0.747	66,559	37,505	66,559	0.00%

Notes: This table summarizes various steps of the underreporting adjustment for SNAP. Column (1) lists the number of SNAP recipient households according to administrative data and as listed in Meyer et al. (2015b). This is taken to represent the “true” number of SNAP recipient households. Column (2) sums households who self-report SNAP in the CPS. Column (3) lists the total SNAP recipient households after completing the adjustment (sum of self-reporting and newly assigned SNAP recipients households). In the last four columns, each of the newly assigned SNAP recipient households is assigned the same amount of SNAP dollars so that after the adjustment, the total dollars in the CPS matches the “true” dollars from Meyer et al. (2015b). The two % *Difference* columns verify that my imputation process closely matches the “true” values for both recipients and dollars.

Table 9: Characteristics of Self-Reported vs. Imputed SNAP Recipient Households

	Self-Reported	Imputed	Total
<i>Controls</i>			
% in 1st Quintile for Market Income	0.46	0.45	0.46
% in 2nd Quintile for Market Income	0.39	0.37	0.39
% with Less Than High School Education	0.33	0.30	0.32
% with High School Education	0.33	0.30	0.32
Mean Children in HH	1.23	0.86	1.11
Mean Children Under 5 in HH	0.47	0.30	0.42
% Black	0.29	0.23	0.27
% Hispanic White	0.17	0.16	0.17
Mean Age of Head	43.94	48.01	45.24
% Female Head	0.69	0.64	0.68
% Married Head	0.26	0.28	0.27
% Reported Other Program in CPS	0.81	0.74	0.79
<i>Characteristics of Interest</i>			
% Single Mother HH	0.31	0.19	0.27
% Married HH	0.17	0.16	0.17
Observations	56721		

Notes: This table compares the characteristics of self-reported SNAP recipient households with SNAP recipient households newly imputed in the underreporting adjustment. The sample includes all households that I believe receive SNAP after the adjustment. The Controls section includes the variables used to predict raw probabilities of receipt. All summary statistics in this table are weighted by household weights reflective of the U.S. population. Data is from the Current Population Survey, Annual Social and Economic Supplement.

Table 10: Verification of Underreporting Adjustment for TANF in the Current Population Survey, 2005–2010

Year	Matching Recipients					Matching Dollars			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Recipients, Administrative, MMS (thousands)	Recipients, CPS (thousands)	Recipients, after Imputation (thousands)	% Difference (After Imputation vs. Administrative)	Scaling Factor (θ)	Dollars, Administrative, MMS (million \$)	Dollars, CPS (million \$)	Dollars, after Imputation (million \$)	% Difference (After Imputation vs. Administrative)
2005	2,042	1,562	2,079	1.82%	0.328	10,531	5,213	10,531	0.00%
2006	1,890	1,242	1,903	0.71%	0.556	9,708	4,343	9,695	-0.13%
2007	1,715	1,183	1,736	1.19%	0.468	8,999	3,932	8,968	-0.35%
2008	1,688	1,257	1,684	-0.24%	0.356	8,818	4,364	8,799	-0.22%
2009	1,824	1,370	1,809	-0.80%	0.348	9,668	4,771	9,668	0.00%
2010	1,903	1,461	1,884	-0.99%	0.320	10,425	5,447	10,425	0.00%

Notes: This table summarizes various steps of the underreporting adjustment for TANF. Column (1) lists the number of TANF recipients according to administrative data and as listed in Meyer et al. (2015b). This is taken to represent the “true” number of TANF recipients. Column (2) sums individuals who self-report TANF in the CPS. Column (3) lists the total TANF recipients after completing the adjustment (sum of self-reporting and newly assigned TANF recipients). In the last four columns, each of the newly assigned TANF recipients is assigned the same amount of TANF dollars so that after the adjustment, the total dollars in the CPS matches the “true” dollars from Meyer et al. (2015b). The two % *Difference* columns verify that my imputation process closely matches the “true” values for both recipients and dollars.

Table 11: Characteristics of Self-Reported vs. Imputed TANF Recipients

	Self-Reported	Imputed	Total
<i>Controls</i>			
% in 1st Quartile for Market Income	0.57	0.56	0.57
% in 2nd Quartile for Market Income	0.01	0.01	0.01
% with Less Than High School Education	0.39	0.36	0.38
% with High School Education	0.39	0.36	0.38
Mean Children in HH	1.70	1.68	1.70
Mean Children Under 5 in HH	0.58	0.54	0.57
% Black	0.35	0.38	0.36
% Hispanic White	0.20	0.16	0.19
Mean Age of Head	33.53	34.62	33.83
% Female Head	0.87	0.85	0.86
% Married Head	0.20	0.21	0.20
% Reported Other Program in CPS	0.79	0.79	0.79
<i>Characteristics of Interest</i>			
% Single Mother Head	0.47	0.29	0.42
% in Single Mother HH	0.53	0.39	0.49
% Married Head	0.09	0.08	0.08
% in Married HH	0.18	0.25	0.20
Observations	8197		

Notes: This table compares the characteristics of self-reported TANF recipients with TANF recipients newly imputed in the underreporting adjustment. The sample includes all individuals that I believe receive TANF after the adjustment. The Controls section includes the variables used to predict raw probabilities of receipt. All summary statistics in this table are weighted by individual weights reflective of the U.S. population. Data is from the Current Population Survey, Annual Social and Economic Supplement.

Table 12: Verification of Underreporting Adjustment for UI in the Current Population Survey, 2005–2010

Year	Matching Recipients					Matching Dollars			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Recipients, Administrative, DOL (thousands)	Recipients, CPS (thousands)	Recipients, after Imputation (thousands)	% Difference (After Imputation vs. Administrative)	Scaling Factor (θ)	Dollars, Administrative, DOL (million \$)	Dollars, CPS (million \$)	Dollars, after Imputation (million \$)	% Difference (After Imputation vs. Administrative)
2005	7,917	5,816	7,921	0.04%	0.3876	33,320	22,300	33,300	-0.06%
2006	7,351	5,227	7,386	0.49%	0.4325	31,500	20,700	31,500	0.00%
2007	7,643	5,200	7,709	0.87%	0.4903	34,010	21,900	34,000	-0.03%
2008	12,636	8,067	12,679	0.34%	0.6202	52,330	38,900	52,300	-0.06%
2009	20,715	12,883	20,687	-0.13%	0.6817	151,800	98,700	152,000	0.13%
2010	16,187	12,423	16,026	-0.99%	0.3382	148,500	97,200	148,000	-0.34%

Notes: This table summarizes various steps of the underreporting adjustment for UI. Column (1) lists the number of UI recipients according to administrative data on the U.S. Department of Labor website. This is taken to represent the “true” number of UI recipients. Column (2) sums individuals who self-report UI in the CPS. Column (3) lists the total UI recipients after completing the adjustment (sum of self-reporting and newly assigned UI recipients). In the last four columns, each of the newly assigned UI recipients is assigned the same amount of UI dollars so that after the adjustment, the total dollars in the CPS matches the “true” dollars from Meyer et al. (2015b). The two % *Difference* columns verify that my imputation process closely matches the “true” values for both recipients and dollars.

Table 13: Characteristics of Self-Reported vs. Imputed UI Recipients

	Self-Reported	Imputed	Total
<i>Controls</i>			
% in 1st Quartile for Market Income	0.13	0.12	0.13
% in 2nd Quartile for Market Income	0.01	0.00	0.01
% with Less Than High School Education	0.12	0.12	0.12
% with High School Education	0.12	0.12	0.12
Mean Children in HH	0.86	0.87	0.86
Mean Children Under 5 in HH	0.18	0.18	0.18
% Black	0.14	0.15	0.14
% Hispanic White	0.12	0.13	0.12
Mean Age of Head	42.58	43.39	42.84
% Female Head	0.39	0.40	0.40
% Married Head	0.51	0.51	0.51
% Reported Other Program in CPS	0.17	0.19	0.18
<i>Characteristics of Interest</i>			
% Single Mother Head	0.06	0.04	0.05
% in Single Mother HH	0.09	0.07	0.08
% Married Head	0.14	0.12	0.13
% in Married HH	0.27	0.30	0.28
Observations	47905		

Notes: This table compares the characteristics of self-reported UI recipients with UI recipients newly imputed in the underreporting adjustment. The sample includes all individuals that I believe receive UI after the adjustment. The Controls section includes the variables used to predict raw probabilities of receipt. All summary statistics in this table are weighted by individual weights reflective of the U.S. population. Data is from the Current Population Survey, Annual Social and Economic Supplement.

Table 14: Percent of U.S. Households of Single Mother vs. Married Households Receiving Various Government Transfers, 2005 vs. 2010

Demographic Group	TANF		SNAP		OASI		SSI		UI		WIC		Households (thousands)	
	2005	2010	2005	2010	2005	2010	2005	2010	2005	2010	2005	2010	2005	2010
<i>Panel A: Self-Reported</i>														
Single Mother Households	9.32%	7.59%	30.30%	39.02%	5.94%	6.06%	6.81%	6.46%	6.16%	12.33%	15.07%	15.20%	8,467	8,863
Married Households	0.94%	1.14%	4.81%	9.96%	2.66%	2.50%	1.55%	1.86%	5.79%	12.20%	6.01%	6.55%	26,340	24,552
<i>Panel B: Post-Imputation</i>														
Single Mother Households	11.82%	9.52%	38.92%	50.34%					7.90%	15.19%				
Married Households	1.38%	1.70%	7.05%	14.35%					8.09%	15.81%				

Notes: This table lists the percentage of single mother households and married households that receive relevant U.S. transfers in 2005 vs. 2010. Panel A is for the raw CPS, while Panel B is after applying the underreporting adjustment. The adjustment assigns additional benefits to both single mother and married households. Data is from the Current Population Survey, Annual Social and Economic Supplement.

C Income

The following three figures run models (1) and (2) on household market income, government transfer income, and total income for single mother vs. married households. These variables, which were used in calculating dependence, further illustrate how work and welfare evolved for single mother as opposed to married households from 2005–2010.

The pooled version of Figure 7a provides suggestive evidence against the identifying assumption for DID that in the absence of the Recession, single mother and married households would have followed parallel trends in dollars of transfer income. Thus, I turn my attention to the year-by-year graphs.



Figure 6: Market Income, Single Mother vs. Married Households, Before and After Onset of Great Recession.

Figure 6b shows that in 2008, the gap in market income between single mother and married households was slightly (about \$1,000) but *insignificantly* smaller than in 2007. Meanwhile, Figure 7b shows that during the Recession, the gap in transfer income of single mother and married households was significantly greater than in 2007, especially for 2009 and 2010. (In 2009, single mother households were estimated to receive an additional \$500 over married households than in 2007.) Together, these figures reveal that my result that single mothers were additionally dependent on the safety net during the

Recession was likely driven by differentially greater government transfers to single mother households rather than differential loss of market income.

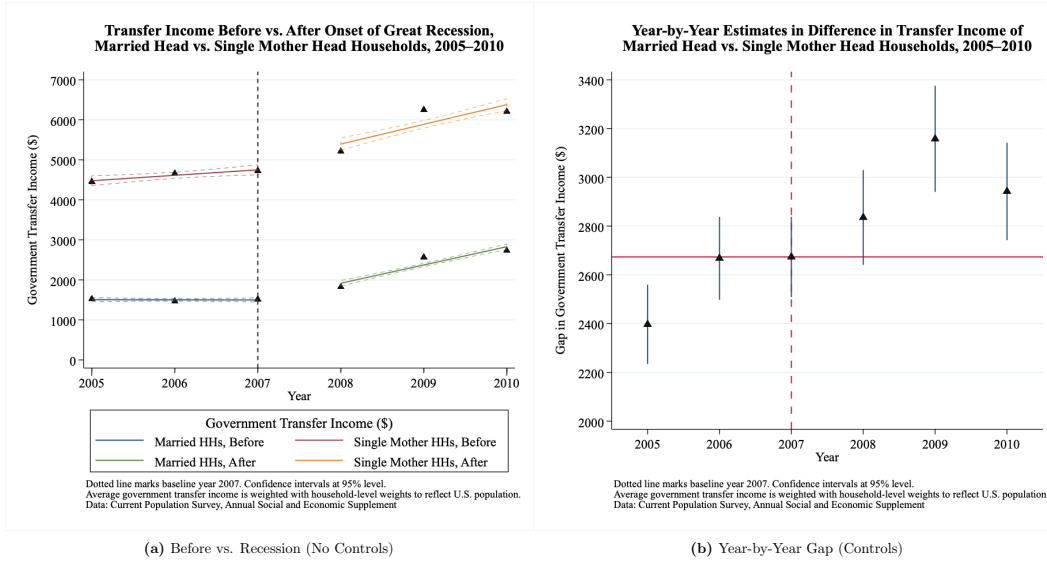


Figure 7: Government Transfer Income, Single Mother vs. Married Households, Before and After Onset of Great Recession (Adjusted Data).

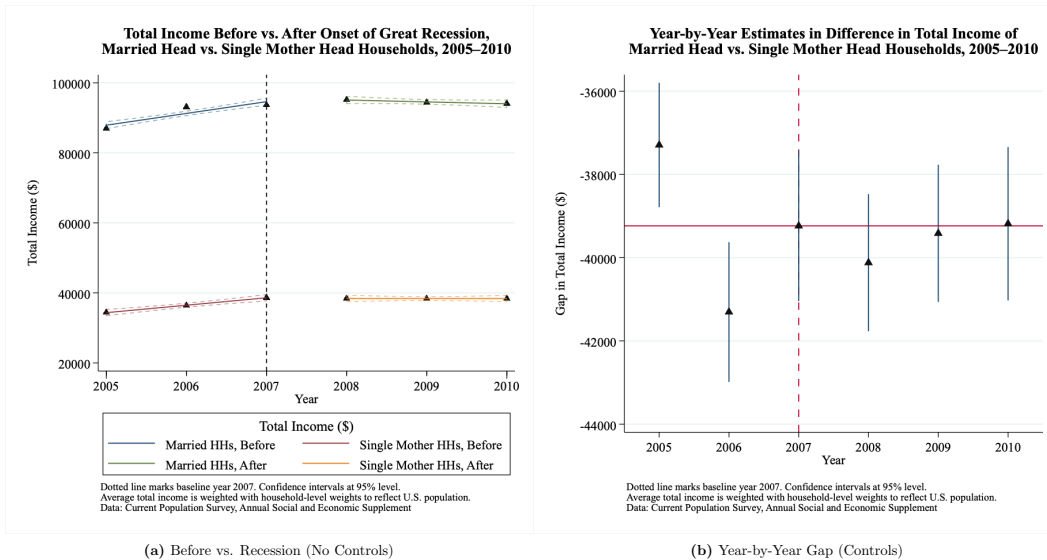


Figure 8: Total Income, Single Mother vs. Married Households, Before and After Onset of Great Recession (Adjusted Data).

D Spousal Employment

The following two figures examine how the Recession impacted the employment status of single mothers as compared to the employment status of *either* the head or spouse of a married household. Together, the figures explore how single mother households might experience employment loss differently given that they are also single heads of household.

Consider an “employed household” one where either the head or spouse (if present) is employed. Using the metric of “employed household” (Appendix Figure 9a) rather than employed head (Figure 1a) produces a much higher gap in employment before the Recession (16 pps higher, at over 96% households employed). However, not only is there a greater pre-existing employment gap between single mother and married households, the Recession also exacerbates the gap more than in the “employed head” metric. Comparing Appendix Figure 9b against Figure 1b finds that in 2010, using the “employed household” metric, single mother households differentially lost employment 0.04 pps more, compared to 0.02 pps more for the “employed head” metric. Yet, there is no evidence that the labor force participation of households changed (Figure 10b). Overall, these analyses suggest that in the Recession, single mother households may have experienced the loss of all sources of earned income differentially more than married households did. (However, this does not necessarily translate to single mothers being more impacted, as married households can also be very impacted by the loss of one income.)

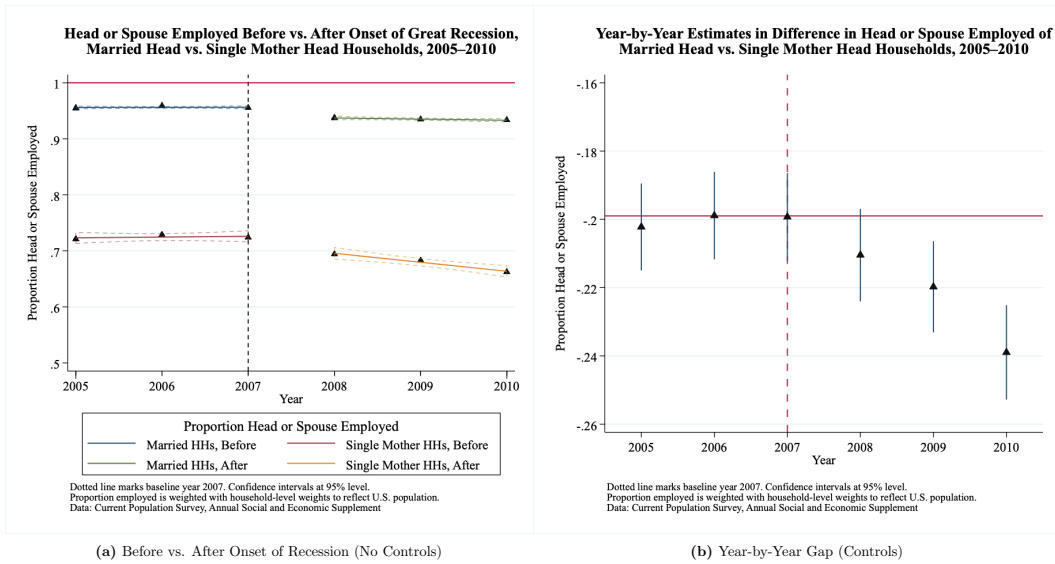


Figure 9: Head or Spouse Employed, Single Mother vs. Married Households, Before and After Onset of Great Recession.

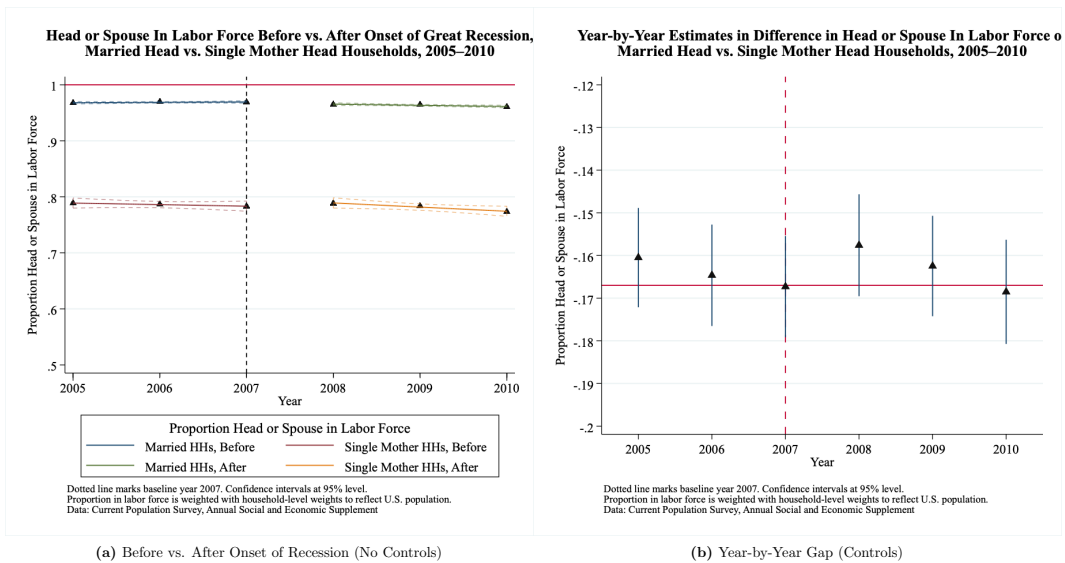


Figure 10: Head or Spouse In Labor Force, Single Mother vs. Married Households, Before and After Onset of Great Recession.