The Impact of Austerity on Gender Inequality in Time Allocation in the United States

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Abstract

The Great Recession of 2007-2009 caused large declines in state revenues which prompted many states to implement austerity measures to meet their balanced budget requirements. Decreases in public spending can have heterogeneous gender effects due to existing inequalities in time allocated for unpaid work. In this paper, I combine data from the American Time Use Survey for 2005-2015 and the State and Local Expenditures database to investigate the relationship between decreases in state education spending and time spent on child care. My analysis utilizes an event study approach to compare changes in time allocated for childcare activities by adults residing in states with and without spending reductions on K-12 and early education programs. Prior to the decreases in education spending, I find that time spent on childcare activities across austerity and non-austerity states trended similarly. However, in the years following the spending cuts, residents of austerity states were spending more time on child care relative to residents of non-austerity states. The increase in child care in austerity states was unevenly distributed across genders. Men were allocating 1.8 additional hours weekly while women were allocating 3 additional hours weekly to child care. I further document long-lasting implications for gender equality: effects on the gender gap in childcare time persist even six years after the initial reduction in education spending. My findings suggest the need for gender budgeting at all stages of the fiscal budget cycle so that governments can pursue both economic and social goals even during times of crisis.

1   Introduction

The economic downturn caused by the Global Financial Crisis and the subsequent recession led to one of the steepest recorded declines in state revenues in US history (McNichol et al., 2010). This coincided with a period of increased demand for government services, thus resulting in large budget shortfalls amounting to \$430 billion between FY09-FY11 (Johnson et al., 2011; Albelda, 2014). Since states have legal or constitutional requirements to balance their budgets[1], this meant that the budget shortfalls had to be addressed either through an increase in taxes or fees, or through spending cuts. Despite receiving federal aid through the American Recovery and Reinvestment Act (ARRA), several states had to reduce funding for crucial services such as healthcare, K-12 education, and higher education among others. Many state governments also reduced the size of their workforce through measures such as furloughs and pay cuts for some state employees (McNichol et al., 2010; Johnson et al., 2011).

The implementation of austerity policies and their ability to lead to an economic recovery has been at the center of numerous debates (Okeke et al., 2021). One of the key areas of contention is the consequence of austerity policies that rely on public spending cuts. Some empirical studies on the compositional effects of austerity offer evidence that expenditure-based adjustments are more effective in reducing government deficit and debt levels relative to tax-based adjustments (Mulas-Granados, 2005; Alesina and Ardagna, 2010; Alesina et al., 2019). However, others find that the composition of austerity policies has a limited impact on public debt relative to GDP (Blanchard and Leigh, 2013). Research on the distributional effects of austerity also shows that expenditure-based adjustments worsen income inequality by increasing long-term unemployment and reducing labor's share of national income (Ball et al., 2013; Woo et al., 2013; Bova et al., 2018). In this paper, I investigate a different channel through which expenditure-based austerity packages can impact inequality – the gendered distribution of unpaid work.

Macroeconomic shocks can have asymmetric gender effects due to differences in the allocation of time for paid and unpaid work. For example, during the COVID-19 pandemic, women took up a larger share of the increased unpaid work that arose due to school closures (Farré et al., 2020; Collins et al., 2021; Giurge et al., 2021; Xue and McMunn, 2021). Women were also more likely than men to reduce their hours of paid work to accommodate the additional time spent on child care and domestic work (Kashen et al., 2020). Such inequalities in time distribution can have long-term implications for women's employment rates, workforce participation and earnings. The reduction in size of the public and social sectors can impose additional burdens on women as they are often the largest users of their services (Elomäki, 2012). Thus, state responses to economic downturns can have strong repercussions for trends in female labor market outcomes. Furthermore, the decline

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[1] Vermont is an exception.

in public provisioning of care services could inhibit their ability to join the formal labor market (Glasmeier and Lee-Chuvala, 2011; Albelda, 2014; Périvier, 2018).

The key question that I address in this paper is whether austerity measures introduced by states following the Great Recession of 2007-2009 led to an increase in gender inequality in time allocated for unpaid childcare activities. My findings illustrate that austerity policies placed steep costs on women by worsening existing gender gaps in the distribution of child care. To arrive at these results, I combine information on individual time diaries from the American Time Use Survey (ATUS) with data on state fiscal spending. I focus specifically on austerity episodes that involved a decrease in spending on K-12 and early education programs as a decline in the availability of these services has a direct impact on the amount of child care that households are required to perform. Between 2008-2013, 42 states reduced their spending on K-12 and early education programs in response to falling revenues during the Great Recession. These spending cuts ranged from 0.19 percent to 10.84 percent of state education budgets. Since a significant percentage of total education expenditures come from state funds, these state-level spending cuts can have large consequences for local school districts which are limited in their ability to raise revenues to cover lost state funding. As a result, school districts were compelled to implement measures such as reducing the length of the school year, canceling summer programs, and limiting funding for preschool programs (Oliff and Leachman, 2011). Such policies place greater childcare responsibilities on households and can impact how they distribute time for unpaid work.

My identification strategy utilizes the variation in state implementation of education spending cuts as well as differences in their timing to compare changes in time spent on child care across states that enacted austerity measures and states that did not. Next, I analyze whether the increase in childcare time in austerity states was unevenly distributed across genders. The staggered adoption of education spending cuts across states raises the possibility that the effect of austerity measures on the treated states may vary over time. In such a scenario, the difference-in-differences (DiD) estimator with two-way fixed effects (TWFE) can lead to biased estimates of the treatment effect (Chaisemartin and D'Haultfœuille, 2020; Goodman-Bacon, 2021; Sun and Abraham, 2021). To overcome the biases of the TWFE-DiD estimator, my empirical strategy utilizes the interaction-weighted estimator proposed by Sun and Abraham (2021).

My analysis shows that decreases in spending on K-12 and early education programs increased the amount of time that residents of austerity states were allocating toward daily childcare activities. Prior to the introduction of these spending cuts, time spent on child care was trending similarly for residents of austerity states and residents of non-austerity states. However, these patterns diverged after the decrease in state spending on K-12 and early education programs. Residents of austerity

states were spending an average of 1.2 hours more weekly on childcare activities relative to residents of non-austerity states.

A breakdown of the overall effect reveals that while both men and women in austerity states raised their weekly childcare hours relative to their counterparts in non-austerity states, women assumed a larger share of the increased childcare responsibilities. I find that the decreases in education spending raised men's weekly childcare time by 1.8 hours and women's childcare time by 3 hours. Based on these estimates, austerity policies would have cost about $2,400 annually for men and about $3,800 annually for women. Furthermore, these policies had long-lasting implications for the distribution of unpaid work through its persistent effect on the gender gap in childcare hours. My findings show that the gender gap in child care kept rising even six years after the initial implementation of education spending cuts.

My paper contributes to several strands of literature. First, this paper adds to the emerging literature that empirically analyzes the changing patterns of time use during economic crises. Economic hardships caused by recessionary periods can lead to greater reliance on household production as was observed both during the Global Financial Crisis and the recent COVID-19 pandemic (Aguiar et al., 2013; Berik and Kongar, 2013; Bridgman et al., 2022). This area of research also shows that time spent on both routine household work as well as child care can respond to short-term economic incentives which may overpower pre-existing patterns of gender norms (Gorsuch, 2016; Davis and Greenstein, 2020). These studies analyze the extent to which unpaid work may substitute for the loss of paid work during economic slumps. My research contributes to this area of the literature by studying how unpaid work responds to a decline in public provisioning of services.

Second, this paper advances the literature on the gendered effects of the Global Financial Crisis. This strand of research challenges the prevailing notion that the Global Financial Crisis led to a 'he-cession' and shows that while men may have lost more jobs than women in the early years of the crisis, women's employment rates experienced a more lackluster recovery (Elder, 2010; Poinasamy, 2013; Albelda, 2014). These studies find that the convergence in US unemployment rates that occurred post-crisis could largely be attributed to a fall in men's unemployment levels as women's unemployment remained similar to the early-crisis period. This was due to stimulus policies that primarily targeted male-dominated industries and sectors, the loss of government jobs due to fiscal austerity, and the continued loss of employment in the financial, trade, and manufacturing sectors. This paper adds to existing scholarship by analyzing the impact of policy responses to the Global Financial Crisis on non-labor market outcomes in the United States.

Finally, my paper also contributes to the literature on child penalties[2]. Research on the impact of government policies such as transfers, parental leave, and childcare provisions has found mixed results on their effect on gender gaps in labor market outcomes (Olivetti and Petrongolo, 2017). While there is evidence that public spending on early childhood programs alleviates gender disparities, greater emphasis is usually placed on the role of prevailing gender norms and culture in determining child penalties incurred by women (Kleven et al., 2019). My paper contributes to this growing literature by exploring a converse argument – can a decline in public provisioning of child care impact child penalties?

From a policy perspective, the findings of this paper support the need for gender-responsive budgeting practices, i.e., the use of fiscal policies and administration to promote greater gender equality (Stotsky, 2016). Gender budgeting recognizes that government budgets are not gender neutral and as such, requires an analysis of fiscal policies and budgetary decisions to understand their intended as well as unintended effects on gender equality. Despite widespread acknowledgment of the need for policies to be evaluated through a gender-sensitive lens, practical implementation has been limited in scope (Alonso-Albarran et al., 2021). A key explanatory factor behind the existing gender gaps in the labor market is the difference in hours spent on paid work (Ferrant et al., 2014; Buckman et al., 2021). If fiscal policies increase the burden of unpaid work that women have to undertake, it reduces their availability for paid employment opportunities. This can worsen gender gaps in labor market outcomes. By incorporating gender budgeting practices in all stages of the policymaking process, governments can utilize targeted fiscal measures to address both economic and social goals even during times of crisis[3].

The rest of this paper is organized as follows. Section 2 describes the sources used to compile the dataset for this paper. Section 3 outlines the empirical strategy used for analysis. Section 4 and Section 5 explain the findings and perform robustness checks of the key results. Section 6 concludes.

2 Data

I combine micro-data from two large-scale surveys to carry out the analysis in this paper. My dataset spans from 2005-2015. As the implementation of austerity policies occurred between 2008 and 2013, the time period included in my dataset allows me to analyze outcomes both prior to and following the public spending cuts. My observations come from a repeated cross-section of individuals.

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[2] The child penalty literature highlights the role of children in explaining persistent gaps in labor market outcomes. A key finding of these studies is that women with children experience a wage penalty compared to men (Angelov et al., 2016; Kleven et al., 2019).

[3] See Quinn (2009) and Downes and Nicol (2020) for a framework to practically implement gender budgeting.

2.1 Education spending

I collect annual data on state education spending from the Urban Institute's State and Local Expenditures database. This database compiles information from the US Census Bureau's Annual Survey of State and Local Government Finances. The survey provides a comprehensive source of information on revenues and expenditures of state as well as local governments. A census is conducted every five years while a sample of states and local governments is selected to collect information for the intervening years.

Figure 1 summarizes the trends in the implementation of spending cuts on K-12 and early education programs across states during and after the Great Recession. For each state, I identify the first instance of a decrease in education spending following the start of the Great Recession as an austerity event[4]. I exclude Maine, Michigan, South Dakota, and Washington DC from my analysis

Figure 1: No. of states implementing austerity each year
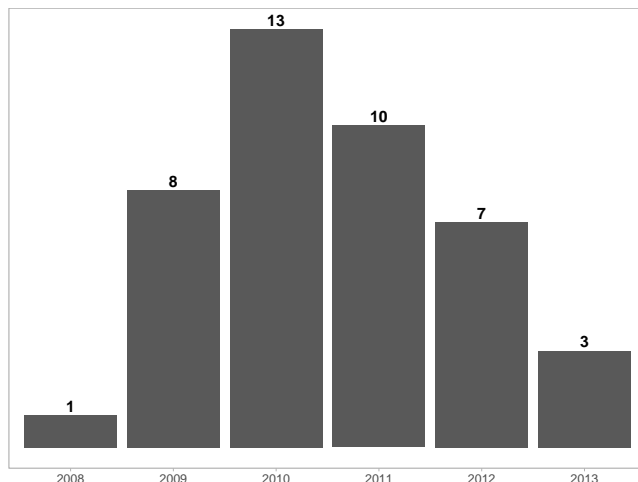
Sources: Author's calculations based on data from the Urban
Institute's State and Local Expenditures database.

as these areas reduced education spending prior to the onset of the Great Recession. The state governments of Iowa, Massachusetts, Nebraska, North Dakota, and Rhode Island did not decrease expenditures on K-12 and early education programs during the years covered in my sample.

A vast majority of states adopted such austerity policies between 2010-2013 which coincided with the time period when federal aid to states began to phase out. On average, the initial decrease in education spending in my sample was 3.87 percent, and these spending declines ranged from 0.19 percent to 10.84 percent.

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[4] Refer to Table A1 for the full list of austerity episodes.

2.2 Time use and demographic characteristics

Annual data on time use and demographic variables were gathered from the American Time Use Survey (ATUS). I pooled 11 cross-sections (2005-2015) using the IPUMS ATUS extract builder that contained a total of 136,149 respondents (Hofferth et al., 2020). The ATUS is a nationally-representative sample sponsored by the Bureau of Labor Statistics (BLS) that focuses on how Americans spend their time. Participants of this survey are sampled from the subset of households that have completed their eighth month of interviews for the Current Population Survey (CPS). Survey respondents are asked to report their activities from the previous day in detailed time intervals. In addition to individual time diaries, the ATUS also contains demographic information such as sex, age, employment status, etc.

2.3 Sample construction

From my initial sample of 136,149 respondents, I retain observations for individuals who reported performing child care. This allows me to capture the childcare responsibilities of parents, other family members, and non-relatives. I define childcare responsibilities to include primary child care of household and non-household children[5] as well as travel time associated with such care work. From the remaining respondents, I retain observations for individuals between the ages of 18-64 who are not enrolled in high school, college, or university. Finally, I exclude individuals residing in Maine, Michigan, South Dakota, and Washington DC from my sample[6]. My final sample comprises data on childcare activities performed by 34,555 individuals.

2.4 Trends in time use

Figure 2 compares the average time spent by men and women on childcare activities in austerity states and non-austerity states following the decreases in spending on K-12 and early education programs. Across both groups of states, women spent more time than their male counterparts on child care. These gaps are a reflection of traditional gender norms that prevail despite trends toward greater sharing of care responsibilities (Pew Research Center, 2013; Pailhé et al., 2021).
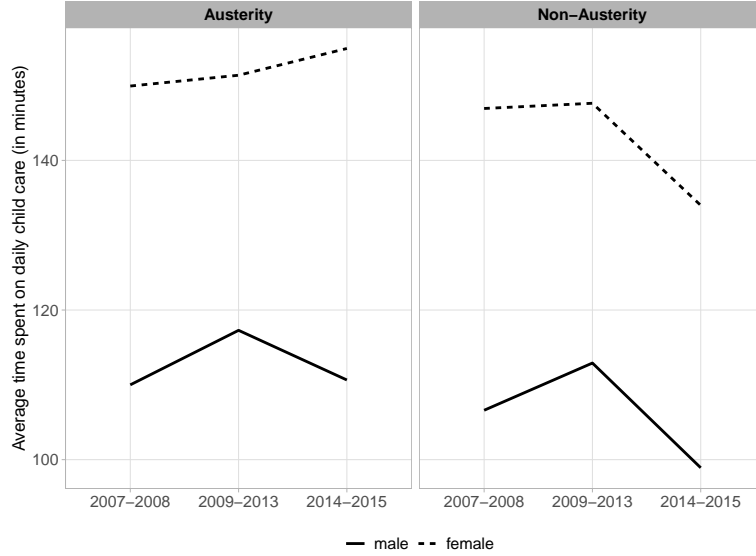
Men in both austerity and non-austerity states increased their average childcare time following the Great Recession. This was an outcome of high male unemployment rates during this period which led to the substitution of lost hours of paid employment with activities such as child care, domestic work, and personal care. However, this increase in average childcare time is temporary. By the end of the time period covered in my sample, men in both austerity and non-austerity states returned to

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[5] Primary child care refers to time periods when child care is performed as the main activity. Examples of activities include reading, playing, and talking with children.

[6] As mentioned previously, these areas are excluded as they introduced education spending cuts immediately before the Great Recession.

Figure 2: Average time spent on daily childcare activities

spending similar (or even lesser) amounts of time on child care as in the early years of the recession.

On the other hand, there is a divergence in the patterns of time spent on childcare activities by women across the two groups of states. Following the onset of the Great Recession, the average amount of time spent on child care does increase slightly for women in both austerity and non-austerity states. This pattern is reversed by 2014-2015 in states that did not reduce spending on education. Similar to their male counterparts, women in non-austerity states were spending lesser time on child care than at the onset of the recession. However, women in austerity states continued to face an increase in their average childcare time.

The patterns displayed in Figure 2 indicate that in austerity states, there was an increasing tendency in the amount of child care performed by women relative to men. This exacerbated existing gender inequalities in time spent on child care. A similar trend was not evident in non-austerity states where the gender gap in child care actually reduced slightly by 2014-2015.

3 Empirical Strategy

The implementation of education spending cuts during the Great Recession took place in a staggered fashion with most of the spending decreases concentrated between 2010-2013. Recent econometric literature has found that when policy adoption is staggered and there exists heterogeneity in treat-

ment effects within-unit over time or between groups of units treated at different times, two-period DiD estimators can assign negative weights on the average treatment effects for certain groups (Chaisemartin and D'Haultfœuille, 2020; Goodman-Bacon, 2021). This issue is not resolved even when the two-period specification is modified to an event study with leads and lags of the treatment variable as the TWFE estimates of the coefficients of the lead and lag terms could be biased by information from other periods (Sun and Abraham, 2021).

To address these biases, I use the interaction-weighted estimator proposed by Sun and Abraham (2021) to analyze the effect of decreases in education spending on time allocated for childcare activities across genders. I implement this estimator in an event study framework which includes six lead periods to compare trends in childcare time prior to spending cuts and six lag periods to study post-treatment effects[7]. Calculation of the interaction-weighted estimator involves three steps: (i) estimating the cohort-specific average treatment effect on the treated (CATT); (ii) calculating the weights, $Pr(E_{i,s} = e)$, by using the sample share of each treatment cohort in that time period; (iii) obtaining a weighted average of the CATT estimated in step (i) using the weights calculated in step (ii).

Reported standard errors for all analyses are robust to heteroskedasticity and are clustered by state, the level at which the treatment is assigned. This accounts for the possibility that changes in childcare time may be correlated within a state. ATUS survey weights are used in all estimations.

3.1 Impact on childcare hours in austerity states

I first evaluate whether the decreases in spending on K-12 and early education programs impacted the time spent on child care by individuals in austerity states. To do so, I estimate the following equation to obtain the CATT.

$$childcare_{i,s,t} = \alpha_s + \lambda_t + \sum_{e \notin Control} \sum_{\substack{l=-6 \\ l \neq -1}}^{6} \beta_{e,l}(\mathbf{1}\{E_{i,s} = e\}austerity_s^l) + \epsilon_{i,s,t} \tag{1}$$

As described earlier, my dataset is constructed at the individual *(i)* by year *(t)* level. Each individual reports their state of residence *(s)* when responding to the ATUS. In my analysis, $childcare_{i,s,t}$ is the amount of time that an individual spends daily on primary child care for household and non-household children as well as on travel associated with such care work. α_s denotes state fixed effects and λ_t denotes year fixed effects.

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[7] Leads prior to six years from the treatment year and lags beyond six years post-treatment are binned with the extreme periods as these values are available for a limited number of observations in the sample.

The variable $austerity_s$ equals 1 if individual i was living in a state that reduced spending on K-12 and early education programs, and 0 otherwise. e is an index of the treatment cohorts, where a cohort refers to all states that reduced spending in the same year. The $Control$ group consists of the five states that did not decrease spending on K-12 and early education programs. Indicator variables $\mathbf{1}\{E_{i,s} = e\}$ measure whether an observation belongs to treatment cohort e. While most states implemented austerity measures between 2010-2013, some states introduced spending cuts in 2008 or 2009. The omitted category is $l = -1$, the year prior to the implementation of education spending cuts. Therefore, each estimate $\beta_{e,l}$ provides the change in time spent on child care in austerity states relative to non-austerity states during year l, as measured from the year immediately prior to the introduction of education spending cuts. If time spent on child care in austerity and non-austerity states was trending similarly prior to the implementation of spending cuts on K-12 and early education programs, I expect that estimated coefficients associated with event times $l = -6$ to $l = -2$ will be small and not statistically significant. I estimate equation (1) and obtain the interaction-weighted estimator following the steps outlined above.

3.2 Impact on the gender gap in childcare hours within austerity states

To analyze whether decreases in education spending had heterogeneous effects on the time allocated for child care by men and women in austerity states, I estimate the following equation.

$$
\begin{aligned}
childcare_{i,s,t} = \alpha_s + \lambda_t + & \sum_{e \notin Control} \sum_{\substack{l=-6 \\ l \neq -1}}^{6} \beta_{e,l}(\mathbf{1}\{E_{i,s} = e\}austerity_s^l) \\
+ & \sum_{e \notin Control} \sum_{\substack{l=-6 \\ l \neq -1}}^{6} \delta_{e,l}(\mathbf{1}\{E_{i,s} = e\}austerity_s^l * female_{i,s,t}) \\
+ & female_{i,s,t} + \epsilon_{i,s,t}
\end{aligned}
\tag{2}
$$

Equation (2) is a modification of equation (1) and as such, the variable descriptions remain unchanged. $female_{i,s,t}$ equals 1 if the respondent is female, and 0 otherwise. Here, the estimated coefficients of the interaction term, $\delta_{e,l}$, measure the effect of interest i.e., change in time spent on childcare activities by women residing in austerity states relative to men residing in austerity states in the six years before and six years after the decrease in education spending, as compared with the year immediately prior to the decrease. If time spent on child care by men and women in austerity states was trending similarly prior to the implementation of spending cuts on K-12 and early education programs, I expect that estimated coefficients associated with event times $l = -6$ to $l = -2$ will be small and not statistically significant.

4 Results

4.1 Child care in austerity states

I first estimate the impact of spending declines on K-12 and early education programs on the amount of time individuals spend on childcare activities. Using the regression specification outlined in equation (1), I show that individuals residing in austerity states were allocating more time to child care relative to individuals residing in non-austerity states. The results of this estimation are presented in Figure 3.

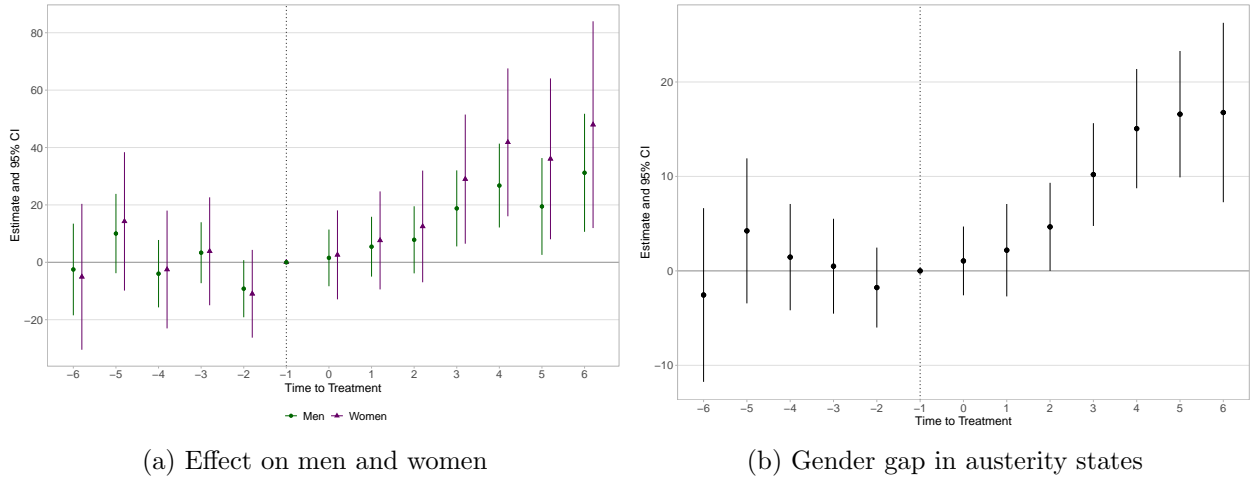Figure 3: Effect of decreases in education spending on daily childcare time
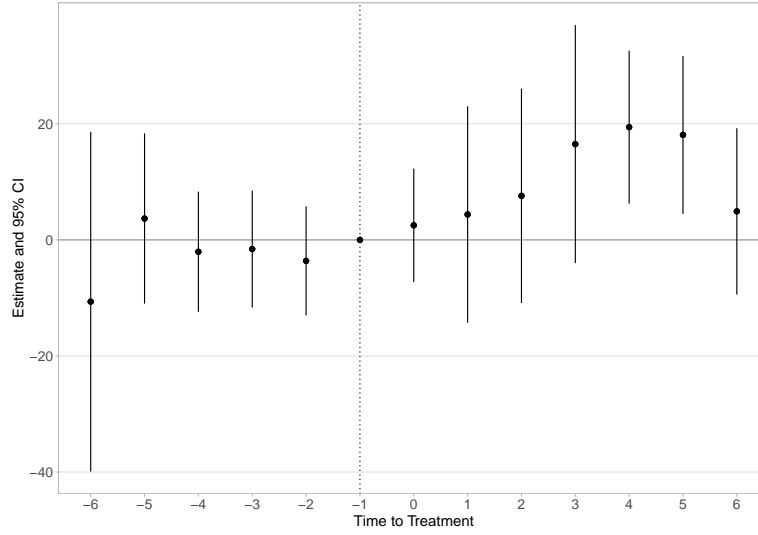
Notes: This figure reports coefficients from the estimation of equation (1). The coefficients represent the change in time spent on daily child care for residents of austerity states relative to residents of non-austerity states in the six years before and six years after the decrease in education spending, as compared with the year immediately prior to the decrease. Standard errors are robust to heteroskedasticity and serial correlation at the state level. ATUS survey weights are used in the estimation.

The estimates of the six leading periods are not statistically significant which indicates that prior to the implementation of spending cuts in education, there were no significant differences between the trends in time spent on child care by residents of austerity states and residents of non-austerity states. However, following the decline in spending on K-12 and early education programs, there was an upward trend in the amount of time that individuals in austerity states were allocating toward child care. In the six years after the introduction of education spending cuts, residents of austerity states were spending around 1.2 additional hours weekly on child care relative to residents of non-austerity states.

4.2 Gender gaps in child care within austerity states

The increase in time spent on unpaid childcare activities by residents of austerity states could have three possible implications for the gender gaps in child care. First, these differences could be driven by an increase in the amount of time men in austerity states spent on child care. In this scenario, the reduced spending on K-12 and early education programs would lead to a reduction in the gender gaps in time allocated for child care. Second, the increase in unpaid childcare work in austerity states could primarily be borne by women. This would cause an increase in the existing gender gaps in childcare hours. Finally, it is also possible that both men and women residing in austerity states were spending more time on child care but to varying degrees. Using equation (2), I disaggregate the effect of decreases in education spending on childcare time by gender. Figure 4 presents these results.

Figure 4: Effect of decreases in education spending on daily childcare time across genders

| (a) Effect on men and women | (b) Gender gap in austerity states |

Notes: This figure reports coefficients from the estimation of equation (2). The left panel shows the change in time spent on daily childcare activities by residents of austerity states relative to residents of non-austerity states in the six years before and six years after the decrease in education spending, as compared with the year immediately prior to the decrease. The right panel shows changes in the gender gap in time spent on daily childcare activities in austerity states in the six years before and six years after the decrease in education spending, as compared with the year immediately prior to the decrease. Standard errors are robust to heteroskedasticity and serial correlation at the state level. ATUS survey weights are used in the estimation.

Spending decreases on K-12 and early education programs increased the time spent on child care by both men and women in austerity states. While men in austerity states were spending 1.8 additional hours per week on child care relative to their counterparts in non-austerity states, women in austerity states experienced an average increase of 3 hours in their weekly childcare time. These differences exacerbated the gender gaps in childcare time within austerity states as is observed in

the right panel of Figure 4. The impact of austerity policies on the gender gap in time allocated for childcare activities increases over the 6-year period following the initial introduction of spending cuts. The persistent and rising effect of austerity measures on gender inequality in childcare time indicates that such policies had long-lasting implications for the distribution of unpaid work between men and women.

4.3 Magnitude of austerity measures

Initial decreases in spending on K-12 and early education programs ranged from 0.19 percent to 10.84 percent and averaged 3.87 percent. With such a broad range of spending cuts, it is possible that the overall effect on childcare hours as well as the impact on the gender gap depended on the magnitude of austerity measures. Smaller spending decreases may imply fewer cuts to education programs that directly impact the childcare responsibilities that households have to undertake. States with smaller initial spending decreases were also more likely to experience a recovery in education spending by 2015, which may have ameliorated the impact on households. Thus, I hypothesize that the change in time allocated for child care was higher for states that implemented larger decreases in education spending.

Figure 5: Differences in effect on daily childcare time by magnitude of austerity measures
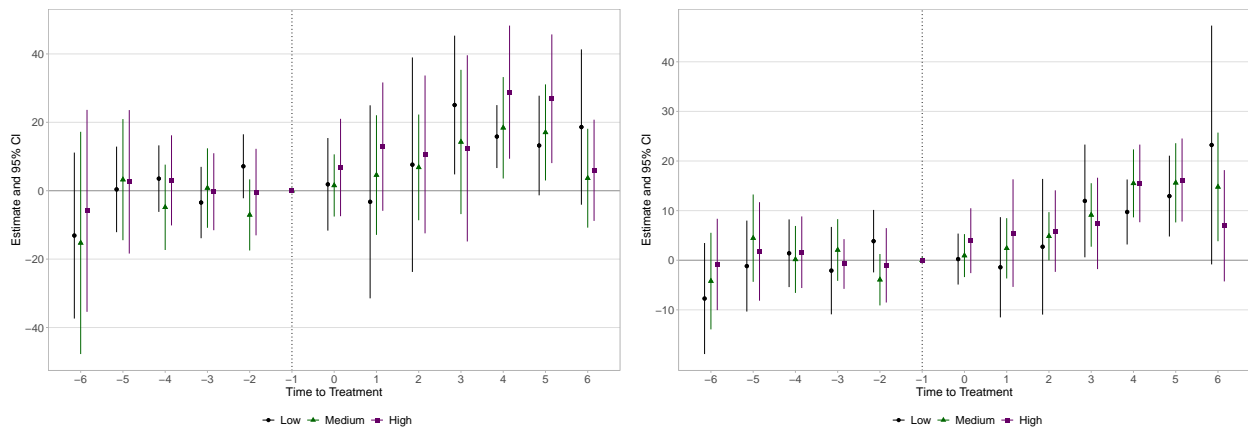
(a) Effect on all residents of austerity states   (b) Gender gap in austerity states

Notes: This figure reports coefficients from estimating equation (1) [left panel] and equation (2) [right panel] separately for three groups of states that are categorized based on the magnitude of initial education spending decreases. These initial spending decreases are classified as: Low (less than 1.22 percent), Medium (between 1.22 percent and 5.92 percent), High (greater than 5.92 percent). The left panel shows the change in time spent on daily childcare activities by residents of austerity states relative to residents of non-austerity states. The right panel shows changes in the gender gap in time spent on daily childcare activities in austerity states. Standard errors are robust to heteroskedasticity and serial correlation at the state level. ATUS survey weights are used in all estimations.

To test this hypothesis, I first categorize states into three groups based on the magnitude of the initial decrease in spending on K-12 and early education programs. These groups are defined as follows: Low, where spending decrease was less than 1.22 percent; Medium, where spending decrease was between 1.22 percent and 5.92 percent; High, where spending decrease greater than 5.92 percent[8]. Next, I estimate equation (1) and equation (2) separately for each of these three groups to analyze whether the magnitude of austerity measures impacted the extent to which individuals had to alter their time allocated for child care and its effect on the gender gap in childcare hours. These results are presented in Figure 5.

Spending cuts on K-12 and early education programs increased the childcare hours of residents of austerity states relative to the residents of non-austerity states irrespective of the magnitude of the spending decrease. The average change in childcare hours in the six years following the austerity event is the highest for states that implemented large spending cuts (an additional 1.7 hours per week). Residents of states with small or mid-sized decreases in education spending experienced similar increases in their weekly childcare hours post-austerity (1.3 and 1.1 hours respectively).

Gender gaps in childcare hours also increased across all three groups of austerity states. The average change in these gaps post-austerity did not vary greatly with the magnitude of the austerity measures. I find that within all groups of austerity states, women were allocating around one additional hour weekly to child care than men.

4.4   Costs of austerity

Public provisioning of child care through preschool programs, before and after-school activities, summer programs, etc. play a crucial role in helping caregivers balance their paid work commitments with childcare responsibilities. Decreases in state education spending can compel local school districts to reduce the availability of such services as they have limited options to cover the funding gaps. As a result, households in austerity states face an increase in the number of hours that they need to devote to child care. The higher childcare demands fall disproportionately on women, who were already undertaking a larger share of these responsibilities prior to the spending cuts.

Failing to account for the asymmetric effects of austerity measures can lead to an underestimation of the true costs of such policies. In the six years after the decrease in education spending, the cumulative increase in childcare time was 675 hours for men and 1080 hours for women. Undertaking these additional hours of child care may have come at the price of lesser time available for paid employment or even a decision to withdraw from the labor force. Since the ATUS covers

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[8] The group thresholds were determined based on the quartiles of spending decreases. Refer to Figure A1 in the Appendix for a distribution of observations across the three groups.

a repeated cross-section of respondents, I am unable to directly estimate the costs imposed on residents of austerity states by tracking employment status over time. However, by evaluating the shadow cost of the additional childcare hours performed, I can obtain an indirect estimate of the costs of austerity.

To calculate the shadow cost of additional childcare hours, I use BLS Occupational Employment and Wage Statistics (OEWS) data on the average hourly wages of "Education administrators, preschool and child care center/program" between 2008-2015[9]. Figure 6 provides a comparison of the costs placed by austerity measures on men with that on women.

Figure 6: Annual cost of austerity policies
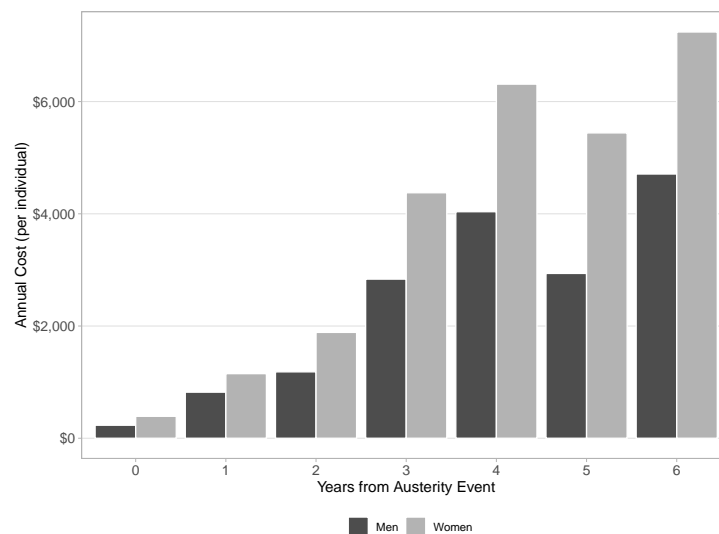
Sources: Author's calculations based on estimated coefficients of
equation (2) and BLS OEWS data

The costs imposed on residents of austerity states gradually rose over time[10]. I find that on average, the increase in childcare responsibilities would have cost men about $2,400 and women about $3,800 annually after the introduction of austerity measures. The decline in spending on K-12 and early education programs also placed increasingly higher costs on women than on men. The gender differential in austerity costs grew from $160 to more than $2,500 within six years of the initial spending cut.

The rising gender gaps in child care caused by decreases in education spending show that austerity measures have long-term implications for progress toward gender equality. Reducing time devoted

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[9] Following Landefeld et al. (2009) and Suh and Folbre (2016), I use a specialist wage to evaluate the market price of unpaid child care.

[10] The fifth year after austerity is the only exception to this increasing trend.

to paid work opportunities to accommodate greater childcare responsibilities can impact women's employment prospects, workforce participation, and earnings. The resulting divergence in labor market outcomes for men and women can also hamper future economic growth. Thus, a one-time austerity event can translate to several years of lower growth and higher inequality.

5 Robustness

5.1 Threats to validity

My empirical strategy assumes that changes in overall childcare hours and the gender gap therein were driven by variations in the implementation and timing of austerity policies in the form of lower education spending. However, this assumption may be violated if states experienced differential levels of economic shocks prior to the introduction of these policies. As austerity measures were a response to declining state revenues during the Great Recession, this may be a plausible concern.

Figure 7: Robustness – Accounting for severity of the Great Recession
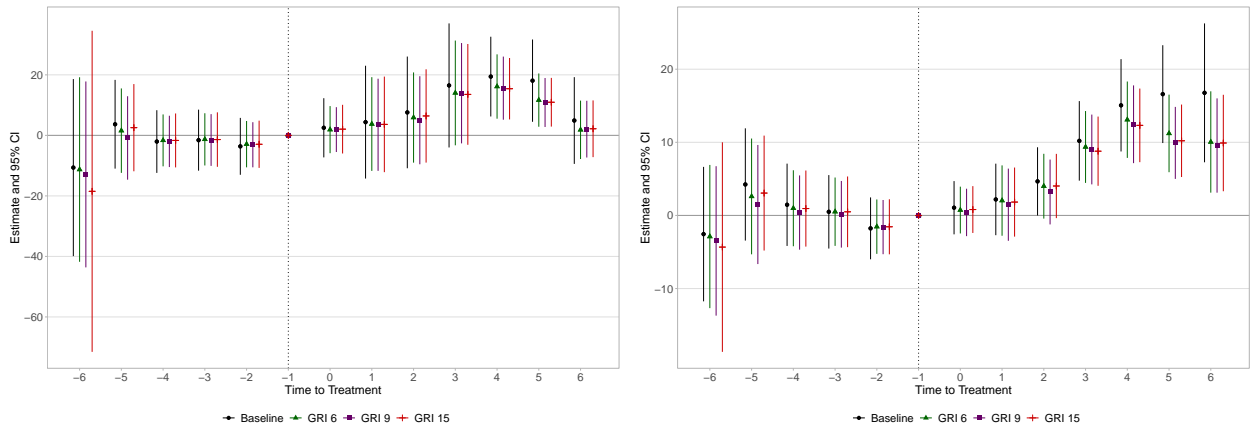
(a) Effect on all residents of austerity states

(b) Gender gap in austerity states

Notes: Baseline specification estimates equation (1) [left panel] and equation (2) [right panel]. The remaining specifications include alternative definitions of GRI as a control variable. The left panel shows the change in time spent on daily childcare activities by residents of austerity states relative to residents of non-austerity states. The right panel shows changes in the gender gap in time spent on daily childcare activities in austerity states.

To address this, I examine the sensitivity of my estimates to the inclusion of state-level controls that capture the intensity of the Great Recession. I use the Great Recession Index (GRI) proposed by Wallace et al. (2022) to account for variations in the degree of economic shock experienced by states during this period. Of the 15 definitions of the GRI proposed by the authors, I selected 3

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that have high levels of reliability[11]. Figure 7 compares my baseline estimates with those obtained after the inclusion of the GRI as a control variable.

My findings remain unchanged after state-level variations in the severity of the Great Recession are accounted for. Austerity measures increased the childcare hours of residents of austerity states relative to residents of non-austerity states. They also increased the gender gap in childcare time in austerity states.

5.2 Controls for household characteristics

My baseline specifications outlined in equation (1) and equation (2) include state fixed effects to control for time-invariant heterogeneity across states as well as year fixed effects to control for unobserved trends that are common across all states. The estimates obtained using these specifications show that time spent on childcare activities was trending similarly prior to the introduction of austerity measures. However, it is possible that differences in household characteristics were driving the observed changes in childcare time following the decline the state education spending.

Figure 8: Robustness – Accounting for household characteristics
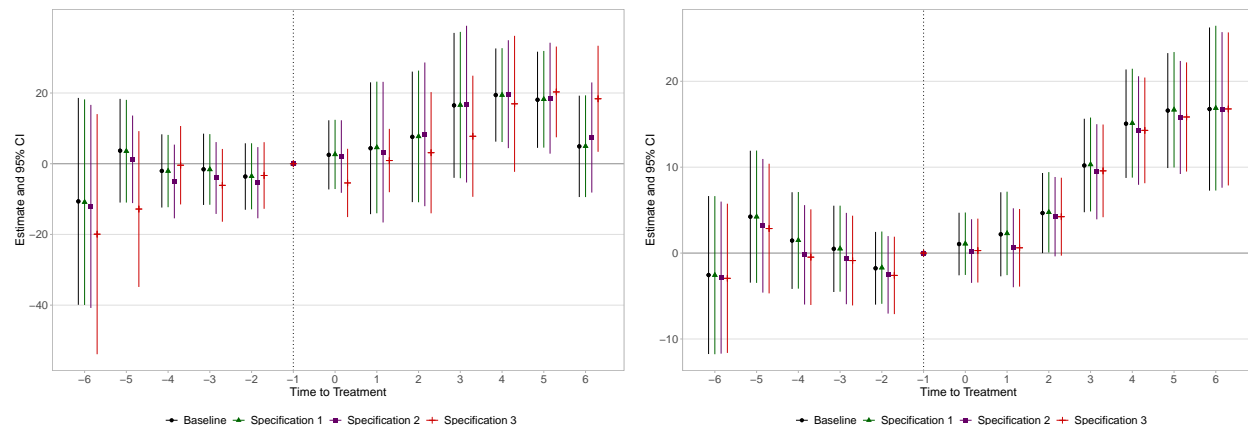
(a) Effect on all residents of austerity states

(b) Gender gap in austerity states

Notes: Baseline specification estimates equation (1) [left panel] and equation (2) [right panel]. The remaining specifications include additional control variables for household characteristics. Specification 1 controls for the presence of a spouse or unmarried partner in the household. Specification 2 includes household income as an additional covariate. Specification 3 includes the interaction terms, child*partner and female*child*partner. The left panel shows the change in time spent on daily childcare activities by residents of austerity states relative to residents of non-austerity states. The right panel shows changes in the gender gap in time spent on daily childcare activities in austerity states.

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[11] Reported as having Cronbach's alpha > 0.8. Results using the remaining definitions are qualitatively similar to those shown here.

To account for this, I include several time-varying controls to capture household income and other structural characteristics in my baseline regression specifications[12]. Figure 8 shows the sensitivity of my initial results to the inclusion of these additional covariates.

I estimate three alternate specifications which include various sets of covariates. First, I control for the presence of a spouse or unmarried partner in the household. Individuals in partnered households may have the option to share increased childcare responsibilities. My next specification includes household income as an additional covariate. Differences in income levels can affect the ability and willingness to pay for alternative childcare options that replace earlier arrangements. Finally, I account for the possibility that single parents and single mothers, in particular, may face different time constraints. My initial findings are robust to these alternate specifications.

6 Conclusion

The Global Financial Crisis and the subsequent recession caused large declines in state revenues in the United States. This led state governments to reduce funding for crucial services such as healthcare and education to meet their balanced budget requirements. Such measures can have unequal gender effects not only for paid work opportunities as women make up a larger share of the public workforce but also through their impact on unpaid work. In recent decades, women in the United States have increased their hours of paid work but continue to spend more time on child care and housework relative to men (Pew Research Center, 2013; Pailhé et al., 2021). When austerity policies lead to a reduction in the availability of public services that support households, they may worsen these existing gender inequalities in the distribution of time if women have to take up a larger share of the increased burden of unpaid work.

In this paper, I evaluate the impact of decreases in state spending on K-12 and early education programs on the amount of time men and women were allocating toward childcare activities. I leverage annual data on individual time diaries from the ATUS which allows me to obtain estimates of time spent on child care for a nationally representative sample. My findings show that the decline in education spending increased the childcare hours of residents of austerity states. This rise in childcare time weighed more heavily on women than on men, thus worsening existing gender gaps in the distribution of childcare responsibilities.

The cuts in education spending placed significant costs on the residents of austerity states. Using BLS data, I find that the increase in childcare responsibilities would have cost men about $2,400 and women about $3,800 annually after the initial implementation of austerity measures. Further-

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[12] These controls are time-varying as my observations come from a repeated cross-section of individuals.

more, there was an increasing trend in the gender differential in austerity costs which rose from $160 to more than $2,500 within six years. The persistent effect of education spending cuts on the gender gaps in child care highlights one of the channels through which austerity policies can hamper progress toward gender equality. The decline in public provisioning of childcare services can lead residents of austerity states, particularly women, to alter their distribution of time between paid and unpaid work to accommodate the increased childcare responsibilities. Even if austerity policies are short-lived, such changes in time distribution can negatively impact the future labor market outcomes of women.

Due to data limitations, I am unable to comment on how austerity measures may have affected the division of work within a household. However, the inclusion of control variables for household structure to my baseline specifications allows me to make comparisons between similar individuals. Furthermore, my empirical strategy identifies a causal link between decreases in state spending on education and the gender distribution of unpaid childcare activities by utilizing the variation in state implementation of education spending cuts as well as differences in their timing. To the best of my knowledge, this causal link has not previously been documented in the literature.

My research has important policy implications. There is widespread acknowledgment that gender-responsive budgeting practices need to be a part of the regular policymaking process. However, implementation across countries has been more variable and ad-hoc (Alonso-Albarran et al., 2021). My paper shows that in the absence of proper evaluation, fiscal policies adopted to tackle periods of economic distress can exacerbate existing gender inequalities, the effects of which can persist for several years. The adoption of gender budgeting practices can introduce a formal framework to evaluate all policies, plans, and budgets through a gender-sensitive lens. Doing so allows governments to account for the economic impact of unequal distribution of unpaid work in their policymaking and budgetary processes. This can ensure that the goal of gender equality is not just pursued during periods of economic well-being but also in periods of downturns.

References

Aguiar, Mark, Erik Hurst, and Loukas Karabarbounis (2013). "Time Use During the Great Recession". In: *American Economic Review* 103.5, pp. 1664–1696. DOI: 10.1257/aer.103.5.1664.

Albelda, Randy (2014). "Gender impacts of the 'Great Recession' in the United States". In: *Women and Austerity: The economic crisis and the future for gender equality*. Ed. by Maria Karamessini and Jill Rubery. Routledge IAFFE Advances in Feminist Economics 11. New York, NY: Routledge. ISBN: 978-0-203-06629-4.

Alesina, Alberto and Silvia Ardagna (2010). "Large Changes in Fiscal Policy: Taxes versus Spending". In: *Tax Policy and the Economy* 24.1, pp. 35–68. DOI: 10.1086/649828.

Alesina, Alberto, Carlo Favero, and Francesco Giavazzi (2019). "Effects of Austerity: Expenditure- and Tax-based Approaches". In: *Journal of Economic Perspectives* 33.2, pp. 141–162. DOI: 10.1257/jep.33.2.141.

Alonso-Albarran, Virginia, Teresa Curristine, Gemma Preston, Alberto Soler, Nino Tchelishvili, and Sureni Weerathunga (2021). "Gender Budgeting in G20 Countries". In: *IMF Working Paper No. 2021/269*. DOI: 10.5089/9781616354510.001.

Angelov, Nikolay, Per Johansson, and Erica Lindahl (2016). "Parenthood and the Gender Gap in Pay". In: *Journal of Labor Economics* 34.3, pp. 545–579. DOI: 10.1086/684851.

Ball, Laurence M., Davide Furceri, Daniel Leigh, and Prakash Loungani (2013). "The Distributional Effects of Fiscal Consolidation". In: *IMF Working Paper No. 2013/151*. DOI: 10.5089/9781475551945.001.

Berik, Günseli and Ebru Kongar (2013). "Time Allocation of Married Mothers and Fathers in Hard Times: The 2007–09 US Recession". In: *Feminist Economics* 19.3, pp. 208–237. DOI: 10.1080/13545701.2013.798425.

Blanchard, Olivier J. and Daniel Leigh (2013). "Growth Forecast Errors and Fiscal Multipliers". In: *American Economic Review* 103.3, pp. 117–120. DOI: 10.1257/aer.103.3.117.

Bova, Elva, Tidiane Kinda, and Jaejoon Woo (2018). "Austerity and inequality: The size and composition of fiscal adjustment matter". In: *Vox CEPR Policy Portal*. URL: https://cepr.org/voxeu/columns/austerity-and-inequality-size-and-composition-fiscal-adjustment-matter.

Bridgman, Benjamin, Andrew Craig, and Danit Kanal (2022). "Accounting for Household Production in the National Accounts: An Update 1965–2020". In: *Survey of Current Business* 102.2. URL: https://apps.bea.gov/scb/2022/02-february/0222-household-production.htm.

Buckman, Shelby R., Laura Y. Choi, Mary C. Daly, and Lily M. Seitelman (2021). "The Economic Gains from Equity". In: *Federal Reserve Bank of San Francisco Working Paper No. 2021-11*. DOI: 10.24148/wp2021-11.

Chaisemartin, Clément de and Xavier D'Haultfœuille (2020). "Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects". In: *American Economic Review* 110.9, pp. 2964–2996. DOI: 10.1257/aer.20181169.

Collins, Caitlyn, Liana Christin Landivar, Leah Ruppanner, and William J. Scarborough (2021). "COVID-19 and the gender gap in work hours". In: *Gender, Work & Organization* 28.S1, pp. 101–112. DOI: 10.1111/gwao.12506.

Davis, Shannon N. and Theodore N. Greenstein (2020). "Households and work in their economic contexts: State-level variations in gendered housework performance before, during, and after the great recession". In: *Journal of Occupational Science* 27.3, pp. 390–404. DOI: 10.1080/14427591.2020.1741430.

Downes, Ronnie and Scherie Nicol (2020). "Designing and implementing gender budgeting – a path to action". In: *OECD Journal on Budgeting* 20.2. DOI: 10.1787/689198fa-en.

Elder, Sara (2010). *Women in labour markets: Measuring progress and identifying challenges.* Geneva, Switzerland: International Labour Office. ISBN: 978-92-2-123319-0.

Elomäki, Anna (2012). *The Price of Austerity - The Impact on Women's Rights and Gender Equality in Europe.* Tech. rep. European Women's Lobby. URL: https://www.womenlobby.org/The-Price-of-Austerity-The-Impact-on-Women-s-Rights-and-Gender-Equality-in.

Farré, Lídia, Yarine Fawaz, Libertad González, and Jennifer Graves (2020). "How the Covid-19 Lockdown Affected Gender Inequality in Paid and Unpaid Work in Spain". In: *IZA Discussion Paper No. 13434.* DOI: 10.2139/ssrn.3643198.

Ferrant, Gaëlle, Luca Maria Pesando, and Keiko Nowacka (2014). *Unpaid Care Work: The missing link in the analysis of gender gaps in labour outcomes.* Tech. rep. OECD Development Centre. URL: https://www.oecd.org/dev/development-gender/Unpaid_care_work.pdf.

Giurge, Laura M., Ashley V. Whillans, and Ayse Yemiscigil (2021). "A multicountry perspective on gender differences in time use during COVID-19". In: *Proceedings of the National Academy of Sciences* 118.12. DOI: 10.1073/pnas.2018494118.

Glasmeier, Amy K. and Christa R. Lee-Chuvala (2011). "Austerity in America: gender and community consequences of restructuring the public sector". In: *Cambridge Journal of Regions, Economy and Society* 4.3, pp. 457–474. DOI: 10.1093/cjres/rsr029.

Goodman-Bacon, Andrew (2021). "Difference-in-differences with variation in treatment timing". In: *Journal of Econometrics* 225.2, pp. 254–277. DOI: 10.1016/j.jeconom.2021.03.014.

Gorsuch, Marina Mileo (2016). "Decomposing the increase in men's time on childcare during the great recession". In: *Review of Economics of the Household* 14.1, pp. 53–82. DOI: 10.1007/s11150-014-9263-8.

Hofferth, Sandra L., Sarah M. Flood, Matthew Sobek, and Daniel Backman (2020). *American Time Use Survey Data Extract Builder: Version 2.8.* URL: https://atusdata.org.

Johnson, Nicholas, Phil Oliff, and Erica Williams (2011). *An Update on State Budget Cuts.* Tech. rep. Center on Budget and Policy Priorities (CBPP). URL: https://www.cbpp.org/research/an-update-on-state-budget-cuts.

Kashen, Julie, Sarah Jane Glynn, and Amanda Novello (2020). *How COVID-19 Sent Women's Workforce Progress Backward.* Tech. rep. Center for American Progress. URL: https://www.americanprogress.org/article/covid-19-sent-womens-workforce-progress-backward/.

Kleven, Henrik, Camille Landais, Johanna Posch, Andreas Steinhauer, and Josef Zweimüller (2019). "Child Penalties across Countries: Evidence and Explanations". In: *AEA Papers and Proceedings* 109, pp. 122–126. DOI: 10.1257/pandp.20191078.

Landefeld, J. Steven, Barbara M. Fraumeni, and Cindy M. Vojtech (2009). "Accounting for Household Production: A Prototype Satellite Account Using the American Time Use Survey". In: *Review of Income and Wealth* 55.2, pp. 205–225. DOI: 10.1111/j.1475-4991.2009.00319.x.

McNichol, Elizabeth, Phil Oliff, and Nicholas Johnson (2010). *States continue to feel recession's impact*. Tech. rep. Center on Budget and Policy Priorities (CBPP). URL: https://www.cbpp.org/research/states-continue-to-feel-recessions-impact.

Mulas-Granados, Carlos (2005). "Fiscal adjustments and the Short-Term Trade-Off between economic growth and equality". In: *Hacienda Pública Española/Revista de Economia Pública* 172.1, pp. 61–92.

Okeke, Angela, Constantinos Alexiou, and Joseph Nellis (2021). "Austerity Effects on National Output and Income Inequality: A Systematic Literature Review". In: *Review of Economics* 72.2, pp. 97–148. DOI: 10.1515/roe-2021-0012.

Oliff, Phil and Michael Leachman (2011). *New School Year Brings Steep Cuts in State Funding for Schools*. Tech. rep. Center on Budget and Policy Priorities (CBPP). URL: https://www.cbpp.org/research/new-school-year-brings-steep-cuts-in-state-funding-for-schools.

Olivetti, Claudia and Barbara Petrongolo (2017). "The Economic Consequences of Family Policies: Lessons from a Century of Legislation in High-Income Countries". In: *Journal of Economic Perspectives* 31.1, pp. 205–230. DOI: 10.1257/jep.31.1.205.

Pailhé, Ariane, Anne Solaz, and Maria Stanfors (2021). "The Great Convergence: Gender and Unpaid Work in Europe and the United States". In: *Population and Development Review* 47.1, pp. 181–217. DOI: 10.1111/padr.12385.

Périvier, Hélène (2018). "Recession, austerity and gender: A comparison of eight European labour markets". In: *International Labour Review* 157.1, pp. 1–37. DOI: 10.1111/ilr.12032.

Pew Research Center (2013). *Modern Parenthood: Roles of Moms and Dads Converge as They Balance Work and Family*. Tech. rep. URL: https://www.pewresearch.org/social-trends/2013/03/14/modern-parenthood-roles-of-moms-and-dads-converge-as-they-balance-work-and-family/.

Poinasamy, Krisnah (2013). *A cautionary tale: The true cost of austerity and inequality in Europe*. Oxfam International. ISBN: 978-1-78077-425-1.

Quinn, Sheila (2009). *Gender budgeting: practical implementation*. Council of Europe. URL: https://rm.coe.int/1680599885.

Stotsky, Janet G. (2016). "Gender Budgeting: Fiscal Context and Current Outcomes". In: *IMF Working Paper No. 2016/149*. DOI: 10.5089/9781475575460.001.

Suh, Jooyeoun and Nancy Folbre (2016). "Valuing Unpaid Child Care in the U.S.: A Prototype Satellite Account Using the American Time Use Survey". In: *Review of Income and Wealth* 62.4, pp. 668–684. DOI: 10.1111/roiw.12193.

Sun, Liyang and Sarah Abraham (2021). "Estimating dynamic treatment effects in event studies with heterogeneous treatment effects". In: *Journal of Econometrics* 225.2, pp. 175–199. DOI: 10.1016/j.jeconom.2020.09.006.

Wallace, Michael, Angran Li, and Allen Hyde (2022). "The Great Recession Index: A Place-based Indicator for Countries, States, and Metropolitan Areas". In: *Social Indicators Research* 160.1, pp. 401–426. DOI: 10.1007/s11205-021-02799-0.

Woo, Jaejoon, Elva Bova, Tidiane Kinda, and Yuanyan Sophia Zhang (2013). "Distributional Consequences of Fiscal Consolidation and the Role of Fiscal Policy: What Do the Data Say?" In: *IMF Working Paper No. 2013/195.* DOI: 10.5089/9781484390917.001.

Xue, Baowen and Anne McMunn (2021). "Gender differences in unpaid care work and psychological distress in the UK Covid-19 lockdown". In: *PLoS One* 16.3. DOI: 10.1371/journal.pone.0247959.
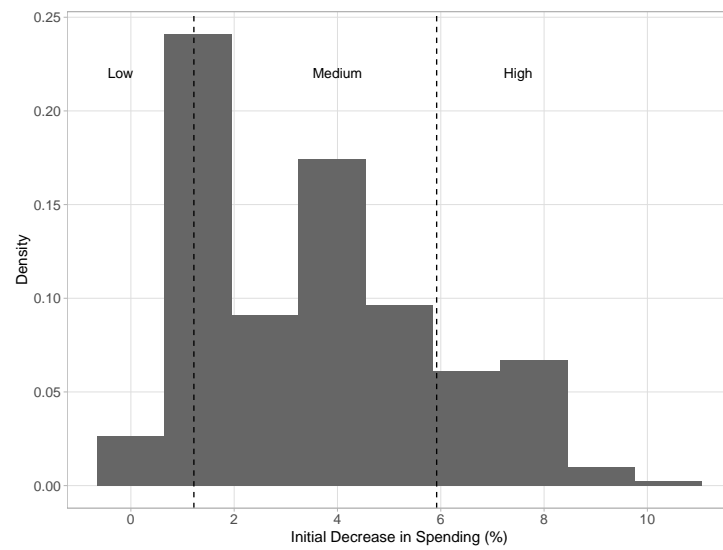
A   Appendix: Additional Tables and Figures

Table A1: Summary of austerity episodes

State	Event Year	Percent Decrease
Hawaii	2010	10.84
Louisiana	2013	8.87
Oklahoma	2011	8.40
Florida	2009	7.79
Nevada	2009	7.50
Utah	2010	7.41
Arkansas	2012	7.03
Alaska	2012	6.93
Wisconsin	2012	6.72
Idaho	2011	6.57
Georgia	2010	5.99
Minnesota	2010	5.71
North Carolina	2010	5.38
Kansas	2011	5.33
Oregon	2010	5.24
New Jersey	2011	5.23
Ohio	2013	4.36
Virginia	2009	3.70
New Mexico	2010	3.69
Washington	2010	3.56
West Virginia	2012	3.52
Texas	2011	3.40
Indiana	2008	3.39
South Carolina	2010	3.16
Colorado	2009	2.72
Wyoming	2011	2.49
Alabama	2010	2.44
Connecticut	2011	2.12
Pennsylvania	2012	2.03
California	2009	1.92
Tennessee	2013	1.34
Illinois	2010	1.18
Mississippi	2010	1.07
Arizona	2009	1.01
Missouri	2010	1.00
Maryland	2011	0.90
New York	2011	0.69
Delaware	2009	0.56
Kentucky	2009	0.40
New Hampshire	2012	0.33
Montana	2012	0.21
Vermont	2011	0.19

Figure A1: Distribution of observations across austerity groups

Notes: The initial spending decreases are classified as: Low (less than
1.22 percent), Medium (between 1.22 percent and 5.92 percent), High
(greater than 5.92 percent).