Social Science Research 102 (2022) 102627

Contents lists available at ScienceDirect

Social Science Research

journal homepage: www.elsevier.com/locate/ssresearch

Do high childcare costs and low access to Head Start and childcare subsidies limit mothers' employment? A state-level analysis

Liana Christin Landivar [a], William J. Scarborough [b], Caitlyn Collins [c], Leah Ruppanner [d,*]

[a] Women's Bureau, U.S. Department of Labor, USA
[b] University of North Texas, USA
[c] Washington University in St Louis, USA
[d] University of Melbourne, Australia

ARTICLE INFO

Keywords:
Women's employment
Maternal employment
Head Start
Childcare subsidies
Childcare costs

ABSTRACT

Access to affordable childcare is crucial to mothers' employment. Yet, childcare costs and access to Head Start, childcare subsidies, and state-funded preschool vary dramatically across U.S. states. Using data from the 2016 American Community Survey five-year estimates, we apply hierarchical logistic regression models to show mothers are more likely to work in states with inexpensive childcare, higher Head Start enrollment and childcare subsidy participation, and increased availability of state-funded preschool. Childcare subsidy access is associated with higher maternal employment amongst those with lower levels of educational attainment, whereas state-funded preschool is associated with higher employment primarily among the college educated. Additionally, our analysis revealed that Head Start has a stronger association with maternal employment in states where childcare costs are high, reducing the negative relationship of employment with expensive childcare. As national discussions continue to center on the importance of childcare, our research adds evidence that public programs support maternal employment through reducing out-of-pocket childcare costs.

1. Introduction

Without a national childcare infrastructure like most other wealthy western countries, childcare is a major household expense for parents of young children in the United States. Although spending up to seven percent of family income on childcare is considered affordable (Department of Health and Human Services 2015; Malik 2019), childcare absorbs an average of 10 percent of a family's household income (Child Care Aware 2018: 25). Families in the highest income bracket spend seven times as much on childcare as the lowest earners (Kornrich et al., 2020), but childcare costs absorb a larger share of income amongst lower-income families (Kornrich and Furstenberg 2013; Laughlin 2013). The cost of childcare means many families cannot afford to place children in full-time care, leading to low and inconsistent enrollment of young children in early childhood education programs (Rigby et al. 2007; Rose 2016).

The limited availability of affordable childcare is a major deterrent to mothers' labor force participation internationally, and many countries have invested in public childcare infrastructure in recent decades (Blau and Kahn 2013; Bourke-Taylor et al. 2011; Sabol and

* Corresponding author.
E-mail addresses: landivar.liana.c@dol.gov (L.C. Landivar), william.scarborough@unt.edu (W.J. Scarborough), c.collins@wustl.edu (C. Collins), leah.ruppanner@unimelb.edu.au (L. Ruppanner).

https://doi.org/10.1016/j.ssresearch.2021.102627
Received 12 May 2020; Received in revised form 25 January 2021; Accepted 9 August 2021
Available online 18 August 2021

Chase-Lansdale 2015; Thévenon 2013). Cross-national research shows that women are more likely to be employed, stay employed, and hold better jobs in countries where childcare is more affordable, available, and high quality (Hegewisch and Gornick 2011). In most OECD countries, childcare is considered a public good, and is publicly subsidized as a result (Gornick and Meyers 2003; OECD 2020). Public sources account for 83 percent of total expenditures on pre–primary school education and care across the OECD (OECD, 2019a). In the U.S., however, childcare is treated as an individual problem to be solved through market or family solutions. This approach limits public childcare funding: the United States spends less than half the OECD average on early childhood education and care as a percent of GDP (OECD, 2019a).

Despite robust cross-national evidence showing that affordable, accessible childcare is critical for mothers' employment (for a review see Hegewisch and Gornick 2011; see also Collins 2019; Del Boca 2015; Gornick and Meyers 2003; Jaumotte 2003), childcare subsidies in the U.S. are largely targeted to those who fall below established income thresholds, meaning that most families are ineligible for economic childcare relief (Ruppanner 2020). Even among those who qualify for subsidized care, demand far exceeds available resources. Only 15 percent of eligible families in the U.S. receive childcare subsidies (Chien 2019). And of those children eligible for Head Start, only 42 percent are enrolled (Chaudry et al., 2017). What is more, most childcare funding targets those aged 2 to 4 to ensure school readiness, leaving parents with a significant coverage gap across children's early, and more expensive, years (Chien 2019).

The deficit in U.S. government support compounds childcare costs for families with multiple young children. Given that each subsequent birth dramatically increases childcare costs, mothers with multiple preschoolers, especially those with fewer resources, may be especially vulnerable to labor market exits. These relationships may be stronger in states where childcare costs are high, public programs are limited, and subsidies are less generous.

States are important actors within the U.S.' federalist system. State governments set eligibility rules, program administration, childcare subsidy reimbursement levels, parental copays, income sources that count toward determining financial eligibility, administrative procedures for enrollment, and childcare licensing requirements (Chaudry et al., 2017; Herbst 2008; Rose 2016). This means that the implementation of federal programs, like Head Start, vary based on state of residence. Some states also fund pre-K for 3- and 4-year-olds but this funding and program coverage also vary significantly across states (Barnett et al., 2012). Further, states have different regulations, labor markets and cost of living conditions, meaning childcare costs in one state can be significantly higher than in another. States' varying childcare policies and costs mean that U.S. mothers today negotiate childcare demands and employment in very different institutional environments (Landivar et al. 2021; Ruppanner 2020; Ruppanner et al. 2019). These experiences may be particularly challenging for mothers with limited educational resources and multiple young children.

To test these relationships, we match data from the American Community Survey five-year sample (2012–2016) of mothers aged 25 to 55 to four state-level measures: (1) the average cost of center-based childcare; (2) the percentage of eligible children enrolled in Head Start; (3) the percentage of childcare subsidy-eligible families receiving assistance; and (4) the percentage of 3- and 4-year-olds enrolled in state-funded pre-K. We expect childcare costs to compound with each subsequent child and thus test how the presence of one, two, or three or more preschool-aged children is associated with maternal employment, comparing these relationships by educational attainment. Then, we introduce a cross-level interaction for the number of preschool-aged children and our state-level measures to determine whether inexpensive childcare costs and higher state-provided subsidies, Head Start enrollment, and state-funded pre-K reduce the negative association between maternal employment and having young children at home. Finally, we examine the interrelationship between childcare costs and the availability of Head Start, childcare subsidies, and state-funded pre-K to test whether these government supports reduce the employment barriers posed by expensive childcare.

Our results show that states impose very different institutional constraints on maternal employment, with greater consequences for those with fewer resources and more children. Not only do increased Head Start, childcare subsidies, and state-funded pre-K availability predict higher rates of maternal employment, but we also find that Head Start accessibility reduces the negative effect of high childcare costs, particularly for less-educated mothers. As national discussions increasingly center on the importance of childcare for all families, our research adds further support for public policies that reduce out-of-pocket childcare costs and expand Head Start, childcare subsidies, and publicly funded pre-K across U.S. states.

2. Childcare and the role of U.S. States

States form a unique institutional context through which childcare resources are extended to working parents. States hold significant power to legislate, regulate, and institute childcare. In the area of education and early childcare, states play an especially significant role. Although the federal government provides funding for some types of early care and education programs, states establish most of the guidelines and regulations. That is, even with federal funding, Head Start and childcare subsidies are structured and delivered within states, and eligible parents are not guaranteed a slot (Chien 2019; Herbst 2008). This leads to significant state variation in childcare contexts pertaining to costs, availability, and quality. In addition to mediating federal programs, states are also principal childcare actors through state-funded childcare centers, for which states often provide some budgetary provisions. Investments tend to center on pre-K to increase school readiness but access to state programs varies dramatically across states. Only three states offer truly universal pre-K (i.e. for all of their pre-K aged children): Vermont, Florida, and the District of Columbia. Seven others offer generous but not completely universal pre-K coverage: Oklahoma, West Virginia, Georgia, Illinois, Iowa, New York, and Wisconsin. Six other states offer no state-funded pre-K coverage and the rest have non-universal, state-funded options (Education Commission of the States 2018).

Here, we focus on the state's role in shaping childcare contexts across four dimensions: market costs of childcare, Head Start enrollment, childcare subsidy take-up, and the provision of state-funded childcare centers. This allows us to untangle the role of the

state across federal and market childcare resources as outlined below (see Fig. 1).

2.1. Policy conditions: Child Care and Development Block Grant, Head Start, and state-funded Pre-K

High-quality, widely available, and affordable childcare is a critical social investment in children's and mothers' futures (Folbre 2008). Children enrolled in high-quality childcare have fewer behavioral problems and perform better on achievement tests (Heckman and Krueger 2005; Ramey et al., 2000). Childcare is also critical to maternal employment, with mothers more likely to work in countries with more generous childcare resources (Flynn 2017; Jaumotte, 2003). Given the widespread social benefits to high-quality childcare, many countries invest heavily in childcare as a core public good (OECD, 2019a, 2019b). Despite the massive gains from a universal childcare program, childcare remains an individual responsibility in the U.S. Most families have no choice but to turn to the market, friends, and family for care (Liu 2015). As a prototypical liberal welfare state, federal provisions of childcare in the U.S. are meager, means-tested, and limited to those in greatest need (Blau 2003; Blau and Tekin 2007; Esping-Andersen 1990). States have also implemented childcare provisions but, for reasons described below, these vary dramatically across states, creating a patchwork of care. Collectively, cross-national research shows that the U.S. trails behind most industrial nations in childcare provisions (Collins 2019).

2.1.1. The Child Care and Development Block Grant

The main sources of federal funding for childcare in the United States are the Child Care and Development Block Grant (CCDBG) and Head Start. Funding from CCDBG is provided through the Child Care and Development Fund (CCDF), which is managed at the federal level and implemented by states. Federal rules stipulate that families are eligible for childcare subsidies through the CCDBG if they have a child under the age of 13, their family income is 85 percent of the state median income, and the parents are working, actively looking for work, or in educational or job training. Only 11 percent of eligible children receive subsidies nationally (United States Government Accountability Office, 2016). In 2015, families with children between the ages of 2 and 4 and with incomes below the poverty line were more likely to receive a childcare subsidy than those over the poverty line: 45 percent of those below the poverty line received a subsidy compared with only 11 percent of those above the poverty line (Chien 2019).

Take-up of childcare subsidies is low for several reasons. For one, states ration limited funding among eligible parents (Herbst 2008). Some parents are also unaware of their eligibility for childcare subsidies or have difficulty navigating the subsidy system (Herbst 2008). States also have flexibility in implementing subsidy guidelines; many states make eligibility stricter than federal guidelines (Herbst 2008). For example, some states set much lower income thresholds that are not always indexed for inflation,

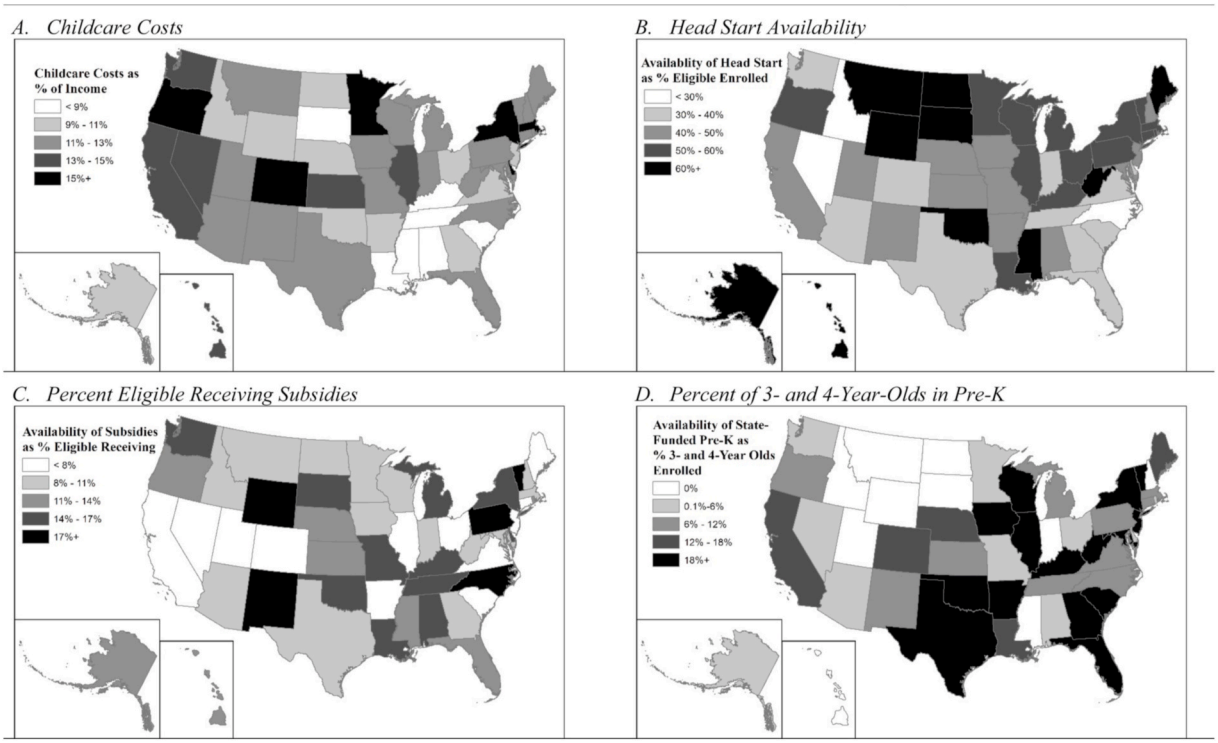

Fig. 1. Variation in State Childcare Contexts. Note: Data on childcare costs are from Childcare Aware State Factsheets (2011–2015). Head Start Availability come from the Head Start Program Information Reports (2009–2010/2010-2011). Availability of Subsidies are from the U.S. Government Accountability Office (2016). State-funded pre-K enrollment come from the National Institute for Early Education Research (Barnett et al., 2012).

meaning only families with very low incomes, below the federal requirement, retain eligibility. Stricter state guidelines render about a third of families ineligible for subsidies that would otherwise qualify under federal rules (Chien 2019). Collectively, these studies indicate that states play an active role in providing resources to extend coverage beyond the federal scope or reduce coverage that may structure maternal employment.

2.1.2. Head Start

Head Start is a categorical grant program administered by the Office of Head Start in the Department of Health and Human Services. Funds are allocated to local agencies administering Head Start programs in each state. To be eligible, children must be between the ages of 3 and 5, live in a family with income below the poverty line, receive other types of income-based public assistance, be homeless, or in foster care (Hofferth 1994; Office of Head Start, 2019). Funding is not highly responsive to changes in demand and, therefore, a significant share of eligible families remains without a slot due to limited funding. Nationally, this means only 12 percent of 4-year-olds and 9 percent of 3-year-olds (or about 40 percent of all preschoolers living in families below the poverty line) are enrolled in the program (Chaudry et al., 2017). The primary goal of Head Start is school readiness, so the focus is on enrolling older children in their preschool years (3 and 4 years old). However, only 56 percent of Head Start programs offer full-week, full-day programs (Office of Head Start 2019). When Head Start enrollment is assessed at the state level, dramatic enrollment gaps emerge (see Fig. 1). For example, North Dakota enrolls 100 percent of eligible children compared to Nevada, which only enrolls 22 percent. States choose different spending priorities (i.e., increasing enrollment, teacher pay, length of care, etc.), which leads to stark variation in enrollment across states.

2.1.3. State-funded Pre-K

In addition to administering federal programs such as CCDBG and Head Start, several states also fund pre-K. These initiatives are not tied to sustaining federal sources and are overseen entirely by state governments. States have full discretion in funding pre-K, which means that the availability of these programs varies from state to state (see Fig. 1). Unlike CCDBG and Head Start, many states have no eligibility restrictions for enrollment besides children's age (Barnett and Hustedt 2011). Some prioritize children with special needs or from low-income families, but few limit enrollment to only those who meet these criteria. Currently, state-funded pre-K serves a total of 20 percent of 3- and 4-year-old children in the U.S. (Friedman-Krauss et al., 2020), with considerable variation in offerings across states (Education Commission of the States 2018).

2.2. Market cost: state variation in childcare costs

Publicly funded childcare is only one piece of the childcare puzzle in the U.S. Most families do not qualify or have access to public programs, leaving them to solve their childcare needs through the market or their social networks. Market-based childcare costs vary dramatically across U.S. states. Married couples in New York spend 14 percent of their annual income on childcare, whereas those in Mississippi spend half that (see Fig. 1). State-to-state variation in childcare costs means that families face starkly different institutional realities when deciding whether caregivers should return to work (Baum 2002). Yet, most scholarship ignores state-level variation in childcare expenses, focusing instead on childcare costs at the national level (see Ruppanner et al. 2019 for discussion) or among those eligible for subsidies, particularly single mothers (Connelly and Kimmel 2003; Tekin 2007). The challenges posed by childcare costs vary widely from state to state in the U.S. The burden of these expenses can be particularly difficult for parents with less education and multiple children. We pay careful attention to these differences in relation to maternal employment.

3. Individual explanations: motherhood and access to resources

The previous section outlined the importance of the state as an actor in disseminating federal and state resources and regulating market forces that drive childcare costs. We expect these state-to-state differences to be associated with maternal employment differently depending on women's educational attainment and number of children. In this section, we outline these arguments at the individual level.

3.1. Childbirth as a major life course transition: the impact on maternal employment

The birth of a child marks a major life course transition with consequences for maternal employment. Longitudinal research shows that the transition into parenthood results in a reshuffling of responsibilities, which often activates traditional gender expectations of mothers as caregivers and fathers as breadwinners (Hynes and Clarkberg 2005; Sanchez and Thomson 1997; Yavorsky et al. 2015). Thus, it is no surprise that, following childbirth, mothers tend to pull back from employment while fathers increase their time at work (Maume 2006). This phenomenon is largely a response to the competing pressures of the intense physical care demands of young children, cultural ideologies of intensive mothering that emphasize parent-provided, one-on-one childcare, and the absence of universal, affordable, quality childcare (Gornick and Meyers 2003; Hays 1996). Although most mothers of young children are employed, mothers are more likely to reduce employment when preschool-aged children are present and increase labor force participation once children reach school age (Landivar 2017). In part, these decisions are ideological, a consequence of middle-class ideals of time-intensive "good mothering" (Collins 2019; Hays 1996). But these responses are also financial. Many families scan the market for affordable childcare and options are typically scant (Kimmel 1998; Self 2005). Research shows that lower childcare costs are associated with higher maternal employment. Chaudry et al. (2017) show that a 20 percent reduction in the cost of care would increase U.S.

mothers' employment by 1–5 percent. We explore these patterns across states to directly assess how these relationships vary by maternal education and number of children.

3.2. Maternal employment by education

College-educated mothers are best equipped to maintain labor force attachment given their greater resources (e.g., higher wages, flexible work, paid leave) (Landivar 2017). College-educated mothers in managerial and professional occupations are the least likely to leave the labor force when they have young children (Landivar 2017). By contrast, mothers with a high school diploma or less are more likely to have jobs with lower wages and fewer benefits. They are less equipped to create work lives that allow them to engage in motherhood and employment compatibly (Damaske 2011). Consequently, a resource gap emerges among mothers, with important class-based repercussions for employment outcomes (Cha 2010; Landivar 2017; Laughlin 2011; Weeden et al. 2016; Williams 2010). For less educated mothers, the availability of other resources—notably labor markets with higher wages and states with less expensive childcare and more publicly-funded childcare programs—may help them maintain employment. We directly explore these relationships.

College-educated mothers are more likely to enroll their children in higher quality, higher-cost, center-based care and to enroll their children at younger ages when care is more expensive (Laughlin 2013; Malik 2019). Because of strict income eligibility rules, college-educated mothers are also less likely to be covered by childcare subsidies or Head Start, although in many states they have equal access to state-funded pre-K as less educated mothers. Nonetheless, even when higher-educated and higher-income families spend more on childcare, they spend less as a proportion of their income (Laughlin 2013; Malik 2019). College-educated mothers are also more likely to have opportunities to offset some of the costs of care (e.g., availability of paid time off, greater schedule control, Dependent Care Allowances) (Chaudry et al., 2017; Landivar 2014; Laughlin 2011; Williams 2010). For less-educated mothers, they are more likely to rely on relatives for care (Laughlin 2013), which introduces greater variability in childcare costs and eligibility to be covered by childcare subsidies (Rachidi 2015). This study extends Damaske's (2011) argument that college-educated mothers are best equipped to overcome institutional barriers to employment than those with lower levels of education. Thus, it is important to estimate the relationship between childcare and employment by education to unpack these differences. We expect less-educated mothers' employment to be most sensitive to state differences in childcare resources.

3.3. The impact of multiple births on maternal employment

We also expect mothers with multiple children to face more difficulty maintaining employment, especially when childcare costs are expensive and public programs less available. In the United States, 39 percent of women between the ages of 15 and 50 have more than one child (U.S. Census Bureau 2019a, 2019b). The average spacing of children is 2.1 years, indicating that many families have multiple children under the age of 6 in the home. This means that multiple children, including multiple young children, are a part of the lived reality of many families. Mothers of multiple children are less likely to be employed, especially mothers of multiple preschool-aged children. Eighteen percent of mothers with one preschool-aged child were out of the labor force in 2013, compared with 24 percent of mothers with two preschool-aged children and 34 percent of mothers with three preschool-aged children (Landivar 2017). For families with multiple young children in states with expensive childcare, mothers may be more likely to leave the labor force.

Although having a larger number of children imposes higher childcare expenses, mothers of multiple children are more likely to be eligible for childcare subsidies or enrolled in Head Start (Herbst 2008). Not only are they more likely to meet the income threshold requirements with multiple children, but they are also more likely to get an offer from the state for childcare subsidies, placement in Head Start, or placement in pre-K in states with income eligibility restrictions. Because of significant variation in the total childcare burden based on the number of children and the potential higher enrollments of mothers of multiple children in Head Start and state-funded pre-K, we evaluate the effect of childcare costs, subsidies, Head Start, and state-funded pre-K by number of children. Since eligibility for public resources increases among those with multiple children, we also pay careful attention to the interaction between multiple children and maternal education. This provides a more comprehensive understanding of childcare resources available to mothers with several children by socioeconomic status.

4. Summary of expected relationships and hypotheses

Taking these literatures together, the expected relationships are clear. At the individual level, mothers with multiple young children should have lower odds of employment than those with fewer or no children (H1). At the state level, higher childcare costs, lower Head Start enrollment, lower childcare subsidy prevalence, and less extensive state-funded pre-K should be negatively associated with maternal employment (H2). Because government childcare programs and funding offer alternatives or aids to expensive childcare, we expect the prevalence of these programs to alleviate the challenge posed by high childcare costs to maternal employment (H3). Finally, we hypothesize the effects of state-level conditions to be larger for mothers of multiple children who have greater childcare requirements (H4) as well as less educated mothers who have fewer personal resources to overcome the challenges posed by unaffordable childcare (H5).

5. Methods

5.1. Data

We focus on parents of young children because most U.S. childcare spending is for children aged 5 years and younger (Chaudry et al., 2017; Malik 2019) and this period of parenthood is associated with the largest reductions in maternal employment (Landivar 2017). Our primary source of individual-level data comes from the 2016 American Community Survey (ACS) five-year PUMS[1] (covering 2012–2016[2]), which provides the most comprehensive coverage of social, demographic, and employment information on the U.S. population—making it ideal for our analysis requiring large cell counts across U.S. states. We restrict our sample to non-mothers and mothers of preschool-age children (5 years or younger) who are between the age of 25 and 55 years old. We limit our sample to women who are at least 25 years old, a common threshold used for educational attainment estimates and analyses (Goldin 2014; Ryan and Bauman 2016), allowing us to omit respondents in their early 20s who have not yet completed their education. Substantive findings are confirmed when expanding our sample to those as young as 18 and excluding respondents enrolled in school.[3]

We use four data sources to measure state-level characteristics that we hypothesize have a relationship to maternal employment. Childcare costs are measured as the average percentage of family income spent on center-based childcare for infants in each state.[4] Data for this measure come from the Child Care Aware State Factsheets averaged across 2011 through 2015 (Child Care Aware, 2011–2015). To measure the availability of Head Start, we use the percentage of eligible 3- and 4-year-olds who are enrolled in Head Start in each state. Source data come from the Head Start Program Information Reports, 2009–2010/2010-2011 compiled by diversitydatakids.org at the Heller School for Social Policy and Management at Brandeis University. Our third state-level characteristic represents the prevalence of childcare subsidies, measured as the percentage of eligible children receiving subsidies in each state. Data for this measure come from the U.S. Government Accountability Office (2016). Lastly, we measure the extent of state-funded pre-K as the percentage of 3- and 4-year-olds enrolled in these programs for each state during the 2011–2012 school year. Data on pre-K enrollment come from the National Institute for Early Education Research (Barnett et al., 2012).

5.2. Analytic approach

We use hierarchical logistic regression equations with varying intercepts to model the likelihood of employment as a function of motherhood status, individual-level covariates, and state-level childcare environment. In this approach, state-level residuals from the intercept (U_{0j}) are parsed from the individual-level error term (ε_{ij}) to effectively provide a separate intercept for each state. This accounts for the nesting of respondents within states that would otherwise violate the assumption of independence between observations in logistic regression. Our basic hierarchical model examines whether the relationship of motherhood (m) to employment (y) depends on state-level childcare costs and policies (p), modelled through an interaction:

$$\ln\left(\frac{y_{ij}}{1-y_{ij}}\right) = \gamma_{00} + \beta_1 m_{ij} + \beta_1 p_j + \beta_2 (m_{ij} \times p_j) + \beta_3 R_{ij} + U_{0j} + \varepsilon_{ij}$$

where motherhood (m) is measured categorically as having one, two, or three or more preschool-aged children, with women without children serving as the referent. Interacting this variable with state-level attributes (p), including average childcare costs, Head Start enrollment, prevalence of childcare subsidies, and access to state-funded pre-K allows us to examine whether these contextual features are related to the likelihood that mothers will be employed compared to women without children. To examine whether the relationship of Head Start, subsidies, and state-funded pre-K to mothers' employment depends on childcare costs, we expand the model to include a three-way interaction between motherhood, policy (Head Start enrollment, subsidies, and state-funded pre-K), and average childcare costs.

Our models also include a set of covariates to account for potential confounders (R_{ij}). At the individual level, these include race (Black, Latina, Asian American, other, with non-Hispanic white as the referent), marital status (separated/divorced, never married, with married as referent), age, foreign born status, logged hourly earnings,[5] logged spouse's income,[6] and education (less than high school, high school, some college, with college degree or more as the referent). Because many of the factors related to women's employment occur at a more local level than states, we also include several covariates measuring economic conditions in respondents'

[1] Public Use Microdata Series (Ruggles et al., 2019).

[2] The Census Bureau recommends using five-year estimates for analyses requiring large sample sizes for specific populations (e.g. mothers of one, two, or three children) within smaller geographies, such as states.

[3] One exception is that the moderating effect of Head Start on the relationship of childcare costs to employment was non-significant for less-educated mothers of three or more children (modelled with the three-way interaction between motherhood, childcare costs, and Head Start availability).

[4] Substantive findings are consistent when using average costs of childcare for 4-year-olds, and center-based childcare prices correlate strongly with average home-based care prices within each state. We use infant care costs because mothers are particularly vulnerable to labor market exits immediately following childbirth.

[5] For those not employed, we predicted hourly earnings based on age, age squared, race, education, and commuting zone of residence. The resulting estimate provides a measure of lost wages for mothers who are out of the labor force.

[6] Those without a spouse had a value of zero on this variable.

commuting zones.[7] These include managerial intensity (percent of labor force employed as managers), casualization (percent working full time), industry composition (service to manufacturing employment ratio), median hourly wages,[8] and the percent of the population that is foreign born. Finally, we include additional state-level controls to account for potential endogeneity between mothers' employment, childcare costs, subsidies, and state-funded pre-K. First, because expensive childcare may be a function of demand, we control for the percentage of children in each state residing in a childcare desert—a community with either no childcare providers or where the number of children is three times greater than the number of childcare slots (Malik et al., 2018). This control variable also allows us to capture some of the variability in the supply of licensed childcare centers relative to demand across states. Second, because 23 states require that recipients of childcare subsidies be employed, we control for the minimum hourly work requirements to be eligible for subsidies in each state (Minton et al., 2017).[9] Also accounting for state differences in the management of childcare subsidies, we control for whether subsidy copayments are adjusted based on the number of children under the recipients' care (Urban, 2020). Lastly, our models include two additional controls that account for the possibility that other forms of public social welfare may be spurious with childcare contexts in predicting maternal employment. Like Head Start and CCDBG subsidies, Temporary Assistance for Needy Families (TANF) is also a federal program administered by state agencies and therefore varies in accessibility and benefits. To account for the availability of TANF, we control for the percentage of families in poverty receiving TANF support (Meyer and Floyd 2020). We also control for the level of benefits TANF provides with a variable measuring TANF cash assistance as a percentage of statewide average fair market rent (Floyd and Schott 2011).

We believe this analytic approach provides the best means to explore the relationship between state childcare contexts and mothers' employment. Nonetheless, there are limitations. First, our use of cross-sectional data does not allow us to control for unobserved, individual-level characteristics that may affect mothers' employment. Studies examining mothers' labor force outcomes often use panel data to account for this form of unobserved heterogeneity (e.g., the Panel Study of Income Dynamics [PSID]; Budig and England 2001; Lundberg and Rose 2000; Waldfogel 1997). Unfortunately, these panel studies lack large enough cell counts within states and by presence and age of children to use in our current application. Thus, our use of the ACS enables us to explore questions around state childcare contexts that are unanswerable with existing, individual-level panel datasets, while also offering an opportunity to test whether mothers' reduced employment relative to women without children is found in this nationally representative dataset. To account for the limitations of the ACS related to individual-level confounders, we include numerous control variables for personal and family characteristics. Additionally, our focal state-level predictors are unlikely to be correlated with individual-level confounders that may predict both motherhood status and employment.

Beyond unobserved individual-level characteristics, it is also possible that additional omitted state variables are associated with both childcare contexts and maternal employment. Given that state legislation around childcare policy is correlated with broader legislative agendas and cultural environments, there are likely unobserved differences between states with varying childcare contexts. To mitigate these concerns, we focus primarily on the association of childcare contexts to mothers' employment relative to women without children, therefore parsing out unobserved state-characteristics related to women's employment more generally from those expressly pertaining to mothers. This strategy has been validated in prior research on women's employment and socioeconomic and childcare contexts (Landivar et al. 2021). In addition, we focus on state policies specifically oriented toward childcare that are more theoretically central in supporting families' caregiving needs, and we control for broader policy environments and socio-demographic composition.

We begin our reporting of results by first highlighting variability in mothers' employment by state and by the number of preschool-aged children. Next, we review descriptive patterns of childcare costs, Head Start availability, subsidy prevalence, and access to state-funded pre-K. Then we present the results of our hierarchical logistic regression models to test our hypotheses regarding the relationship between mothers' employment and state childcare contexts.

6. Results

6.1. State variation in mothers' employment and childcare contexts

Fig. 2 illustrates employment rates for mothers with children less than 6 years old across each U.S. state and Washington, D.C. States are sorted vertically according to employment rates for mothers of one preschool-aged child. Utah has the lowest rates of employment for mothers of one (60 percent employed), two (44 percent), and three or more (30 percent) children. At the other end, South Dakota has the third highest rate of employment among mothers with one child (80 percent), the second highest rate for mothers with two children (77 percent), and the third highest rate for mothers with three or more children (68 percent). Across nearly every state, mothers of three or more children have lower rates of employment than mothers of two children and mothers of one child. Similarly, mothers of two preschool-aged children have lower rates of employment than mothers of one child. These trends suggest that each additional child further reduces maternal employment. Yet, the extent of this difference varies across states. In Washington state, the share of mothers who are employed decreases by about 15 percentage points with each additional child, while in Texas this difference is 10 percentage points. In North Dakota, mothers of two and three or more preschool-aged children have similar rates of

[7] Commuting zones are defined by respondents' place of work, measured with Public Use Microdata Areas (Ruggles et al., 2019). We used place of residence for respondents who are not employed.

[8] Median hourly wages of commuting zones were adjusted by regional price parity, reflecting local cost of living.

[9] Substantive findings remain when restricting our sample to the 28 states without employment requirements for subsidies.

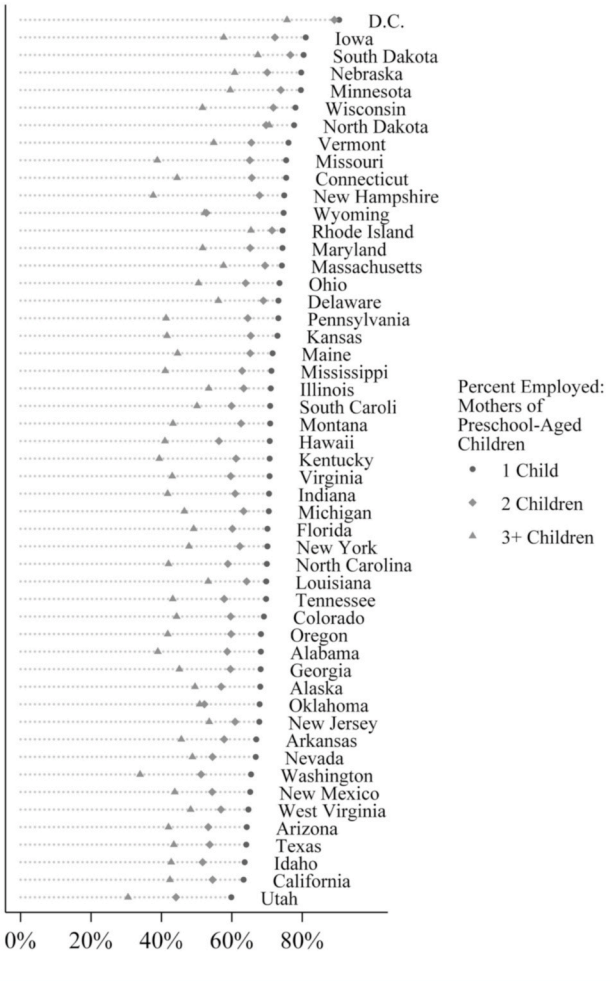

Fig. 2. Maternal Employment Rate by State. Note: Mothers' employment rates calculated with data from the 2016 five-year ACS PUMS.

employment (70 percent) that are only seven percentage points lower than mothers of one child.

In addition to these descriptive trends, Fig. 2 also suggests that states' broader reputations are not necessarily associated with what we might expect about rates of mothers' employment. States with different political, economic, and cultural environments, such as California and Texas, often have similar rates of mothers' employment. Maternal employment differs among Democratic states:

Table 1
State-level descriptive statistics.

	Overall		Less Than High School		College Educated	
	Mean	SD	Mean	SD	Mean	SD
% Women With Preschool-Aged Children	34.8	3.8	39.0	7.4	35.9	4.9
% with 1 Child	24.0	1.8	26.2	5.8	23.9	2.4
% with 2 Children	9.3	1.8	10.1	2.4	10.5	2.4
% with 3+ Children	1.6	0.6	2.6	1.4	1.6	0.8
Women's Employment by State						
Women Without Children	78.6	5.1	43.7	7.4	90.2	1.9
1 Child under 6 years	71.4	5.5	46.4	8.3	79.3	5.3
2 Children under 6 years	62.1	7.7	36.2	9.7	71.0	7.8
3+ Children under 6 years	48.4	9.1	29.9	19.3	54.5	13.3
State-Level Childcare Contexts						
% of Income Spent on Childcare	11.8	2.3				
% Eligible Enrolled in Head Start	52.1	17.4				
% Eligible Receiving Subsidies	11.5	3.8				
% of 3- and 4-Year Olds Enrolled in State-Funded Pre-K	13.6	2.3				

California and Washington have low maternal employment rates and Minnesota and Vermont have high rates. Politically conservative states from different regions often have high levels of maternal employment (e.g., South Dakota and Missouri). These dynamic patterns indicate that the factors shaping mothers' employment may not readily be associated with popular characterizations.

Table 1 summarizes state-level characteristics examined in this study. On average, 35 percent of women across states had at least one child below the age of 6. Of those, the majority had only one child, with a smaller share having two or three or more preschool-aged children. There was little difference by education in the share of women with young children. Table 1 also reports women's employment by motherhood status. On average, 79 percent of women without children were employed, compared to 71 percent of mothers with one child, 62 percent of mothers with two children, and 48 percent of mothers with three or more preschool-aged children. Consistent with Fig. 2, there was significant variation in states' employment trends, with a standard deviation of between 5 and 9 across mothers' employment. Employment trends differed by level of education. College-educated women without children had twice the rate of employment as non-mothers with less than a high school degree. Differences in employment rates for women without children and mothers was much larger for the college educated than those with lower levels of education. Among the college educated, 79 percent of mothers with one child, 71 percent with two children, and 55 percent with three or more children were employed. Despite these dips, however, a college degree appears to be a powerful driver of employment when compared to the employment rates of mothers with less than a high school education. Just under half of less-educated mothers with one young child were employed, while around a third of less-educated mothers with two and three or more children were working. On average, mothers of one child had rates of employment similar to non-mothers with less than a high school education, yet differences emerge after we control for individual and contextual factors in the analysis below (see Table 2). Less-educated mothers of two and three or more children had lower average rates of employment than those without children.

Finally, Table 1 also examines state childcare contexts. Mirroring trends in mothers' employment, states also had major differences in childcare costs and policy supports. Across states, childcare costs average 12 percent of family income. For some families, childcare costs may be partly offset by the availability of programs such as Head Start, childcare subsidies, or state-funded pre-K. Yet, Table 1 reports that not all eligible families receive these supports and there is variability in access across states. On average, 52 percent of eligible children were enrolled in Head Start across U.S. states. Yet, this figure varies widely, as indicated by the standard deviation of 17 and the map illustrated earlier (Fig. 1). This variation underscores that although Head Start is a federally funded program, it is not evenly available across the country. Turning to the availability of childcare subsidies, relatively few families who qualify for subsidies receive them. On average, subsidies are given to only 11.5 percent of eligible state residents, suggesting major barriers to accessing these resources. Lastly, Table 1 reports that, on average, fewer than 14 percent of 3- and 4-year-olds are enrolled in state-funded pre-K in states throughout the U.S., with substantial variation across states.[10]

The descriptive statistics reveal two patterns lending further motivation for our hypotheses. First, there is major variation across states in mothers' employment, in both broad trends and by the number of preschool-aged children. Second, there are differences in childcare contexts between states. Not only does the average cost of childcare vary, but the availability of federally funded programs such as Head Start and childcare subsidies, as well as state-funded pre-K, range widely from state to state as a result of differing funding and implementation strategies. To further explore the relationship between mothers' employment and childcare contexts, we present the results of our hierarchical logistic regression models.

6.2. *The relationship between mothers' employment and state-level childcare contexts*

Table 2 shows the results of our models testing whether state childcare contexts are associated with mothers' employment. The first set of models provides a baseline by testing the association of motherhood with the likelihood of employment, controlling for socio-demographic and contextual variables. Across levels of education, being a mother of preschool-aged children was associated with lower odds of employment, net of control variables (Model 1; $p < .001$). This finding confirms previous research on maternal employment (Hynes and Clarkberg 2005; Killewald and Zhuo 2015; Landivar 2017) and on state-to-state differences (Ruppanner et al. 2019). Model 1 also reveals that the likelihood of employment decreases with each additional preschool-aged child, consistent with our expectations (H1). The reduction in employment associated with motherhood was largest for women with a college degree, reflecting the fact that college-educated women without children have high employment rates (see Table 1). It is notable that despite the descriptive trends showing little overall difference in employment between women with less than a high school degree who have no children and those who have one young child, the results in Table 2 show a significant reduction in the likelihood of employment ($p < .001$). This suggests that having a child is associated with reductions in employment among less educated women who would otherwise be working.

Models 1 through 3 include state-level characteristics measuring childcare contexts. In these models, state childcare contexts are not interacted with motherhood and therefore provide only baseline associations. We find that childcare costs, Head Start enrollment, subsidy prevalence, and the extent of state-funded pre-K are unrelated to women's employment. While these main effects are informative in establishing baseline associations between childcare contexts and women's employment, they do not shed light on whether these state characteristics predict maternal employment.

The first set of models in Table 1 shows the reduced likelihood of employment associated with motherhood. We are unable to

[10] Note that the descriptive statistics provided in Table 1 are between-state averages and may differ slightly from national averages that pool state residents. For example, the national percentage of eligible families receiving subsidies is 11 percent (U.S. Government Accountability Office 2016), but the between-state average is 11.5 percent. This is because some populous states, such as California (8 percent), have lower subsidy prevalence.

Table 2
Random intercept logistic regression models predicting employment with motherhood and state childcare contexts.

	Baseline			Childcare Context * Motherhood		
	Pooled Model 1	Less than HS Model 2	College+ Model 3	Pooled Model 4	Less than HS Model 5	College+ Model 6
Number of Preschool Children (0)						
1 Child	−0.522***	−0.196***	−0.786***	−0.424***	−0.176	−1.101***
	(0.017)	(0.052)	(0.022)	(0.102)	(0.175)	(0.150)
2 Children	−1.028***	−0.640***	−1.250***	−1.181***	−0.634*	−1.935***
	(0.023)	(0.054)	(0.035)	(0.172)	(0.270)	(0.198)
3+ Children	−1.547***	−0.902***	−1.961***	−1.660***	−0.441	−2.537***
	(0.049)	(0.078)	(0.050)	(0.276)	(0.616)	(0.303)
State Childcare Contexts						
Childcare Costs (% of Income)	0.378	−0.147	1.352	1.772	1.580	2.079*
	(0.977)	(1.415)	(0.993)	(1.013)	(1.442)	(1.053)
Head Start Enrollment	−0.011	−0.245	0.106	−0.174	−0.478*	−0.269*
	(0.137)	(0.191)	(0.121)	(0.135)	(0.224)	(0.133)
% Eligible Receiving Childcare Subsidies	−0.657	−0.662	−0.454	−1.247*	−1.482**	−1.118
	(0.582)	(0.547)	(0.544)	(0.566)	(0.522)	(0.587)
Pre-K Availability	−0.112	−0.083	−0.008	−0.221	−0.002	−0.292
	(0.170)	(0.236)	(0.130)	(0.174)	(0.247)	(0.153)
Childcare Costs * Motherhood of Preschool-Aged Children						
Childcare Costs * 1 Child				−3.567***	−3.934**	−1.847
				(0.521)	(1.240)	(1.029)
Childcare Costs * 2 Children				−2.940***	−5.175**	0.205
				(0.860)	(1.795)	(1.287)
Childcare Costs * 3+ Children				−3.170*	−8.929**	−0.921
				(1.401)	(3.083)	(1.905)
Head Start * Motherhood of Preschool-Aged Children						
Head Start Enrollment * 1 Child				0.317**	0.657*	0.688***
				(0.117)	(0.311)	(0.188)
Head Start Enrollment * 2 Children				0.567**	1.027**	0.815**
				(0.180)	(0.375)	(0.257)
Head Start Enrollment * 3+ Children				0.753***	1.018	1.169***
				(0.203)	(0.656)	(0.328)
Subsidy * Motherhood of Preschool-Aged Children					0.000	0.000
Subsidy Availability * 1 Child				1.477***	2.174**	1.336
				(0.385)	(0.825)	(0.687)
Subsidy Availability * 2 Children				1.714**	1.994*	1.486
				(0.612)	(0.945)	(0.807)
Subsidy Availability * 3+ Children				−0.077	0.025	0.015
				(1.060)	(1.958)	(1.013)
Pre-K * Motherhood of Preschool-Aged Children						
Pre-K Availability * 1 Child				0.189	−0.369	0.518**
				(0.138)	(0.432)	(0.187)
Pre-K Availability * 2 Children				0.405	−0.253	0.785**
				(0.217)	(0.443)	(0.258)
Pre-K Availability * 3+ Children				1.051***	0.975	0.972**
				(0.300)	(0.680)	(0.332)
Constant	−0.974*	−1.852***	−1.634**	−1.007*	−1.873***	−1.437*
	(0.467)	(0.452)	(0.632)	(0.450)	(0.432)	(0.596)
Variance (Constant)	0.016***	0.020***	0.014***	0.015***	0.019***	0.013***
	(0.003)	(0.006)	(0.003)	(0.003)	(0.005)	(0.003)
N	1701392	119665	692283	1701392	119665	692283

Note: All models include controls for individual-level (race, marital status, age, foreign born status, wages, spouse's earnings, and education), local labor market (industry composition, median wage, managerial intensity, casualization, and percent foreign born), and state (childcare deserts, work requirements for subsidies, whether subsidies adjust for number of children, TANF to poverty ratio, and TANF benefits as a share of fair market rent) characteristics. Coefficients and standard errors for childcare costs (% of family income), % enrolled in Head Start, % eligible receiving subsidies, % enrolled in pre-K, and interactions of these variables with number of children multiplied by 100 to simplify presentation. Standard errors in parentheses, *p < .05; **p < .01; ***p < .001.

determine the extent to which these trends are driven endogenously whereby working women have fewer or no children. Assuming this individual-level relationship remains constant across states, the second set of models (3–6) tests whether patterns of maternal employment are associated with state-childcare contexts. These results lend initial support to our hypotheses. States with more expensive childcare had lower levels of maternal employment (Model 4; p < .05), supporting H2. This relationship affirms previous research showing that mothers reduce their labor force participation when childcare prices are high (Connelly 1992; Han and Waldfogel 2002; Ruppanner et al. 2019). Examining differences by level of education, however, reveals important nuances. Among college-educated women, the high childcare prices had non-significant relationships on the employment odds of mothers with one, two, and three or more children. It is possible that selectivity is driving these trends—such that only college-educated women who can

afford childcare have more than one young child. In contrast, childcare costs had a significant negative association with employment for mothers with less than a high school diploma ($p < .01$) that increased in magnitude with each additional child. These women are less likely to hold jobs that can pay for the growing cost of childcare with additional children. Therefore, these mothers are more likely to leave the labor force as they have more children in states with expensive childcare. These findings provide partial support for H4 by showing that the negative association between childcare prices and mothers' employment is most pronounced for mothers of multiple children, but this relationship pertains only to less-educated mothers and is not observed for mothers with a college degree, lending support for H5.

While childcare costs are negatively associated with the likelihood of mothers' employment, Head Start availability is positively associated. For both less than high school and college-educated mothers, greater accessibility to Head Start was associated with a higher likelihood of employment (Models 5 and 6; $p < .05$), lending support for H2. This suggests that this public form of childcare

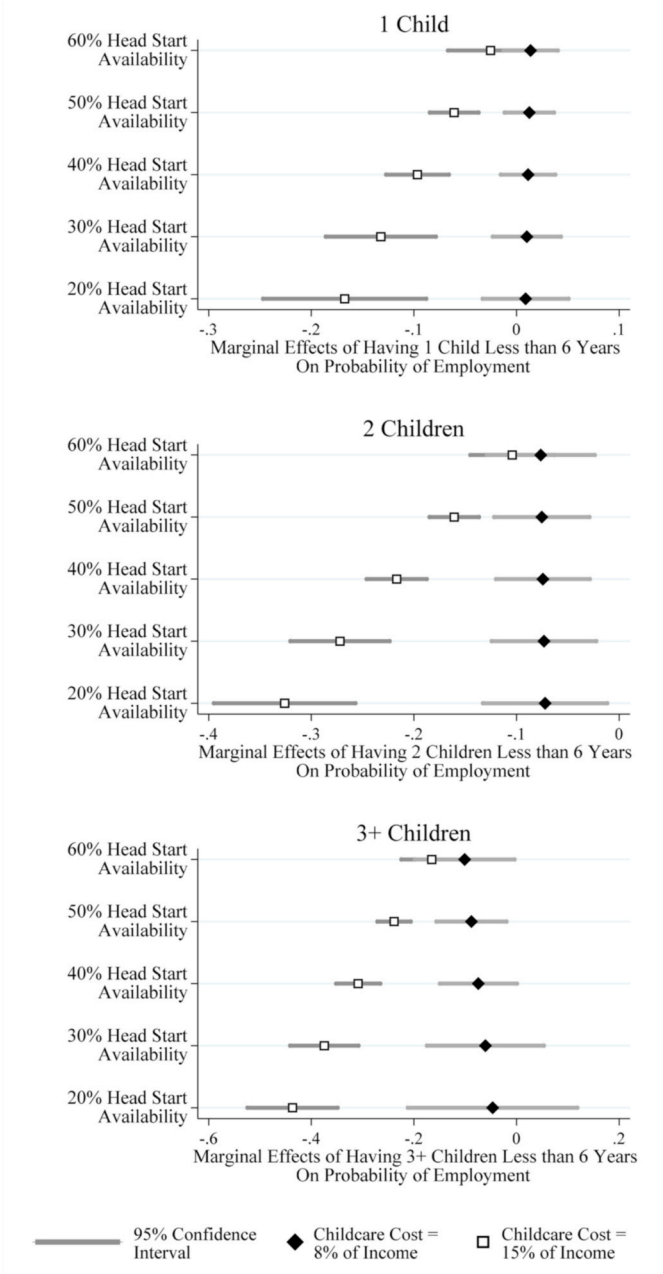

Fig. 3. Marginal Effects of Motherhood on Probability of Employment for Less than High School Educated Mothers by Head Start Enrollment and Childcare Costs. Note: Figures calculated with data from 2016 ACS five-year PUMS.

makes it possible for some women to avoid private childcare expenses and remain in the labor force. One exception is that states' Head Start enrollment was not significantly associated with the employment of less-educated mothers with three or more children, although the coefficient was positive and only slightly smaller in magnitude than what we observed among college-educated mothers with three or more children. Nonetheless, the overall trends point to a positive relationship between Head Start and mothers' employment (supporting H2). The relationship of Head Start to mothers' employment was consistently positive regardless of mothers' education, even though college-educated mothers would be less likely to be eligible for these programs. This suggests that the advantages of Head Start on mothers' employment extend beyond the immediate beneficiaries, perhaps by reducing competitive market pressures that increase costs in areas with more limited childcare resources.

In addition to Head Start enrollment, childcare subsidies also support mothers' employment, but primarily for mothers with lower educational attainment. Among mothers who have less than a high school education, the accessibility of subsidies was associated with a higher likelihood of employment for mothers with one and two children (Model 5; $p < .05$). This positive relationship was not observed among less-educated mothers with three or more children, suggesting either that subsidies do not provide enough support for mothers with three or more children or that mothers of three or more children decide not to work regardless of subsidy support. Subsidies were also non-significantly related to college-educated mothers' employment, who are less likely to qualify for this form of public support.

In contrast to subsidies, Table 2 reports that the prevalence of state-funded pre-K has a positive association with maternal employment among college-educated mothers, but not lower-educated mothers. College-educated mothers with one, two, and three or more children in states with more expansive state-funded pre-K are predicted to have a higher likelihood of employment than those residing in states where state-funded pre-K is less common (Model 6; $p < .01$). For mothers with less than a high school education, state-funded pre-K is non-significantly related to employment. However, the coefficient for the relationship of pre-K availability to less-educated mothers of three or more children is similar in magnitude to college-educated mothers, suggesting that state-funded pre-K may have minor benefits for this specific group. Overall, however, these results indicate that state-funded pre-K is primarily associated with a greater likelihood of employment among college-educated mothers, reflecting the fact that these programs are less likely than Head Start or childcare subsidies to have eligibility restrictions that would limit access for more educated parents.

6.3. *Childcare context: testing interactions at the state level*

In general, higher childcare costs predict lower levels of maternal employment, while greater Head Start, childcare subsidy, and state-funded pre-K availability are associated with increased levels of maternal employment. To further investigate these state-level dynamics, we tested a three-way interaction between motherhood status, childcare costs, and the availability of Head Start, subsidies, and state-funded pre-K (Appendix Table A1). This interaction term allows us to examine whether the three variables measuring the prevalence of publicly funded childcare programs offset the negative effects of high childcare costs, testing H3.

The results of the three-way interaction reveal a key mechanism by which government childcare policies support less-educated mothers' employment. Given the complexity of these relationships, we present main findings graphically in Fig. 3. Examining differences by level of education, we find that the protective effects of Head Start availability were most pronounced for mothers with less than a high school education, who are most likely to qualify for enrollment in these programs (supporting H5). Among less-educated mothers, greater availability of Head Start mitigated the negative effects of childcare costs for mothers of one ($p < .05$), two ($p < .01$), and three or more young children ($p < .05$). These interaction terms were non-significant for college-educated mothers, likely because these women are less likely to qualify for Head Start and because our previous results (Table 2) showed that childcare costs are not as strongly related to college-educated mothers' employment. This finding indicates that a key mechanism by which Head Start supports maternal employment among mothers with lower levels of educational attainment is by providing alternative childcare arrangements in states that have high childcare costs.

The relationship between Head Start availability, childcare costs, and employment among mothers with less than a high school education is illustrated in Fig. 3, which plots the probability of mothers' employment relative to non-mothers by the availability of Head Start, comparing states with higher childcare costs (15 percent of income) to those with lower childcare costs (8 percent of income). For less educated mothers of one, two, and three or more children, their employment is less common in states with the greatest constraints: lower Head Start enrollment and higher childcare costs. As Head Start becomes more available, however, the gap in maternal employment between high-cost and low-cost states converges. This suggests that Head Start mitigates some of the barriers presented by high childcare costs among less educated mothers, allowing them to remain employed (support for H3).

In addition to Head Start, we also examined whether the prevalence of childcare subsidies and state-funded pre-K moderated the relationship between childcare costs and maternal employment. Unlike Head Start, we found that these two additional policy contexts did not alter the association of childcare expenses to the likelihood of mothers' employment. We report full results of these models in the Appendix, Table A1. In short, we found that the negative association between childcare costs and maternal employment exists regardless of subsidy prevalence or the extent of state-funded pre-K. This relationship holds across levels of education. These findings suggest that, unlike Head Start, childcare subsidies and state-funded pre-K do not offset the challenges of expensive childcare. It is possible that the lower levels of availability of these two programs relative to Head Start (see Table 1) contribute to these patterns.[11]

[11] As a further robustness check, we estimated our models restricting the sample to a higher threshold of pre-K enrollment that included only states with at least 20 percent of 3- and 4-year-olds in state-funded pre-K (14 states) and 30 percent (6 states) and found that our null findings for pre-K are consistent.

Although mothers' employment was positively associated with greater childcare subsidy prevalence among mothers with lower levels of education (see Table 2), this program did not reduce the negative relationship of expensive childcare to these mothers' likelihood of employment. This is possibly due to co-pays and other out-of-pocket expenses that subsidy recipients often cover, which may be higher in states with more expensive childcare. Subsidies may also cover an insufficient share of childcare costs in high-cost markets. State-funded pre-K was neither associated with less-educated mothers' employment (Table 2), nor did it moderate the negative relationship of childcare costs to these mothers' employment (Table A1). As availability of state-funded pre-K was low in many states, these patterns indicate that state-funded pre-K may not serve as a major source of employment support in most states among mothers with lower levels of education.

7. Discussion and conclusion

In this study, we situate maternal employment decisions within states' childcare resources. Given the lack of a robust, national infrastructure for childcare like the systems available in other wealthy western nations, an emerging literature documents vast geographical differences in care across the United States (Chaudry et al., 2017; Ruppanner 2020; Ruppanner et al. 2019). This means that some mothers face steeper institutional constraints—more expensive childcare, less Head Start coverage, fewer childcare subsidies, and scarcer opportunities to enroll children in state-funded pre-K—than others just by virtue of living in one state versus another.

Our findings of significant heterogeneity across states challenge conventional theorizing about the United States in much of the comparative welfare state literature and in discussions about the U.S. crisis of care. We suggest that the monolithic conceptualization of the U.S. as a liberal welfare state obscures important intranational differences that have material consequences for women, children, and families. The opportunities and constraints on mothers' employment are very different in Nebraska, for example, than they are in Georgia and relate to each states' distinct provision of public childcare policies and childcare costs. Importantly, we also found that states' availability of progressive policies such as paid parental leave does not necessarily support mothers' employment if childcare costs remain high. For example, California was one of the first states in the nation to legislate paid parental leave for working parents, but it has some of the most expensive childcare options and among the lowest rates of maternal employment. California, thus, is a prime target to extend family policies to support mothers' employment (Ruppanner 2020).

Childcare costs are only one dimension structuring maternal employment. We also find Head Start, childcare subsidies, and state-funded pre-K to be important contextual features with dynamic relationships to mothers' employment. Our findings suggest that Head Start enrollment supports less-educated mothers' employment through reducing the challenges related to expensive childcare. These benefits of Head Start enrollment extend to those with one, two, and three or more young children in the home. By contrast, we found that childcare subsidies are also associated with employment among mothers with lower educational attainment, but not through reducing the burden of expensive childcare. Unlike Head Start, childcare subsidies still require significant out-of-pocket expenses, such as co-pays, that may continue to pose barriers to parents' employment in high-cost environments. Whereas the benefits of Head Start and childcare subsidies were observed among mothers with lower levels of education who are more likely to be eligible for these programs, state-funded pre-K was primarily associated with employment among college-educated mothers.

Our findings provide initial evidence that public investments in childcare across U.S. states have a strong and positive relationship to maternal employment. More research is needed to determine causality and establish the mechanisms driving these relationships. Studies focusing on longitudinal shifts in childcare policy and childcare costs within states may be well suited for addressing concerns with omitted variable bias in establishing the relationship between state-level contexts and mothers' employment. In addition, our focus was primarily on state-level availability and costs of formal childcare, but informal childcare also plays a critical role in supporting mothers' employment, which may be especially valuable to those with less education and multiple preschool-aged children. These questions are particularly pressing in light of the unprecedented disruption of childcare under COVID-19 that had disparate impacts across cities, states, and regions. Thus, future research expanding on our conceptual findings might investigate how childcare costs and resources are distributed within smaller geographical units—counties, cities, neighborhoods—to better contextualize the multiplicity of caregivers and the patchwork of resources within states.

Our study adds to a growing body of research highlighting the social benefits of public childcare policies (Collins 2019; Kaufman 2020; Ruppanner 2020; Scarborough et al., 2021). Absent a national childcare program, our findings underscore the role that states can play in supporting maternal employment through expanding the availability of Head Start, childcare subsidies, and publicly funded pre-K—programs associated with higher levels of maternal employment. In particular, our findings suggest that Head Start may be a critical avenue for expanding childcare access in the United States.

Disclaimer

The views in this paper represent those of the authors and not necessarily those of the Department of Labor.

Acknowledgement

This project is funded by the ARC DE150100228. The authors would like to thank the editor and anonymous reviewers at Social Science Research for helpful comments and suggestions on earlier versions of this article. The authors would also like to thank Rhiannon Patterson at the Government Accountability Office for guidance in retrieving and using childcare subsidy data.

Appendix A

Table A1
Random Intercept Logistic Regression Models Predicting Employment with Motherhood and State Childcare Contexts, Three-Way Interaction Results

	Childcare Context * Childcare Costs * Motherhood					
	Pooled		Less than HS		College+	
	β	SE	β	SE	β	SE
Presence of Preschool Children						
Number of Preschool Children (0)						
1 Child	−0.574	(0.500)	1.359	(0.868)	−2.178*	(0.865)
2 Children	−1.529	(0.897)	−0.404	(1.263)	−2.604*	(1.173)
3+ Children	−2.716	(1.390)	2.414	(2.349)	−2.946*	(1.359)
State Childcare Contexts						
Childcare Costs (% of Income)	6.419	(5.588)	10.254	(6.663)	2.722	(5.121)
Head Start Enrollment	0.253	(0.627)	1.517*	(0.679)	−1.031	(0.593)
% Eligible Receiving Childcare Subsidies	1.630	(3.652)	−0.741	(4.291)	3.089	(3.347)
Pre-K Availability*Childcare Costs	−0.814	(0.979)	−2.093	(1.564)	−0.402	(0.982)
Head Start Enrollment*Childcare Costs	−4.821	(6.052)	−20.182**	(6.417)	6.259	(5.570)
Subsidy Availability*Childcare Costs	−24.870	(31.584)	−6.350	(36.037)	−36.138	(29.125)
Pre-K Availability*Childcare Costs	5.132	(7.994)	18.719	(12.087)	0.564	(8.087)
Childcare Costs * Motherhood of Preschool-Aged Children						
Childcare Costs * 1 Child	−2.471	(3.968)	−17.034*	(7.339)	6.785	(7.177)
Childcare Costs * 2 Children	−0.441	(6.722)	−8.708	(10.186)	5.509	(9.229)
Childcare Costs * 3+ Children	5.100	(11.291)	−34.985	(18.077)	2.399	(11.238)
Head Start * Motherhood of Preschool-Aged Children						
Head Start * 1 Child	−0.205	(0.639)	−1.627	(0.961)	1.250	(0.962)
Head Start * 2 Children	−0.326	(1.060)	−3.017**	(1.105)	0.950	(1.467)
Head Start * 3+ Children	1.003	(1.024)	−5.514	(3.482)	1.473	(1.848)
Subsidy * Motherhood of Preschool-Aged Children						
Subsidy Availability * 1 Child	5.104	(2.806)	−1.444	(4.136)	7.222	(5.009)
Subsidy Availability * 2 Children	7.956	(4.285)	14.940*	(7.009)	6.027	(5.799)
Subsidy Availability * 3+ Children	4.735	(7.329)	−1.450	(12.927)	2.249	(7.932)
Pre-K * Motherhood of Preschool-Aged Children						
Pre-K Availability * 1 Child	0.139	(0.803)	0.148	(1.628)	1.301	(1.326)
Pre-K Availability * 2 Children	0.993	(1.584)	2.173	(2.267)	1.314	(2.044)
Pre-K Availability * 3+ Children	3.681	(2.142)	5.552	(3.687)	0.909	(2.409)
Childcare Costs * Head Start Availability*Motherhood of Preschool Aged Children						
Childcare Costs * Head Start *1 Child	4.487	(5.492)	20.985*	(10.114)	−4.626	(8.703)
Childcare Costs * Head Start *2 Children	8.006	(8.728)	37.025***	(10.631)	−1.024	(12.499)
Childcare Costs * Head Start *3+ Children	−1.215	(9.536)	60.920*	(28.891)	−2.690	(15.629)
Childcare Costs * Subsidy Availability*Motherhood of Preschool Aged Children						
Childcare Costs * Subsidy Availability*1 Child	−29.446	(21.781)	27.759	(34.350)	−46.944	(42.272)
Childcare Costs * Subsidy Availability*2 Children	−50.625	(33.785)	−105.063	(54.046)	−36.258	(48.330)
Childcare Costs * Subsidy Availability*3+ Children	−38.995	(59.552)	10.045	(99.819)	−17.688	(66.095)
Childcare Costs * Pre-K Availability*Motherhood of Preschool Aged Children						
Childcare Costs * Pre-K Availability*1 Child	0.315	(6.491)	−5.923	(12.578)	−6.036	(10.829)
Childcare Costs * Pre-K Availability*2 Children	−5.162	(12.248)	−21.915	(18.013)	−4.174	(15.734)
Childcare Costs * Pre-K Availability*3+ Children	−21.990	(17.621)	−41.641	(29.585)	0.827	(20.482)
Constant	−1.498	(0.921)	−2.757**	(1.012)	−1.486	(1.064)
Variance (Constant)	0.014***	(0.003)	0.017***	(0.004)	0.011***	(0.003)
N	1701392		119665		692283	

Note: All models include controls for individual level (race, marital status, age, foreign born status, wages, spouse's earnings, and education), local labor market (industry composition, median wage, managerial intensity, casualization, and percent foreign born), and state (childcare deserts, work requirements for subsidies, whether subsidies adjust for number of children, TANF to poverty ratio, and TANF benefits as a share of fair market rent) characteristics. Coefficients and standard errors for childcare costs (% of family income), % enrolled in Head Start, % eligible receiving subsidies, % enrolled in pre-K, and interactions of these variables with number of children multiplied by 100 to simplify presentation. Standard errors in parentheses, *p < .05; **p < .01; ***p < .001.

References

Barnett, W.S., Hustedt, J.T., 2011. Improving Public Financing for Early Learning Programs, vol. 23. Preschool Brief. http://nieer.org/resources/policybriefs/24.pdf.
Barnett, W.S., Carolan, M.E., Fitzgerald, J., Squires, J.H., 2012. The State of Preschool 2012: State Preschool Yearbook. Executive Summary. National Institute for Early Education Research. https://nieer.org/wp-content/uploads/2016/08/yearbook2012_ executivesummary.pdf.
Baum, C., 2002. A dynamic analysis of the effect of child care costs on the work decisions of low-income mothers with infants. Demography 39, 139–164.

Blau, D., 2003. Childcare subsidy programs. In: Moffitt, R. (Ed.), Means-tested Transfer Programs in the U.S. University of Chicago Press, Chicago, IL, pp. 291–363.
Blau, D., Tekin, E., 2007. The determinants and consequences of childcare subsidies for single mothers in the USA. J. Popul. Econ. 20, 719–741.
Blau, F.D., Kahn, L.M., 2013. Female labor supply: why is the US falling behind? Am. Econ. Rev. 103 (3), 251–256.
Bourke-Taylor, H., Howie, L., Law, M., 2011. Barriers to maternal workforce participation and relationship between paid work and health. J. Intellect. Disabil. Res. 55, 511–520.
Budig, M.J., England, P., 2001. The wage penalty for motherhood. Am. Socio. Rev. 66, 205–225.
Cha, Y., 2010. Reinforcing separate spheres: the effect of spousal overwork on men's and women's employment in dual-earner households. Am. Socio. Rev. 75, 303–329.
Chaudry, A., Morrissey, T., Weiland, C., Yoshikawa, H., 2017. Cradle to Kindergarten: A New Plan to Combat Inequality. Russell Sage, New York.
Chien, N., 2019. Factsheet: Estimates of Childcare Eligibility and Receipt for Fiscal Year 2015. U.S. Department of Health and Human Services, Issued January.
Child Care Aware of America, 2018. The US and the High Cost of Childcare: A Review of Prices and Proposed Solutions for a Broken System. Child Care Aware, Arlington, VA.
Child Care Aware of America, 2015. Annual state fact sheet. Child care aware. USA.childcareaware.org/statefactsheets, 2011-2015. (Accessed 12 April 2019).
Collins, C., 2019. Making Motherhood Work. How Women Manage Careers and Caregiving. Princeton University Press, Princeton, NJ.
Connelly, R., Kimmel, J., 2003. The effect of childcare costs on the employment and welfare recipiency of single mothers. South. Econ. J. 69 (3), 498–519.
Connelly, R., 1992. The effect of childcare costs on married women's labor force participation. Rev. Econ. Stat. 74, 83–90.
Damaske, S., 2011. For the Family? How Class and Gender Shape Women's Work. Oxford University Press, New York.
Del Boca, D., 2015. Child Care Arrangements and Labor Supply. In: IDB Working Paper Series, vol. 569. No. IDB-WP.
Department of Health and Human Services, 2015. Child Care and Development Fund (CCDF) Program, Proposed Rule, 80 Fed. Reg. 80466-80582. Issued December 24.
Diversitydatakids.org, 2019. Head Start Capacity: Head Start Participations as Share of Head Start Income-Eligible Children. Heller School for Social Policy and Management at Brandeis University.
Education Commission of the States, 2018. How States Fund Pre-K: A Primer for Policymakers. https://www.ecs.org/wp-content/uploads/How-States-Fund-Pre-K_A-Primer-for-Policymakers.pdf.
Esping-Andersen, G., 1990. The three political economies of the welfare state. Int. J. Sociol. 20 (3), 92–123.
Floyd, I., Schott, L., 2011. TANF Benefits Fell Further in 2011 and Are Worth Much Less than in 1996 in Most States. Center on Budget and Policy Priorities. https://www.cbpp.org/research/tanf-benefits-fell-further-in-2011-and-are-worth-much-less-than-in-1996-in-most-states.
Flynn, L., 2017. Childcare markets and maternal employment: a typology. J. Eur. Soc. Pol. 27 (3), 260–275.
Folbre, N., 2008. Valuing Children: Rethinking the Economics of the Family. Harvard University Press, Cambridge, MA.
Friedman-Krauss, A.H., Barnett, W.S., Garver, K.A., Hodges, K.S., Weisenfeld, G.G., DiCrecchio, N., 2020. The State of Preschool 2019: State Preschool Yearbook. National Institute for Early Education Research. https://nieer.org/wp-content/uploads/2020/11/YB2019_Full_Report.pdf.
Goldin, C., 2014. A grand gender convergence: its last chapter. Am. Econ. Rev. 104 (4), 1091–1119.
Gornick, J.C., Meyers, M., 2003. Families that Work: Policies for Reconciling Parenthood and Employment. Russell Sage Foundation, New York.
Han, W., Waldfogel, J., 2002. Child care costs and women's employment: a comparison of Single and married mothers with pre-school-aged children. Soc. Sci. Q. 82 (3), 552–568.
Hays, S., 1996. The Cultural Contradictions of Motherhood. Yale University Press, New Haven.
Heckman, J.J., Krueger, A.B., 2005. Inequality in America: what Role for Human Capital Policies? MIT Press Books, Cambridge, MA.
Hegewisch, A., Gornick, J.C., 2011. The impact of work-family policies on women's employment: a review of research from OECD countries. Community Work. Fam. 14 (2), 119–138.
Herbst, C., 2008. Who are the eligible non-recipients of child care subsidies? Child. Youth Serv. Rev. 30, 1037–1054.
Hofferth, S.L., 1994. Who enrolls in Head Start? A demographic analysis of Head start-eligible children. Early Child. Res. Q. 9, 243–268.
Hynes, K., Clarkberg, M., 2005. Women's employment patterns during early parenthood: a group-based trajectory analysis. J. Marriage Fam. 67 (1), 222–239.
Jaumotte, F., 2003. Labour force participation of women: empirical evidence on the role of policy and other determinants in OECD countries. OECD Econ. Stud. 2, 51–108.
Killewald, A., Zhuo, X., 2015. Mothers' long-term employment patterns. Upjohn Institute for Employment Research, Kalamazoo, MI. Working Paper 15-247.
Kimmel, J., 1998. Childcare costs as a barrier to employment for single and married mothers. Rev. Econ. Stat. 80, 287–299.
Kornrich, S., Furstenberg, F., 2013. Investing in children: changes in parental spending on children, 1972–2007. Demography 50, 1–23.
Kornrich, S., Ruppanner, L., Lappegård, T., 2020. Spending on children across four countries: variation in the role of income and women's labor force participation. Social Politics 27 (3), 562–587.
Landivar, L.C., 2014. Opting out, scaling back, or business-as-usual? An occupational assessment of women's employment. Socio. Forum 29 (1), 189–214.
Landivar, L.C., 2017. Mothers at Work: Who Opts Out? Lynne Rienner Publishers, Boulder, CO.
Landivar, L.C., Ruppanner, L., Scarborough, W.J., 2021. Are states created equal? Moving to a state with more expensive childcare reduces mothers' odds of employment. Demography 58 (2), 451–470.
Laughlin, L., 2011. Maternity Leave and Employment Patterns: 2006-2008. Current Population Reports, P70–128. U.S. Census Bureau, Washington, D.C.
Laughlin, L., 2013. Who's minding the kids? Childcare arrangements: spring 2011. In: Current Population Reports, P70–135. U.S. Census Bureau, Washington, D.C.
Liu, M., 2015. An ecological review of literature on factors influencing working mothers' child care arrangements. J. Child Fam. Stud. 24, 161–171.
Lundberg, S., Rose, E., 2000. Parenthood and the earnings of married men and women. Lab. Econ. 7 (6), 689–710.
Malik, R., 2019. Working Families Are Spending Big Money on Childcare. Center for American Progress. https://www.americanprogress.org/issues/early-childhood/reports/2019/06/20/471141/working-families-spending-big-money-child-care/.
Malik, R., Hamm, K., Schochet, L., Novoa, C., Workman, S., Jessen-Howard, S., 2018. America's Child Care Deserts in 2018. Center for American Progress. https://www.americanprogress.org/issues/early-childhood/reports/2018/12/06/461643/americas-child-care-deserts-2018/.
Maume, D.J., 2006. Gender differences in restricting work efforts because of family responsibilities. J. Marriage Fam. 68 (4), 859–869.
Meyer, L., Floyd, I., 2020. Cash assistance should reach millions more families to lessen hardship. Center on Budget and Policy Priorities. https://www.cbpp.org/research/family-income-support/tanf-reaching-few-poor-families.
Minton, S., Blatt, L., Tran, V., Stevens, S., Giannerelli, L., 2017. The CCDF policies database book of tables. Office of Planning, Research, and Evaluation. https://www.acf.hhs.gov/sites/default/files/opre/ccdf_policies_database_2016_book_of_tables_final_12_05_17_b508.pdf.
Office of Head Start, 2019. Sec. 645, participation in Head Start programs, Head Start policy and regulations. Office of Head Start. https://eclkc.ohs.acf.hhs.gov/policy/head-start-act/sec-645-participation-head-start-programs.
Organisation for Economic Co-operation and Development, 2019a. PF3.1: Public Spending of Childcare and Early Education. OECD Family Database. https://www.oecd.org/els/soc/PF3_1_Public_spending_on_childcare_and_early_education.pdf.
Organisation for Economic Co-operation and Development, 2019b. PF3.2: Enrolment in Childcare and Pre-school. OECD Family Database, 2020). Is childcare affordable?. Policy Brief on Employment, Labour and Social Affairs. https://www.oecd.org/els/family/OECD-Is-Childcare-Affordable.pdf. http://www.oecd.org/els/soc/PF3_2_Enrolment_childcare_preschool.pdf.Organisation for Economic Co-operation and Development.
Rachidi, A., 2015. Childcare Assistance in the United States and Non-standard Work Schedules. Economic Policy Working Paper 2015-13. American Enterprise Institute, Washington, D.C.
Ramey, C.T., Campbell, F.A., Burchinal, M., Skinner, M.L., Gardner, D.M., Ramey, S.L., 2000. Persistent effects of early childhood education on high-risk children and their mothers. Appl. Dev. Sci. 4 (1), 2–14.
Rigby, E., Ryan, R.M., Brooks-Gunn, J., 2007. Childcare quality in different state policy contexts. J. Pol. Anal. Manag. 26, 887–908.
Rose, K.K., 2016. Childcare in the United States. In: Shehan, C.L. (Ed.), Encyclopedia of Family Studies. Wiley Press, Hoboken, NJ.

Ruggles, S., Flood, S., Goeken, R., Grover, J., Meyer, E., Pacas, J., Sobek, M., 2019. IPUMS USA: Version 9.0 [ ], vol. 2019. IPUMS, Minneapolis, MN. https://doi.org/10.18128/D010.V9.0.
Ruppanner, L., 2020. Motherlands: How States Push Mothers Out of Employment. Temple University Press, Philadelphia, PA.
Ruppanner, L., Moller, S., Sayer, L., 2019. Expensive childcare and short school days= Lower maternal employment and more time in childcare? Evidence from the American Time Use Survey. Socius 5, 1–14.
Ryan, C.L., Bauman, K., 2016. Educational Attainment in the United States: 2015. Current Population Reports P20-578. U.S. Census Bureau, Washington, D.C.
Sabol, T.J., Chase-Lansdale, P.L., 2015. The influence of low-income children's participation in Head Start on their parents' education and employment. J. Pol. Anal. Manag. 34, 136–161.
Sanchez, L., Thomson, E., 1997. Becoming mothers and fathers: parenthood, gender, and the division of labor. Gend. Soc. 11 (6), 747–772.
Scarborough, W.J., Collins, C., Ruppanner, L., Landivar, L.C., 2021. Head Start and families' recovery from economic recession: policy recommendations for COVID-19. Fam. Relat. 70 (1), 26–42.
Self, S., 2005. What makes motherhood so expensive? The role of social expectations, interdependence, and coordination failure in explaining lower wages of mothers. J. Soc. Econ. 34, 850–865.
Tekin, E., 2007. Childcare subsidies, wages, and employment of single mothers. J. Hum. Resour. 42 (2), 453–487.
Thévenon, O., 2013. Drivers of female labor force participation in the OECD. OECD Social, Employment and Migration Working Papers. OECD Publishing, Paris. No. 145.
United States Census Bureau, 2019a. Fertility of Women in the United States: 2018. U.S. Census Bureau. https://www.census.gov/data/tables/2018/demo/fertility/women-fertility.html.
United States Census Bureau, 2019b. Households and Families: 2018. American Community Survey 1-Year Estimates Subject Tables. Table ID S1101.
United States Government Accountability Office, 2016. Child Care: Access to Subsidies and Strategies to Manage Demand Vary across States. Government Accountability Office, Washington, D.C.. GAO-17-60.
Urban, Institute, 2020. CCDF Policies Database. https://ccdf.urban.org/search-database.
Waldfogel, J., 1997. The effect of children on women's wages. Am. Socio. Rev. 62, 209–217.
Weeden, K.A., Cha, Y., Bucca, M., 2016. Long work hours, part-time work, and trends in the gender gap in pay, the motherhood wage penalty, and the fatherhood wage premium. The Russell Sage Foundation Journal of the Social Sciences 2, 71–102.
Williams, J., 2010. The odd disconnect: our family-hostile public policy. In: Christensen, K., Schneider, B. (Eds.), Workplace Flexibility: Realigning 20th-Century Jobs for a 21st-Century Workforce. Cornell University Press, Ithaca, NY, pp. 196–219.
Yavorsky, J.E., Kamp Dush, C.M., Schoppe-Sullivan, S.J., 2015. The production of inequality: the gender division of labor across the transition to parenthood. J. Marriage Fam. 77 (3), 662–679.