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Care Labor Demand Shocks and Inequality: How Childcare Costs Exacerbate Inequality among American Families

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Abstract

This article argues that care infrastructures can shape family income inequality and examines access to childcare services in the US as a case study. We propose that market-priced childcare systems generate inequalities in how births impact mothers' income contributions to families and aggravate family income inequality as a result. Using the Survey of Income and Program Participation (SIPP) merged with state-level childcare prices, we estimate individual fixed effects regression models for the consequences of births on family income and on its proximate determinants: mothers' labor supply and earnings, and partners' labor supply and earnings. Our models include state and year fixed effects and identify the impact of childcare costs from within-state variation in childcare prices. Our analyses show that births increase family income inequality due to the negative impact of births on mothers' earnings and that the negative impact of births on mothers' earnings is not compensated by increases in partners' earnings or income transfers. We find that higher childcare costs accentuate birth earnings penalties for mothers without college degrees, but not for mothers with college degrees. In all, we show that childcare costs exacerbate family income gaps between women without and with a college degree by 29 percentage points.

Keywords

childcare costs, family income inequality, unpaid caregiving, birth penalties

Disciplines

Demography, Population, and Ecology | Family, Life Course, and Society | Gender and Sexuality | Inequality and Stratification | Social and Behavioral Sciences | Sociology

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ABSTRACT

This article argues that care infrastructures can shape family income inequality and examines access to childcare services in the US as a case study. We propose that market-priced childcare systems generate inequalities in how births impact mothers' income contributions to families and aggravate family income inequality as a result. Using the Survey of Income and Program Participation (SIPP) merged with state-level childcare prices, we estimate individual fixed effects regression models for the consequences of births on family income and on its proximate determinants: mothers' labor supply and earnings, and partners' labor supply and earnings. Our models include state and year fixed effects and identify the impact of childcare costs from within-state variation in childcare prices. Our analyses show that births increase family income inequality due to the negative impact of births on mothers' earnings and that the negative impact of births on mothers' earnings is not compensated by increases in partners' earnings or income transfers. We find that higher childcare costs accentuate birth earnings penalties for mothers without college degrees, but not for mothers with college degrees. In all, we show that childcare costs exacerbate family income gaps between women without and with a college degree by 29 percentage points.

INTRODUCTION

In the United States, nearly 4 million new babies are born every year, each requiring 24/7 care and supervision for several years. The provision of care for newborns and young children up to school age requires a large amount of human labor that is performed by both paid and unpaid caregivers. The birth of a child often demands substantial reconfigurations of labor efforts in the household that affect family income. When someone, disproportionately the mother, drops out of the labor force to provide care for a newborn, the family loses a source of income. Access to childcare services can help families avoid income losses that come from reductions in paid work. However, when access to childcare services depends on purchasing power, as it is the case in primarily market-priced childcare systems like in the US, higher-income families can more easily rely on childcare services to avoid income losses, and this might exacerbate family income inequality.

In a context of rising family income inequality since the 1970s, the economic consequences of births remain an unexplored mechanism that can contribute to family income inequality. Existing research about the drivers of rising family income inequality has focused on changes in labor market processes, widening wage gaps or changes in demographic family-formation processes shifting households' composition and attributes (McCall and Percheski 2010; Schwartz 2010; Sudo 2017; Western et al. 2016). However, the fact that births leave a long-lasting mark on women's earnings (Juhn and McCue 2017; Killewald and García-Manglano 2016; Kleven et al. 2019; Musick, Bea, and Gonalons-Pons 2020) and that women's earnings constitute a substantial and growing portion of families' incomes (Bloome et al. 2019; Glass et al. 2021), suggest that the economic consequences of births may be important determinants of families' economic positions. Furthermore, if the impact of births on families' economic position

is unequal, with more negative effects for lower-income families than for higher-income families, births might constitute an underappreciated mechanism contributing to increasing family income inequality. Understanding families' incomes and income disparities when children are young is also important because these conditions shape children's wellbeing and experiences at a critical age (Jackson and Schneider 2022; McLanahan 2004; Schneider, Hastings, and LaBriola 2018).

While there is an extensive body of scholarship documenting the negative impacts of births on mothers' economic outcomes (for recent overviews of this literature see: Ferragina 2020; Hegewisch and Gornick 2011; Olivetti and Petrongolo 2017), we know less about the impact of births on *family* income. Birth penalties on mothers' earnings might translate into income losses for the family, but not necessarily. Indeed, mothers' earnings losses could be offset with additional sources of income (e.g., partners' earnings or income transfers). In one of the few analyses directly focused on how births impact family income in the United States, Stanczyk (2020) finds that household income adequacy declines with births, indicating that birth penalties on mothers' earnings translate to declines in family income. Thus, it does not appear that other sources of income are able to compensate for mothers' labor earnings losses. In particular, fathers' earnings do not substantially increase with births (Killewald and García-Manglano 2016; Kleven et al. 2019; Musick et al. 2020; Musick, Gonalons-Pons, and Schwartz 2021).

In this article, we argue that birth penalties contribute not only to the production of gender inequality but also to the production of family income inequality. We offer a conceptual framework to articulate the relationship between birth penalties and family income inequality. This framework describes how birth penalties are importantly determined by the care

infrastructure and economic tradeoffs when replacing mothers' unpaid care labor. We define care infrastructure as policies that shape the availability and prices of care services as well as policies that deliver income transfers for unpaid caregivers.[1] We empirically examine this argument by examining the US market-priced childcare system. We expect that market-priced childcare services exacerbate inequalities in how births impact mothers' economic outcomes and that these inequalities reverberate in the distribution of family income. More precisely, we expect that more expensive childcare disproportionately discourages post-birth paid work among women with lower earnings potential, and that this leads to substantial income losses for families in the lower half of the income distribution. In the absence of processes offsetting the negative impact of childcare prices on mothers' income contributions to families, this mechanism will result in an increase in family income inequality.

We use individual fixed effects regression models to estimate how births and childcare costs impact family income, examining all major proximate determinants of family income: mothers' labor supply and earnings, partners' labor supply and earnings, and income transfers from public programs. We use data from the Survey of Income and Program Participation (SIPP) and time-varying state-level information on average childcare prices. Our models control for individual and state fixed effects: we are thus explaining an individual mother's earning losses as a function of the variation in childcare costs over time within a state: for example, if a mother without a college degree in Pennsylvania gives birth at a time when Pennsylvania's childcare

[1] Care infrastructure is a relatively novel term that has gained popularity during the COVID-19 Pandemic. It was originally coined by Ai-Jen Poo, recipient of the MacArthur Genius Award and prominent labor activist of domestic worker rights, who has written extensively about the need to invest in public infrastructure for care provision (e.g., Poo 2016). There are other concepts in the literature that relate to care infrastructure, such as the social organization of care provision (Folbre 2012) or the concept of care regimes (Bettio and Plantenga 2004). For the purpose of this study, we find care infrastructure a useful concept to highlight policies related to care provision, while the concepts of social organization of care provision or care regimes are often used to refer to a broader range of contextual characteristics including, for instance, social norms about caregiving that we do not address in this study.

costs are lower, we expect her to have lower post-birth earnings losses, and thus higher family income. We show that childcare costs fuel inequalities in women's labor supply responses to births, with a $1,000 increase in the annual price of childcare (representing an 11% increase over the mean childcare price of $9,500) being associated with a 0.7 hour decline in weekly work hours and a 15 percent decline in monthly earnings for women without college degrees. In contrast, higher childcare costs have no statistically significant effect on work hours or earnings for women with college degrees or for men. Taken together, we find that childcare costs exacerbate family income inequality between women, with each additional $1,000 increase in the annual price of childcare being associated with a 5 percent decline in family income for women without a college degree (the average decline is 18 percent for this group), but virtually no change among women with college degrees.

Our study makes three key contributions. First, we make a theoretical contribution by developing a framework that articulates the relationship between care infrastructure and family income inequality. Second, our research design improves the identification strategy to estimate the relationship between childcare costs and the economic penalties of births. Our panel regression models with individual and state fixed effects improve on prior research that has largely relied on cross-sectional models; likewise, we leverage independently collected data on actual state-level childcare prices, while previous studies using panel data have often relied on predicted childcare prices data or focused on policy interventions that impact only specific population subgroups. Lastly, our study also contributes to expanding our understanding of the economic impact of births, broadening the current focus on mothers' economic outcomes to study its impacts on family income and on family income inequality.

BACKGROUND

The existing literature about birth penalties on mothers' economic outcomes includes considerable signs that having children might significantly impact families' economic positions, although family income has not been a focus in this literature. For instance, studies show that births leave long-lasting marks on mothers' economic outcomes (employment, hours of paid work, wages, earnings), but that they have much smaller impacts on father's economic outcomes, providing little indication about the possibility of men's earnings offsetting mothers' earnings losses (Aisenbrey and Fasang 2017; Budig and England 2001; Budig and Hodges 2010; Cooke 2014; Doren 2019; England et al. 2016; Florian 2018; Gangl and Ziefle 2009; Killewald 2013; Killewald and García-Manglano 2016; Musick et al. 2020). Kleven (2019), for instance, estimates that in the United States the transition to parenthood is associated with a long-term 31 percent decline in mothers' earnings but neither decline nor increase in fathers' earnings.

The existing literature also includes signs that the consequences of births are moderated by social policies and that the consequences of births might exacerbate economic inequalities. Studies find that social policies and social norms can moderate the size of birth penalties (for recent overviews of this literature see: Ferragina 2020; Hegewisch and Gornick 2011; Olivetti and Petrongolo 2017). Budig and colleagues (2012), for instance, find that the difference in employment levels between mothers and non-mothers is lower in countries with parental leave and public childcare, particularly when gender norms support mothers' employment. Recent studies relying on regional variation within the United States find similar patterns (Landivar, Ruppanner, and Scarborough 2021; Landivar, Ruppanner, et al. 2021; Ruppanner et al. 2021). Studies also find that birth penalties might be larger for lower-income women and that policies might moderate birth penalties differently for higher and lower income women (Del Boca,

Pasqua, and Pronzato 2009; Hook and Paek 2020; Keck and Saraceno 2013). Hook and Paek's (2020) cross-national comparative study, for instance, finds that the correlation between spending on early childhood education and the difference between mothers' and non-mothers' employment is stronger for mothers without a college degree than for mothers with a college degree. Studies focused on childcare costs find a similar pattern, indicating that childcare costs exacerbate birth penalties for mothers with lower earnings potential compared to mothers with higher earnings potential (Anderson and Levine 1999; Baum II 2002; Kaestner, Lubotsky, and Qureshi 2016; Landivar, Scarborough, et al. 2021; Ruppanner et al. 2021; Tekin 2007a).

Despite the pattern of findings pointing in a direction consistent with the idea that birth penalties and the care infrastructure can shape family income inequality, we do not have a conceptual framework nor an empirical record to precisely quantify whether and how births shape family inequality. While family earnings losses can be implied from studies on motherhood penalties, direct estimates are often lacking because the focus has been on labor supply or hourly wage measures. Furthermore, the existing evidence about the potential sources of income offsetting the losses of mothers' earnings at the family level is incomplete, because research about the impact of births on fathers' outcomes or on other sources of family income has not been as comprehensive as the research on penalties on mothers' outcomes. The impact of births on family income has been the focus in only a handful of studies (Aassve, Mazzuco, and Mencarini 2005; Bould, Crespi, and Schmaus 2012; Sigle-Rushton and Waldfogel 2007), with just one of these in the US (Stanczyk 2020). Stanczyk (2020) offers the most comprehensive study of household income dynamics around births in the United States and provides direct evidence that births are associated with declines in family income, in particular family income adequacy. Stanczyk (2020), however, does not focus on family income inequality nor on care

infrastructure. To conceptualize these relationships, the next section introduces a framework that explicitly articulates how birth penalties shape family income inequality depending on the features of the care infrastructure.

Care Events, Care Infrastructure, and Family Income Inequality

We propose a *replacement costs* framework to articulate the role of the care infrastructure and births in the production of family income inequality. The purpose of this framework is to center the intensity of structured constraints on mothers' labor as key determinants of birth penalties. This framework answers calls to integrate births and childcare within broader frameworks of care needs (Folbre 2012; Folbre and Wright 2012) and is grounded in the tradition of social reproduction theory that highlights the volume of human labor needed to sustain and care for human beings (Bhattacharya 2017; Laslett and Brenner 1989).

Our framework begins with the premise that a central challenge that arises with births is a labor challenge: how to meet the *need for human care labor* demanded by newborns. In contrast to conceptual models of mothers' labor supply that emphasize mothers' attributes, work orientations, and/or their job opportunities as predictors of labor supply behavior, our framework will focus instead on the constraints and economic tradeoffs implied by different ways of meeting the care labor demands that arise with births. Newborns' need for 24/7 care and supervision for several years represents a very substantial increase in care labor demand that needs to be met by someone: typically the mother, paid caregivers, partners, relatives, or a combination of these. Characterizing births as *care labor demand shocks* connects births to other episodes that pose similar labor challenges because they likewise increase individuals' responsibility to meet care needs, such as children or adults developing disabilities or recovering

from accidents or surgical interventions. Our replacement costs framework can be applied to model individuals' employment behavior after births as well as after other episodes that also give rise to care labor demand shocks.

The replacement costs framework models mothers' labor supply as a function of the economic tradeoffs involved in replacing own unpaid care labor. Because women continue to be socially assigned the responsibility of caregiving (Glenn 2010), mothers' unpaid care labor is socially seen as the default way of meeting the demand for care labor arising with births, and alternative options are considered against this default (see, for instance, studies discussing how household outsourcing spending is evaluated against mothers' potential earnings or how mothers and childcare services are seen as direct substitutes: e.g., Gupta 2007; Rao 2020). Since mothers' labor supply is a key driver of birth penalties on earnings and family income, this means that our model expects birth penalties to be larger when the ability to find someone to care for newborns is very limited and/or not cost effective. From our standpoint, the ability to find someone to care for the newborn becomes a crucial determinant of birth penalties –if nobody is available to care for the newborn except the mother, many mothers will have to quit their jobs and incur large earnings losses. When replacement for unpaid labor exists, our model expects birth penalties to be importantly determined by the costs of these replacements. If others are available to care for the newborn but procuring their services is expensive, adopting this option will generally be cost effective only for those whose rewards from paid work are high enough to offset the costs of paid care services. In other words, all else being equal, our model expects that average birth penalties will decline when replacement costs are low and increase when replacement costs are high.

Consider the following simple model. Childcare costs is p per hour and the mother's wage is w per hour. Mothers' income y can be defined as $y=h(w-p)$ if she works h hours; if there is free childcare provided by the government or relatives, then $p=0$. Note that childcare costs p act as a tax on wages, implying that the take home pay is lower than it would be in the absence of the childcare costs. Assume there is a care income b (i.e., a policy income transfer program for individuals with care responsibilities): if the mother is not employed, $y=b$; if there is no such care income then $b=0$. We focus on the monetary incentives and take other factors shaping mothers' decisions about work as given. It is clear that if $w<p$, i.e. if the mother's hourly wage is lower than the hourly cost of childcare, there is a strong disincentive and barrier to paid work. In general, the lower a woman's wage relative to the cost of childcare, the less likely she is going to be employed. Clearly, if the cost of childcare is zero ($p=0$), such as when childcare is freely provided by the government or by relatives, the cost of childcare will not influence a woman's decision to seek employment, and she will be more likely to be employed than with any positive cost of childcare ($p>0$). If a mother can receive a fixed income b for taking care of her own child, then not working is financially advantageous if $b> h(w-p)$, i.e. if this income is higher than the net earnings that the woman would bring home. The condition $b> h(w-p)$ is equivalent to $w<b/h+p$, i.e. if a woman's wage is low enough, it is more financially advantageous to take care of her newborn than to be employed. Note that when the cost of childcare p increases and/or the caregivers' income b increases, it is more likely for any particular woman to have a low enough wage to satisfy $w<b/h+p$, i.e. to be in a situation where it is more financially advantageous to meet the newborn's care labor demand herself than to find a substitute for her unpaid care labor and be employed.[2]

[2] The replacement costs model is clearly related to the opportunity costs model. Our model aims to offer a reinterpretation and revision that more strongly emphasizes the intensity of constraints on labor supply that arise

The replacement costs framework offers straightforward predictions about the impacts of the care infrastructure on birth penalties. There are two types of care infrastructure policy that directly intervene into replacement costs: (a) policies that shape the availability and prices of paid caregiver services (determines the parameter p in the simple model above), and (b) policies that provide income transfers for unpaid caregiving (determine the parameter b in the simple model above). By structuring the feasibility and tradeoffs associated with replacing unpaid care labor, care infrastructures shape the distribution of birth penalties across families and determine whether births result in increases in family income inequality or not. Births will increase family inequality if birth penalties are systematically larger for lower income families, they will reduce family income inequality if birth penalties are systematically larger for higher income families, or they will result in no change in family income inequality if birth penalties do not impact family income or if the impact is even across families. Care infrastructures with high replacement costs (p is high, b is low) will trend towards the first scenario (*births increase family income inequality*). High replacement costs due to expensive paid care services will tend to hamper mothers' labor supply in lower income families more strongly than in higher income families, resulting in systematically larger birth penalties in the former compared to the latter. High replacement costs due to low income transfers for caregivers lead to lower family incomes when mothers do not work. By contrast, our replacement costs model predicts that care infrastructures with low replacement costs (i.e., p is low or b is high) will trend towards the second or third scenarios (*births decrease or do not impact family income inequality*). In a low replacement costs context, the size of birth penalties will tend to be less structured by family income because everyone can equally access paid caregiver services to substitute for unpaid care

from care labor demand shock events, such as births, and to articulate in detail how these constraints are structured by care infrastructures.

labor and/or receive income transfers for unpaid caregiving that offset earnings losses from reducing paid work labor supply. The next section presents the US care infrastructure context that we characterize as a high replacement costs context.

The U.S. Care Infrastructure

The United States care infrastructure is characterized by high replacement costs. The United States is one of the OCED countries where access to childcare services is most expensive and most dependent on purchasing power (OECD 2020). Unlike other high-income countries, the US does not have a comprehensive policy guaranteeing affordable childcare access for all families (Chaudry et al. 2017; Cooke 2011; Folbre 2012; Gornick and Meyers 2003; Morgan 2006, 2006). Historically, attempts to develop comprehensive childcare policy have failed in large part due to efforts to protect the male-breadwinner family model and resistance to increased government spending on social services (Michel 1999; Swinth 2018).[3] Furthermore, the United States does not have any substantial income transfer program for unpaid caregivers. There is no comprehensive paid leave policy, and the income transfer programs that exist for families with children are generally conditional on mothers' paid work (e.g., from the perspective of single mothers both EITC and TANF are conditional on employment and cannot thus be considered to transfer income for unpaid caregiving) (Cancian and Danziger 2009).

Since the 1970s, government intervention in childcare provision has been relatively marginal and resulted in a two-tiered market system of childcare (Folbre 2012; Michel 1999; Swinth 2018). For low-income families, the federal government provides childcare subsidies and

[3] The 1940 Lanham Act, which established extensive childcare services for a brief moment during the Second World War, was quickly dismantled as men returned from war (Michel 1999). And the 1970 Comprehensive Child Development Act, which proposed extensive federal funding to develop affordable childcare services, was vetoed by President Richard Nixon (Swinth 2018).

the Head Start program. Neither of these two policies, however, come close to reaching all low-income families, with estimates suggesting that only 8 to 15 percent of eligible families access childcare subsidies (Ullrich et al. 2019). For families with labor earnings, the federal government provides childcare tax credits that only partially offset the costs of purchasing childcare services on the market. More recently, some states and cities have rolled out affordable pre-kindergarten programs covering three- and/or four-year-olds (Chaudry et al. 2017). Overall, costly and privately provided care services are the only formal childcare available to most families in the United States. In practice, this means that the cost of childcare is prohibitive to many families, thus constraining many families to rely on unpaid caregiving for young children.

There are numerous studies showing that higher childcare costs are associated with lower labor supply among mothers in the United States. Point estimates vary across studies, but the average effect size suggests that childcare costs constitute a substantial barrier to US mothers' employment[4] (for recent reviews see Akgunduz and Plantega 2017; Morrissey 2016). Studies also documented that childcare costs are associated with declines in mothers' wages and earnings (Andresen and Nix 2019; Gelbach 2002; Givord and Marbot 2015; Ha 2009; Press, Fagan, and Laughlin 2006; Russo 2017; Schofield and Polette 2002; Wikström, Kotyrlo, and Hanes 2015). Some studies have examined heterogeneity in the relationship between childcare costs and birth penalties, but only with respect to mothers' labor supply outcomes. Studies that assess

[4] From studies reporting elasticities (change in probability of employment corresponding to 1 percent change in childcare costs) and finding statistically significant results, estimates range from a low of -0.14 to a high of -1.1 (Blau and Robins 1988; Connelly 1992; Connelly and Kimmel 2003; Han and Waldfogel 2001; Mason and Kuhlthau 1992; Ribar 1992, 1995; Tekin 2007). Other studies also find statistically significant declines in mothers' employment associated with childcare prices (Ahn 2012; Bainbridge, Meyers, and Waldfogel 2003; Baum II 2002; Cochi Ficano, Gennetian, and Morris 2006; Connelly and Kimmel 2003; Del Boca, Pasqua, and Pronzato 2009; Ha 2009; Heckman 1974; Herbst 2013; Kimmel 1998; Landivar, Scarborough, et al. 2021; Landivar, Ruppanner, and Scarborough 2021; Ruppanner et al. 2021; Ruppanner, Moller, and Sayer 2019). Only a few studies find no substantial relationship between childcare costs and mothers' labor supply (Ribar 1995; Connelly 1990; Blau and Robins 1991; Michalopoulos et al. 1992).

heterogeneity by family income find that the employment of mothers in lower-income families is more sensitive to childcare costs than in higher-income families (Baum II 2002; Tekin 2007b), and studies assessing heterogeneity by mothers' level of education find that sensitivity to childcare prices is higher among mothers with lower levels of education (Anderson and Levine 1999; Kaestner et al. 2016; Ruppanner et al. 2021). Additionally, one US study shows that Head Start programs correlate with lower poverty levels among families with children (Scarborough et al. 2021).

The two sets of studies finding heterogeneity by family income and mothers' education are consistent with our expectation that contexts with high replacement costs will lead to larger birth penalties for mothers with lower earnings potential. However, these studies do not directly examine earnings penalties or family income penalties, and research examining the impact of childcare costs on mothers' wages and earnings has not evaluated heterogeneity as extensively (Andresen and Nix 2019; Gelbach 2002; Givord and Marbot 2015; Ha 2009; Press et al. 2006; Russo 2017; Schofield and Polette 2002; Wikström et al. 2015).

OUR STUDY

We focus on birth penalties and childcare prices to provide an empirical demonstration of the relationship between births and family income inequality as delineated by the replacement costs framework. We expect market-priced childcare provision to produce inequalities in how women respond to birth events and how this impacts families' incomes. More specifically, we hypothesize that childcare costs will disproportionately constrain post-birth paid work for women with lower earnings potential but less so for women with higher earnings potential. We expect that these earnings losses will not be substantially offset by other sources of family

income, either partners' earnings or income transfers. As a result, since women with lower-earnings potential are disproportionately in lower-to-middle income families, market-based childcare will generate larger earnings losses for lower-income families compared to higher-income families and consequently increase family income inequality.

Our analysis is structured in two parts. The first section presents descriptive evidence to examine the relationship between births and family income inequality. We track how family income inequality changes around birth events and explore how these changes relate to women's income contributions to their families. The second section investigates the relationship between childcare costs and birth penalties on mothers' labor supply and earnings, their partners' labor supply and earnings, and their families' incomes (including transfers). This analysis examines how these relationships vary between mothers with high- versus low-earnings potential.

DATA AND METHODS

Data Sources and Samples

Our primary data source is the Survey of Income and Program Participation (SIPP) (U.S. Census Bureau 2001). The SIPP is a nationally representative household panel survey that began in 1984 and was designed as a continuous series of independent national panels with interviews every four months for up to five years. The SIPP has a large sample size—each panel including 40,000 to 50,000 families since 1996—and tracks detailed monthly information about household and family composition, employment, and earnings of all adult members, as well as other income sources. The analyses use data from the 2008 and 2014 panels for which we can obtain state-level childcare prices. In supplementary analyses we also use panel data from the Current

Population Survey (CPS) and county-level childcare prices data to address the concern that state-level measures mask too much within-state variation (see Appendix Tables S1-S2).

Our analytical sample includes women ages 15 to 45 who gave birth over the course of the panel survey, including first and higher-order births (N = 1,878). The results presented in this article focus on the subsample of women partnered with men to provide parallel analyses for the economic outcomes of their male partners, and supplementary analyses using the broader sample of women partnered with men or women and unpartnered women are available in the Appendix (see tables Table S3-S4). Regression analyses remove person-months observations for the six months preceding the birth event to avoid contaminating our measures of pre-birth economic position with pregnancy-related changes.

Measures

We examine the relationship between births and the following five outcome variables: mothers' hours of work, their partners' hours of work, mothers' monthly earnings, their partners' monthly earnings, and family income.

Birth transitions are measured using a dummy variable that equals 0 before the birth and equals 1 after the birth. This measure draws on time-varying monthly information about the number and ages of own children living in the household over the course of the panel. Birth events are operationalized as the increment in the number of own zero-year-olds in the household.

Hours of paid work is measured as a continuous variable that ranges from 0 (not employed) to 80. We use information on usual weekly hours of work as a synthetic measure of labor supply on the intensive and extensive margins.

Earnings is a continuous variable that measures monthly pre-tax earnings from labor, including self-employment and/or business income. Earnings are adjusted for inflation and expressed in 2010 dollars.

Family income is a continuous variable that measures monthly pre-tax family income. This measure equals the sum of earnings from labor and income transfers from all adult members of the family plus income transfers linked to children in the family, for example, Supplemental Security Income payments received by children under 15. Family income is adjusted for inflation and expressed in 2010 dollars.

Women's earnings potential is a time-fixed dummy variable indicating completion of college degree (0 = no college degree, 1 = college degree). We use women's level of education as a proxy for earnings potential because it allows us to identify groups that vary in their long-run earnings potential.

Childcare costs is a continuous variable indicating the state-level average price for center- and family-based childcare services for zero-to-three-year-olds. Data about childcare prices comes from the advocacy group Childcare Aware, which provides the longest-running public data on state-level childcare prices in the United States. Their data is released in annual reports on their website (https://www.childcareaware.org/) and has been used in related research in the past (Landivar, Scarborough, et al. 2021; Landivar, Ruppanner, et al. 2021; Ruppanner et al. 2021; Ruppanner, Moller, and Sayer 2019). Childcare prices are adjusted for inflation and expressed in 2010 dollars. In supplementary analyses we use recently released data by the Women's Bureau at the U.S. Department of Labor tracking childcare prices at the county level. For more information see the Appendix section on "Analyses with CPS and county-level childcare costs measures and Tables S1-S2.

Individual-level controls. We construct measures for age, age at birth, birth parity, marital status (0 = married, 1 = not married), and partners' level of education (0 = no college degree, 1 = college degree). Time-invariant variables, such as age at birth or birth parity are used to control for heterogeneity in the relationship between birth events and outcomes (i.e., they are interacted with the birth event indicator). We also construct an indicator variable that identifies subsequent births during the panel; this variable equals 0 before and 1 after the subsequent birth.

State-level controls. We construct measures for state-level time-varying characteristics that could confound our estimates about the relationship between childcare costs and birth penalties. We measure state-level year-to-year changes in GDP per capita, women's employment level, and women's average wages. The GDP per capita measure comes from Bureau of Economic Analysis (www.bea.gov). Data on women's employment and wages is calculated using the CPS-ASEC files (Flood et al. 2021). Women's employment level is measured as the proportion of working-age women employed, and average wages are calculated based on the sample of full-time, full-year women workers. In supplementary analyses we use measures on women's employment and wages separately for women with a college degree and without a college degree to address the possibility of diverging time-varying trends in labor market characteristics for the two groups of women.

Methods

We use individual-level fixed effects regression models to examine how birth events impact mothers' labor supply and earnings, their partners' labor supply and earnings, and their families' incomes. These models only leverage within-individual variation in the outcome variable, thus controlling for time-constant unobserved differences across individuals that could confound the

relationships of interest. An example of such unobserved differences is differences in specific labor market skills that are not captured by education. Our analyses focus on estimating how birth penalties are moderated by childcare prices and testing whether this moderation varies between mothers without a college degree and mothers with a college degree. We begin by estimating the same model separately for the two groups of mothers. This model can be formalized as follows:

$$(1) \quad Y^{c}_{ismy} = \beta_1 BIRTH_{ismy} + \beta_2 CC_{smy} + \beta_3 BIRTH_{ismy} \times CC_{smy} + \beta_j \boldsymbol{X}_{jismy} + \beta_r \boldsymbol{Z}_{rsmy} + \partial_s + \varphi_y + \theta_m + \delta_i + \varepsilon_{ismy}$$

where Y^{c}_{ismy} is an economic outcome (e.g., paid work hours) for an individual *i* from group *c* (0 = no college degree, 1 = college degree) in state *s*, month *m*, and year *y*. β_1 is the birth indicator capturing within-person changes in the outcome variable before versus after the birth of a child. Recall that our sample includes first births and higher-order births. β_2 is a coefficient for the variable childcare costs (CC). β_3 is a coefficient for the interaction between the birth event and childcare costs, which captures how the impact of births on outcome variables varies with childcare costs. β_j are coefficients corresponding to time-varying individual-level control variables ($\boldsymbol{X}_{jismy}$) for age, marital status, and subsequent births. β_r are coefficients corresponding to time-varying state-level control variables ($\boldsymbol{Z}_{rsmy}$), such as state GDP or women's average wage. ∂_s are state fixed effects, φ_y are year fixed effects, θ_m are calendar month fixed effects, and δ_i indicate individual fixed effects. ε_{ismy} is the individual error term.

We estimate a pooled fully interacted model to examine whether the impact of childcare costs on birth penalties varies systematically between the two groups of mothers. This model interacts each of the terms included in equation (1) with the time-invariant college dummy

measure of women's earnings potential, including a three-way interaction between births, childcare costs, and women's education. This three-way interaction tests for the difference between β_3 for women without a college degree and β_3 for women with a college degree. All models remove observations for the six months prior to birth to avoid capturing economic changes during pregnancy. All models compute robust standard errors clustered at the state level, since this is the level of measurement for our main independent variable of interest, i.e. childcare costs.

These regression models estimate key coefficients of interest solely leveraging within-individual within-state over-time variation. That is, the coefficient for the interaction between births and childcare costs is estimated by evaluating how within-individual changes pre versus post births vary across births taking place in the same state as prices for childcare services change over time. For example, we compare the change in earnings for two observationally identical women in California, where one gave birth in 2008, and the other in 2016, with prices of childcare being 27 percent higher in real terms in 2008 than in 2016. The models provide unbiased estimates of the effect of childcare costs on outcomes if specific assumptions hold. The estimates net out time-invariant unobserved characteristics at the individual and state level, but they can be confounded by unmeasured time-varying characteristics correlated with variation in childcare costs. For instance, if increasing childcare prices were correlated with increasing employer discrimination against mothers in non-professional jobs, the three-way interaction could be upwardly biased because it would pick up larger declines in post-birth employment for mothers without a college degree compared to mothers with a college degree resulting from both increasing childcare prices and employer discrimination. Similarly, if changing attitudes about motherhood and employment correlated with changing childcare prices, this could also confound

the key estimates of interest. Additionally, if selection into having births changes over time and is correlated with childcare costs, this could also impact our estimates. This correlation could be accidental, or it could be causal if childcare prices contribute to changing selection patterns. Rising childcare prices, for instance, might discourage fertility among women with disadvantageous labor market traits and make births more positively selected, or conversely, they might discourage fertility among women with advantageous labor market traits and make births less positively selected. If childcare costs shape selection patterns, our estimates of childcare costs impacts are still valid for the population of women, but the estimates may not represent the cost to *individual* women who may select into having a child when childcare costs change. We further discuss potential sources of bias and sensitivity tests in the robustness checks section below.

The analysis progresses as follows. First, we estimate baseline models that estimate birth penalties and how they are moderated by childcare prices including controls only for age, and state, year, month, and individual fixed effects. The second model adds a time-varying control for subsequent births. The third model adds controls for time-varying marriage transitions and for the interaction between births and age at birth, marital status at birth, and partners' level of education. These controls make sure that our key coefficient of interest is not confounded by heterogeneity in how births impact economic outcomes by these characteristics. The fourth model adds state-level time-varying controls for GDP per capita, women's employment, and women's average wages.

RESULTS

Descriptive Evidence

Table 1 presents descriptive statistics for the analytical sample. The sample includes 1,878 partnered women who gave birth during the panel and 81,733 person-months observations. 48 percent of these births are first-order births, and the remainder are higher-order births. Women's average time in the sample is about 4 years (47 months). Women are on average 30.4 years of age when they first enter the panel, and 42 percent of them hold a college degree. Descriptive statistics for economic outcomes before versus after births show well-known patterns. Women's labor supply drops substantially after birth events, whereas men's slightly increases. Women's average monthly earnings are lower after birth events, while men's are substantially higher. The average family income is slightly higher after births.

TABLE 1 HERE

Figure 1 provides descriptive evidence for the general claim that care events leave a mark on family income inequality. This figure plots income inequality (measured with the coefficient of variation) among families who experience a birth during the panel over months preceding and following the birth event. The figure shows that family income inequality increases substantially with births, beginning its increase during pregnancy months (-9 to -1), peaking at the month of birth, and declining somewhat over the first few months following the birth but remaining stable thereafter at a level higher than before birth. The difference in family income inequality between -12 and +12 is .05, an increase that corresponds to about 40 percent of the increase in family income inequality between 1967 and 2005 (Schwartz 2010). The increase in family income inequality during pregnancy is somewhat surprising and suggests that childcare services are not the only constrain impacting families' incomes at this life-course juncture. These changes likely

reflect pregnancy adjustments in employment and family composition that might be related or unrelated to childcare prices.

FIGURE 1 HERE

Figure 1 also displays simulated counterfactual trends showing how family income inequality would evolve if women's earnings remained constant. To generate this trend, we calculate each woman's average monthly earnings for the period between two years and six months before the birth (months -24 to -6), and we assign this value to all observations after the birth. This exercise indicates that changes in family income inequality following births strongly reflect changes in women's earnings, as opposed to reflecting changes in men's earnings or other income transfers families might receive. In particular, changes in family income inequality are strongly related to changes in earnings among women without a college degree. If the earnings of women without a college degree remained at their pre-birth levels, family income inequality would not increase at birth. The same does not hold for women with a college degree. If the earnings of women with a college degree remained at their pre-birth levels, family income inequality would still substantially increase.

This descriptive evidence shows that births have a marked impact on the distribution of family income among families experiencing a birth. While it is generally recognized that birth events come with major shifts in women's labor supply and earnings and play a key role in structuring gender inequality, the relationship between births and family income inequality has not been explored. The next section examines whether childcare prices shape birth penalties for mothers with and without a college degree in ways that might contribute to this increase in family income inequality. If childcare prices exacerbate gaps in women's labor supply responses to birth events, these patterns might contribute to increases in family income inequality.

Childcare costs and labor supply

Table 2 presents results for regression models examining the relationship between childcare costs and labor supply responses to birth events for women (Panel A) and their partners (Panel B). The table reports coefficients from four models estimated for the two groups of mothers separately, as well as the three-way interaction term from the pooled model testing whether the interaction between births and childcare costs systematically differs between the two groups of women (β_3 for mothers without a college degree and β_3 for mothers with a college degree).

TABLE 2 HERE

The results indicate that childcare costs moderate the impact of births on paid work hours for women without a college degree but not for women with a college degree or for men. Births are associated with substantial declines in hours of paid work for both groups of mothers, although birth penalties are larger for mothers without a college degree. Using Model 4, we estimate that births result in a 9-hour decline in weekly paid work hours for mothers without a college degree and a 6-hour decline for mothers with a college degree. The interaction between births and childcare prices is only statistically significant for mothers without a college degree. In Model 4, this interaction indicates that an increase in one unit in childcare costs (which amounts to an increase of a $1,000 or an 11% increase on the average annual price for childcare services) is associated with an additional 0.7-hour decline in weekly paid work for women without a college degree. The same coefficient for the college group is much smaller and not statistically significant. Despite the difference in size between the two interaction coefficients, the three-way interaction coefficient from the pooled model is not statistically significant. Comparing coefficients across regression models reveals that the key estimates of interest do not substantially change as models incorporate controls for potential confounding processes. Model

3, which adds controls to allow for heterogeneity in birth penalties by birth order, marital status, and partners' education, only slightly reduces the size of the coefficients for birth penalties and the interaction with childcare costs for mothers without a college degree.

Figure 2 Panel A illustrates the results more intuitively by plotting average marginal effects (AME) of births across levels of childcare costs and by women's education using results from Model 4. Childcare costs are measured in 1,000s of dollars (in 2010 dollars) and are mean centered at $9,500, in other words, the value -4 represents a context in which annual childcare costs are $4,000 below the mean, or equal $5,500, and the value +2 illustrates a context in which childcare costs are $2,000 above the mean, or $11,500. The plotted childcare costs range covers 90 percent of the observed variation in childcare prices. The first bars on the left-side represent the size of the birth penalty in the most affordable childcare cost scenario, showing that in this context births are associated with a 5-hour decline in paid work for both groups of women. As childcare costs increase, the birth penalties become larger for mothers without a college degree but do not change for mothers with a college degree. In the most expensive childcare costs context, births are associated with a 12-hours decline in paid work for mothers without a college degree but only with a 5-hour decline for mothers with a college degree. The differences across levels of childcare costs are statistically significant for mothers without a college degree but not statistically significant for mothers with a college degree. These results are consistent with previous studies finding that the labor supply of women with lower earnings potential is more sensitive to the affordability of childcare services than the labor supply of women with higher earnings potential (Anderson and Levine 1999; Kaestner et al. 2016; Ruppanner et al. 2021).

FIGURE 2 HERE

Table 2 Panel B displays regression results for models on men's paid work hours. Based on existing research, we did not anticipate births or childcare costs to markedly shape men's labor supply, not even to offset the declines in women's labor supply. The results support these expectations. The analyses show that for men births are associated with small and statistically insignificant changes in paid work hours. The interaction between births and childcare prices is not statistically significant for men partnered either with mothers without a college degree or with mothers with a college degree. However, for men partnered to mothers without a college degree, the interaction coefficient is positive and suggests a slight moderation pattern in the opposite direction to the one we find for mothers. Figure 2 Panel B presents these results visually. For men partnered to mothers without a college degree, the average marginal effect of births is small and grows more positive with increasing childcare costs. This pattern is consistent with the idea that men's labor supply might compensate for losses in women's labor supply that grow larger with childcare costs, but the size of this compensatory pattern is very small and not statistically significant. For men partnered with mothers with a college degree birth effects are small, positive, and do not substantially vary across childcare prices.

Childcare costs and labor earnings

Table 3 presents results for regression analyses of mothers' monthly earnings (Panel A) and their partners' monthly earnings (Panel B). As in Table 2, we report coefficients from four models estimated for the two groups of mothers separately, as well as the three-way interaction terms from the pooled models testing whether the interaction between births and childcare costs systematically differs between the two groups of women (β_3 for mothers without a college degree and β_3 for mothers with a college degree).

TABLE 3 HERE

The results for the regression on labor earnings follow patterns remarkably similar to the results on paid work hours, illustrating how changes in paid work hours translate into changes in earnings. We find that births are associated with substantial earnings losses for both groups of women, but that childcare costs moderate the size of these birth penalties only for mothers without a college degree. The interaction coefficient between births and childcare costs for women without a college degree is negative and statistically significant, and it indicates that a one-unit change in childcare costs is associated with a 10 percent decline in monthly earnings (from Table 3 Model 4, exp(-0.11)-1 = -0.10). This same coefficient for mothers with a college degree is positive and not statistically significant. The three-way interaction coefficient is statistically significant indicating that the interaction between births and childcare costs are systematically different for the two groups of women: the earnings of women without a college degree are significantly more negatively affected by childcare costs that the earnings of women with a college degree.

Panel A of Figure 3 illustrates these results visually. Similar to our results for paid work hours, we find that in the context of affordable childcare services, the size of the birth penalty is similar for the two groups of women and amounts to about a 65 percent decline in monthly earnings (from Table 3 Model 4, exp(-1.05)-1 = -0.65). For women without a college degree, the size of this birth penalty grows as childcare prices increase, and the differences across levels of childcare costs are statistically significant. For women with a college degree the birth penalty becomes slightly smaller, although these differences across levels of childcare costs are not statistically significant.

FIGURE 3 HERE

The results for men's monthly earnings are also generally similar to the results for their paid work hours. For men, births are associated with much smaller changes in monthly earnings compared to women, and the impact of births is not noticeably moderated by state-level childcare prices. For men partnered with women without a college degree, births are associated with small but statistically significant increases in monthly earnings. These increases might stem from increases in wages and also increases in work hours (Table 2 shows that births are associated with increases in paid work hours for this group, although these coefficients are not statistically significant).

Taken together, the analyses of monthly earnings indicate that higher childcare prices are associated with a widening of the earnings gap between mothers without college degrees and mothers with college degrees. Comparing birth penalties on mothers' earnings across levels of childcare prices indicates that, *ceteris paribus*, birth events do not substantially affect earnings gaps among women when childcare prices are low (birth penalties are similar in size for both groups of women), but they do as childcare costs increase. Moving from the most affordable to the least affordable childcare costs scenario increases the difference in percentage decline in earnings between the two groups of mothers by 63 percentage points. Unless this widening gap is compensated by other income sources, and the results for men's earnings suggest that changes in men's earnings are not offsetting the losses in women's labor income, these widening gaps in women's earnings will translate into widening gaps in family income as well.

Childcare costs and family income

Table 4 present results for models of family income. As before, we report coefficients from four models estimated for the two groups of mothers separately and report the three-way interaction

terms from the pooled models testing whether the interaction between births and childcare costs systematically differs between the two groups of women (β_3 for mothers without a college degree and β_3 for mothers with a college degree).

TABLE 4 HERE

The results on family income repeat the patterns found in models on labor supply and earnings, indicating that birth penalties on mothers' outcomes translate into marked family income losses without notable income offsets via partners' earnings or transfers. As in preceding analyses, we find that for women without a college degree births are associated with declines in family income that grow larger as childcare costs increase. We estimate that a one-unit increase in childcare costs is associated with an additional 5 percent decline in family income, and this coefficient is statistically significant (from Table 4 Model 4, exp(-0.05)-1 = -0.05). For women without a college degree, childcare costs do not moderate the relationship between births and family income. The three-way interaction testing for the difference between the two interaction coefficients is statistically significant and indicates that childcare costs moderate birth penalties on family income differently for women with and without a college degree.

FIGURE 4 HERE

Figure 4 illustrates these results visually. We find that in the most affordable scenario, birth penalties on family income are somewhat smaller for women without a college degree compared to women with a college degree. In this childcare costs scenario, births are associated with a 5 percent decline in family income for women without a college degree and a 18 percent decline for women with a college degree. As childcare costs increase, the birth penalty on family income for women without a college degree grows and the one for women with a college degree remains roughly the same. In the most unaffordable childcare costs scenario, we estimate that

births are associated with a 45 percent decline in family income for women without a college degree and a 16 percent decline for women with a college degree, indicating a widening gap in family income. Moving from the most affordable to the least affordable childcare costs scenario increases the difference in percentage decline in family income between the two groups of mothers by 29 percentage points. This result, together with the descriptive finding indicating that the evolution of family income inequality around births is most sensitive to changes in earnings of women without a college degree, is consistent with the expectation that births, and childcare costs play a role in the production of family income inequality.

Other sensitivity checks and robustness tests

We conducted several sensitivity analyses to assess the robustness of our findings to different measures of childcare costs as well as different model specifications. Our results are robust to using a more geographically detailed measure of childcare costs at the county level. Appendix Tables S1-S2 present results for analogous analyses using panel data from the Current Population Survey and the Census Childcare costs database at the county level to examine the relationship between births, childcare costs, and mothers' and fathers' labor supply. In these analyses we also find that childcare costs increase birth penalties for mothers without a college degree but not for mothers with a college degree or for fathers. Our conclusions also apply to a broader analytical sample including unpartnered mothers. Appendix Tables S3-S4 presents the analyses for this broader analytical sample and shows similar results. Unpartnered mothers represent a larger share of mothers in the no-college group compared to the college group. The results indicate that our estimates of childcare costs–induced increases in birth penalties are robust to also including unpartnered women in the sample. These findings are consistent with previous research showing sensitivity to childcare prices among unpartnered women (Connelly

and Kimmel 2003; Han and Waldfogel 2001; Kimmel 1998). Supplementary analyses we analyzed the impact of births and childcare costs on hourly wages (see Appendix Table S5). The results are also robust to controls for number and ages of children in the household and to controls for the differential impact of births by race (see Appendix Tables S6-S7).

DISCUSSION

This article advances a replacement costs approach to describe how two core dimensions of the care infrastructure—care services and income transfers for unpaid caregiving—can shape the economic consequences of care events on family income inequality. The framework integrates the study of birth penalties within a broader framework that centers care labor needs (Folbre 2012; Folbre and Wright 2012). We provide an empirical demonstration of the relationship between care services, care event penalties, and family income inequality, focusing on birth penalties and childcare prices in the United States. Our results show that childcare costs increase birth penalties on labor supply and earnings for mothers without a college degree but not for women with a college degree or for the male partners of either group of mothers. We find that this uneven distribution of birth penalties induced by childcare costs translates into a widening gap in family income, showing that partners' earnings and transfers are unable to compensate for the widening inequality in women's earnings.

An important goal of our study has been to propose the care infrastructure as an important set of institutions to understand family income inequality. Prevailing research on drivers of family income inequality has largely focused on mechanisms related to labor market or family formation forces (McCall and Percheski 2010; Schwartz 2010; Sudo 2017; Western et al. 2016). For instance, two dominant explanations about rising family income inequality in the

United States relate to wage dispersion and rising prevalence of single-parent households (McCall and Percheski 2010). Our framework, instead, sheds light on the way societies structure resources for individuals experiencing care events as an additional important area to understand the processes producing family income inequalities. In extensions of this work, we are comparatively examining whether one reason why social democratic welfare states are more egalitarian than liberal ones is due to their more egalitarian care infrastructures. Our study provides a conceptual framework to connect with the literature examining the relationship between women's employment and family income inequality (Cancian and Reed 1998, 1999; Esping-Andersen 2007; Gonalons-Pons and Schwartz 2017; Gonalons-Pons, Schwartz, and Musick 2021; Permanyer, Esteve, and Garcia 2019; Sudo 2017). Our perspective also adds to the emerging literature about how care infrastructure shapes parental investments and time spent with young children (Jackson and Schneider 2022).

Our study broadens the scope of research on birth penalties in several directions. First, we expand on how birth penalties play a role in structuring not only gender inequality but also family income inequality. The research on motherhood penalties has enormously advanced our understanding of birth penalties, and our contribution extends this line of work to think more comprehensively about how care events impact personal income and family income inequality. This contributes to the emerging research examining how births impact economic outcomes beyond mothers' or fathers' labor market positions and incorporating public transfers (Aassve et al. 2005; Bould et al. 2012; Sigle-Rushton and Waldfogel 2007; Stanczyk 2020). Furthermore, by providing a framework that connects births to other care events, we aim to encourage more systematic communication between research about the impact of births and research about the impact of other care events, such as the onset of disability or dementia (Coe, Skira, and Larson

2018; Coe and Van Houtven 2009). These two types of studies have been typically separated from each other, with only a few recent studies starting to integrate them (Lightman and Link 2021).

This study provides new evidence to understand the relationship between childcare costs and birth penalties in the United States. We implement an improved and more robust identification model compared to most previous research. Most studies examining how childcare costs shape birth penalties rely on cross-sectional models that compare mothers to non-mothers, exposing the estimates to potential confounder bias due to systematic differences in unobserved characteristics between the two groups. By leveraging panel models, we address this key source of confounder bias, and we can more precisely estimate the impact of childcare costs at the crucial moment of birth transitions. Our estimates are comparatively less robust than studies examining questions about childcare costs utilizing policy changes, because these studies can more robustly claim that the estimates rely on exogenous changes in childcare costs (Andresen and Nix 2019; Cascio 2009; Fitzpatrick 2010; Gelbach 2002; Herbst 2017; Russo 2017). Although our models include state and year fixed effects as well as state-level time-varying controls to address potential confounder biases coming from time-varying unobserved processes, we cannot be certain that these controls remove all possible confounders that affect both childcare costs and families' outcomes. The advantage of our estimates relative to policy-intervention studies is that we can obtain a broader estimate that is not specific to the scope of the policy.

This study has several limitations. Our estimates rely on a measure of childcare costs that ignore within-state heterogeneity in prices for childcare services. This measure is less than ideal, and we pursued more geographically fine-grained data at the county level to conduct sensitivity

analyses (see Appendix Tables S1-S2). The robustness of our core findings to analyses using the county-level data is reassuring, but even county-level prices ignore real-world price heterogeneity across local childcare markets. This data limitation means that our estimates rely on the implicit assumption that changes in prices at the regional level reflect roughly proportional changes in prices across the region (i.e., if the average price in Pennsylvania increases, we hope this reflects similar increases across the state). Note that this type of measurement error will tend to downwardly bias our estimates. Another limitation is that our data covers a relatively narrow observation window spanning two years before and after birth events. Longer panel data could enable studying how long lasting the impacts of births on family income and family income inequality are.

Our study has clear policy implications. We show that a robust childcare infrastructure would contribute to reduce family income inequality at a key life period for young children's lives. Our framework more generally implies that robust care infrastructures that support people through care events by facilitating the possibility to rely on paid caregivers (and/or providing income transfers to offset earnings losses resulting from providing unpaid care) can help reduce family income inequality. Human societies require and mobilize a lot of care labor to fulfill the care needs of children, working-age adults, and older adults. This care labor is often taken for granted, naturalized, made invisible, and only during the COVID-19 pandemic has its relevance become a bit more visible. Our framework and empirical study aim to contribute to the efforts of further making visible the social relevance of care labor and the way it is socially organized by articulating how the social organization of care provision structures family income inequality.

REFERENCES

Aassve, Arnstein, Stefano Mazzuco, and Letizia Mencarini. 2005. "Childbearing and Well-Being: A Comparative Analysis of European Welfare Regimes." *Journal of European Social Policy* 15(4):283–99. doi: 10.1177/0958928705057262.

Ahn, Haksoon. 2012. "Child Care Subsidy, Child Care Costs, and Employment of Low-Income Single Mothers." *Children and Youth Services Review* 34(2):379–87. doi: https://doi-org.proxy.library.upenn.edu/10.1016/j.childyouth.2011.11.010.

Aisenbrey, Silke, and Anette Fasang. 2017. "The Interplay of Work and Family Trajectories over the Life Course: Germany and the United States in Comparison." *American Journal of Sociology* 112(5):1448–84.

Akgunduz, Yusuf Emre, and Janneke Plantega. 2017. "Child Care Prices and Maternal Employment: A Meta-Analysis." *Journal of Economic Surveys* 32(1):118–33. doi: https://doi.org/10.1111/joes.12192.

Anderson, Patricia, and Philip Levine. 1999. *Child Care and Mothers' Employment Decisions*. w7058. Cambridge, MA: National Bureau of Economic Research. doi: 10.3386/w7058.

Andresen, Martin Eckhoff, and Emily Nix. 2019. "What Causes the Child Penalty? Evidence from Same Sex Couples and Policy Reforms." *Statistics Norway Discussion Paper* No. 902:1–69.

Bainbridge, Jay, Marcia K. Meyers, and Jane Waldfogel. 2003. "Child Care Policy Reform and the Employment of Single Mothers." *Social Science Quarterly* 84(4):771–91. doi: https://doi-org.proxy.library.upenn.edu/10.1046/j.0038-4941.2003.08404002.x.

Baum II, Charles L. 2002. "A Dynamic Analysis of the Effect of Child Care Costs on the Work Decisions of Low-Income Mothers with Infants." *Demography* 39(1):139–64.

Bettio, Francesca, and Janneke Plantenga. 2004. "Comparing Care Regimes in Europe." *Feminist Economics* 10(1):85–113. doi: 10.1080/1354570042000198245.

Bhattacharya, Tithi. 2017. *Social Reproduction Theory: Remapping Class, Recentering Oppression*. London: Pluto Press.

Blau, David M., and Philip K. Robins. 1988. "Child-Care Costs and Family Labor Supply." *The Review of Economics and Statistics* 70(3):374–81. doi: https://doi.org/10.2307/1926774.

Bloome, Deirdre, Derek Burk, and Leslie McCall. 2019. "Economic Self-Reliance and Gender Inequality between U.S. Men and Women, 1970-2010." *American Journal of Sociology* 124(5):1413–67. doi: 10.1086/702278.

Bould, Sally, Isabella Crespi, and Gunther Schmaus. 2012. "The Cost of a Child, Mother's Employment Behavior and Economic Insecurity in Europe." *International Review of Sociology* 22(1):5–23.

Budig, Michelle J., and Paula England. 2001. "The Wage Penalty for Motherhood." *American Sociological Review* 66(2):204–25. doi: 10.2307/2657415.

Budig, Michelle J., and Melissa J. Hodges. 2010. “Differences in Disadvantage: Variation in the Motherhood Penalty across White Women’s Earnings Distribution.” *American Sociological Review* 75(5):705–28. doi: 10.1177/0003122410381593.

Budig, Michelle J., Joya Misra, and Irene Boeckmann. 2012. “The Motherhood Penalty in Cross-National Perspective: The Importance of Work-Family Policies and Cultural Attitudes.” *Social Politics* 19(2):163–93.

Cancian, Maria, and Sheldon Danziger. 2009. *Changing Poverty, Changing Policies*. New York: Russell Sage Foundation.

Cancian, Maria, and Deborah Reed. 1998. “Assessing the Effect of Wives’ Earnings on Family Income Inequality.” *The Review of Economics and Statistics* 80:73–79.

Cancian, Maria, and Deborah Reed. 1999. “The Impact of Wives’ Earnings on Income Inequality: Issues and Estimates.” *Demography* 36(2):173–84.

Cascio, Elizabeth U. 2009. “Maternal Labor Supply and the Introduction of Kindergartens into American Public Schools.” *The Journal of Human Resources* 44(1):140–70. doi: 10.3368/jhr.44.1.140.

Chaudry, Ajay, Taryn Morrissey, Christina Weiland, and Hirokazu Yoshikawa. 2017. *Cradle to Kindergarten. A New Plan to Combat Inequality*. New York: Russell Sage Foundation.

Cochi Ficano, Carlena K., Lisa A. Gennetian, and Pamela A. Morris. 2006. “Child Care Subsidies and Employment Behavior Among Very-Low-Income Populations in Three States.” *Review of Policy Research* 23(3):681–98. doi: https://doi.org/10.1111/j.1541-1338.2006.00223.x.

Coe, Norma B., Meghan M. Skira, and Eric B. Larson. 2018. “A Comprehensive Measure of the Costs of Caring For a Parent: Differences According to Functional Status.” *Journal of the American Geriatrics Society* 66(10):2003–8. doi: https://doi-org.proxy.library.upenn.edu/10.1111/jgs.15552.

Coe, Norma B., and Courtney Harold Van Houtven. 2009. “Caring for Mom and Neglecting Yourself? The Health Effects of Caring for an Elderly Parent.” *Health Economics* 18(9):991–1010. doi: 10.1002/hec.1512.

Connelly, Rachel. 1992. “The Effect of Child Care Costs on Married Women’s Labor Force Participation.” *The Review of Economics and Statistics* 74(1):83–90. doi: 10.2307/2109545.

Connelly, Rachel, and Jean Kimmel. 2003. “The Effect of Child Care Costs on the Employment and Welfare Recipiency of Single Mothers.” *Southern Economic Journal* 69(3):498–519. doi: https://doi.org/10.2307/1061691.

Cooke, Lynn P. 2011. *Gender-Class Equality in Political Economies*. Routledge.

Cooke, Lynn Prince. 2014. “Gendered Parenthood Penalties and Premiums across the Earnings Distribution in Australia, the United Kingdom, and the United States.” *European Sociological Review* 30(3):360–72.

Del Boca, D., S. Pasqua, and C. Pronzato. 2009. "Motherhood and Market Work Decisions in Institutional Context: A European Perspective." *Oxford Economic Papers* 61(Supplement 1):i147–71. doi: 10.1093/oep/gpn046.

Doren, Catherine. 2019. "Is Two Too Many? Parity and Mothers' Labor Force Exit." *Journal of Marriage and Family* 81(2):327–44. doi: 10.1111/jomf.12533.

England, Paula, Jonathan Bearak, Michelle J. Budig, and Melissa J. Hodges. 2016. "Do Highly Paid, Highly Skilled Women Experience the Largest Motherhood Penalty?" *American Sociological Review* 81(6):1161–89. doi: 10.1177/0003122416673598.

Esping-Andersen, Gøsta. 2007. "Sociological Explanations of Changing Income Distributions." *American Behavioral Scientist* 50(5):639–58.

Ferragina, Emanuele. 2020. "Family Policy and Women's Employment Outcomes in 45 High-income Countries: A Systematic Qualitative Review of 238 Comparative and National Studies." *Social Policy & Administration* 54(7):1016–66. doi: 10.1111/spol.12584.

Fitzpatrick, Maria Donavan. 2010. "Preschoolers Enrolled and Mothers at Work? The Effects of Universal Prekindergarten." *Journal of Labor Economics* 28(1):51–85. doi: https://doi.org/10.1086/648666.

Flood, Sarah, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren, and Michael Westberry. 2021. *Integrated Public Use Microdata Series, Current Population Survey: Version 9.0 [Dataset]*. Minneapolis: IPUMS.

Florian, Sandra M. 2018. "Motherhood and Employment Among Whites, Hispanics, and Blacks: A Life Course Approach." *Journal of Marriage and Family* 80(1):134–49. doi: 10.1111/jomf.12448.

Folbre, Nancy. 2012. *For Love or Money. Care Provision in the United States*. New York: Russell Sage Foundation.

Folbre, Nancy, and Erik O. Wright. 2012. "Defining Care." in *For Love or Money: Care Provision in the United States*. New York: Russell Sage Foundation.

Gangl, Markus, and Andrea Ziefle. 2009. "Motherhood, Labor Force Behavior, and Women's Careers: An Empirical Assessment of Teh Wage Penalty for Motherhood in Britain, Germany and the United States." *Demography* 46(2):341–69.

Gelbach, Jonah B. 2002. "Public Schooling for Young Children and Maternal Labor Supply." *American Economic Review* 92(1):307–22. doi: 10.1257/000282802760015748.

Givord, Pauline, and Claire Marbot. 2015. "Does the Cost of Child Care Affect Female Labor Market Participation? An Evaluation of a French Reform of Childcare Subsidies." *Labour Economics* 36:99–111. doi: https://doi-org.proxy.library.upenn.edu/10.1016/j.labeco.2015.07.003.

Glass, Jennifer L., R. Kelly Raley, and Joanna R. Pepin. 2021. "Children's Financial Dependence on Mothers: Propensity and Duration." 7:1–11.

Glenn, Evelyn Nakano. 2010. *Forced To Care: Coercion and Caregiving in America*. Cambridge, MA: Harvard University Press.

Gonalons-Pons, Pilar, and Christine R. Schwartz. 2017. “Trends in Economic Homogamy: Changes in Assortative Mating or the Division of Labor in Marriage?” *Demography* 54:985–1005.

Gonalons-Pons, Pilar, Christine R. Schwartz, and Kelly Musick. 2021. “Changes in Couples’ Earnings Following Parenthood and Trends in Family Earnings Inequality.” *Demography* 58(3):1093–1117. doi: 10.1215/00703370-9160055.

Gornick, Janet, and Marcia K. Meyers. 2003. *Families That Work: Policies Reconciling Parenthood and Employment*. New York: Russell Sage Foundation.

Gupta, Sanjiv. 2007. “Autonomy, Dependence, or Display? The Relationship Between Married Women?S Earnings and Housework.” *Journal of Marriage and Family* 69(2):399–417. doi: 10.1111/j.1741-3737.2007.00373.x.

Ha, Yoonsook. 2009. “Stability of Child-Care Subsidy Use and Earnings of Low-Income Families.” *Social Service Review* 83(4):495–525. doi: 10.1086/650352.

Han, Wenjui, and Jane Waldfogel. 2001. “Child Care Costs and Women’s Employment: A Comparison of Single and Married Mothers With Pre-School-Aged Children.” *Social Science Quarterly* 82(3):552–68. doi: https://doi-org.proxy.library.upenn.edu/10.1111/0038-4941.00042.

Heckman, James J. 1974. “Effects of Child-Care Programs on Women’s Work Effort.” *Journal of Political Economy* 82(2, Part 2):S136–63. doi: 10.1086/260297.

Hegewisch, Ariane, and Janet C. Gornick. 2011. “The Impact of Work-Family Policies on Women’s Employment: A Review of Research from OECD Countries.” *Community, Work & Family* 14(2):119–38. doi: 10.1080/13668803.2011.571395.

Herbst, Chris M. 2013. “Universal Child Care, Maternal Employment, and Children’s Long-Run Outcomes: Evidence from the U.S. Lanham Act of 1940.” *IZA Discussion Paper* No. 7846:1–63.

Herbst, Chris M. 2017. “Universal Child Care, Maternal Employment, and Children’s Long-Run Outcomes: Evidence from the US Lanham Act of 1940.” *Journal of Labor Economics* 35(2):519–64. doi: https://doi-org.proxy.library.upenn.edu/10.1086/689478.

Hook, Jennifer L., and Eunjeong Paek. 2020. “National Family Policies and Mothers’ Employment: How Earnings Inequality Shapes Policy Effects across and within Countries.” *American Sociological Review* 85(3):381–416. doi: 10.1177/0003122420922505.

Jackson, Margot I., and Daniel Schneider. 2022. “Public Investments and Class Gaps in Parents’ Developmental Expenditures.” *American Sociological Review* 87(1):105–42. doi: 10.1177/00031224211069975.

Juhn, Chinhui, and Kristin McCue. 2017. “Specialization Then and Now: Marriage, Children, and the Gender Earnings Gap across Cohorts.” *Journal of Economic Perspectives* 31(1):183–204.

Kaestner, Robert, Darren Lubotsky, and Javaeria Qureshi. 2016. “Mother’s Employment by Child Age and Its Implications for Theory and Policy.”

Keck, Wolfgang, and Chiara Saraceno. 2013. “The Impact of Different Social-Policy Frameworks on Social Inequalities Among Women in the European Union: The Labour-Market Participation of Mothers.” *Social Politics* 20(3):297–328.

Killewald, Alexandra. 2013. “A Reconsideration of the Fatherhood Premium: Marriage, Coresidence, Biology, and Fathers’ Wages.” *American Sociological Review* 78(1):96–116. doi: 10.1177/0003122412469204.

Killewald, Alexandra, and Javier García-Manglano. 2016. “Tethered Lives: A Couple-Based Perspective on the Consequences of Parenthood for Time Use, Occupation, and Wages.” *Social Science Research* 60:266–82. doi: 10.1016/j.ssresearch.2016.03.007.

Kimmel, Jean. 1998. “Child Care Costs as a Barrier to Employment for Single and Married Mothers.” *Review of Economics and Statistics* 80(2):287–99. doi: 10.1162/003465398557384.

Kleven, Henrik, Camille Landais, Johanna Posch, Andreas Steinhauer, and Josef Zweimüller. 2019. “Child Penalties Across Countries: Evidence and Explanations.” *NBER Working Paper No. 25524* 1–20.

Landivar, Liana Christin, Leah Ruppanner, and William J. Scarborough. 2021. “Are States Created Equal? Moving to a State With More Expensive Childcare Reduces Mothers’ Odds of Employment.” *Demography* 58(2):451–70. doi: 10.1215/00703370-8997420.

Landivar, Liana Christin, William J. Scarborough, Caitlyn Collins, and Leah Ruppanner. 2021. “Do High Childcare Costs and Low Access to Head Start and Childcare Subsidies Limit Mothers’ Employment? A State-Level Analysis.” *Social Science Research*. doi: https://doi.org/10.1016/j.ssresearch.2021.102627.

Laslett, Barbara, and Johanna Brenner. 1989. “Gender and Social Reproduction: Historical Perspectives.” *Annual Review of Sociology* 15:381–404.

Lightman, Naomi, and Claire Link. 2021. “Gender, Class and the Cost of Unpaid Care: An Analysis of 25 Countries.” *Journal of Comparative Family Studies* 52(2):206–44. doi: 10.3138/jcfs-52-2-004.

Mason, Karen Oppenheim, and Karen Kuhlthau. 1992. “The Perceived Impact of Child Care Costs on Women’s Labor Supply and Fertility.” *Demography* 29(4):523–43. doi: https://doi-org.proxy.library.upenn.edu/10.2307/2061850.

McCall, Leslie, and Christine Percheski. 2010. “Income Inequality: New Trends and Research Directions.” *Annual Review of Sociology* 36(1):329–47. doi: 10.1146/annurev.soc.012809.102541.

McLanahan, Sara. 2004. “Diverging Destinies: How Children Are Faring Under the Second Demographic Transition.” *Demography* 41(4):607–27.

Michel, Sonya. 1999. *Children’s Interests / Mothers’ Rights. The Shaping of America’s Child Care Policy*. New Haven: Yale University Press.

Morgan, Kimberly. 2006. *Working Mothers and the Welfare State: Religion and the Politics of Work-Family Policies in Western Europe*. Stanford: Stanford University Press.

Morrissey, Taryn W. 2016. “Child Care and Parent Labor Force Participation: A Review of the Research Literature.” *Review of Economics of the Household* 15(1):1–24. doi: 10.1007/s11150-016-9331-3.

Musick, Kelly, Megan Bea, and Pilar Gonalons-Pons. 2020. “His and Her Earnings Following Parenthood in the United States, Germany, and the United Kingdom.” *American Sociological Review* 85(3):639–74.

Musick, Kelly, Pilar Gonalons-Pons, and Christine Schwartz. 2021. “Change and Variation in Couples’ Earnings Equality Following Parenthood.” *Population Center Working Papers* 3-31–2021:53.

OECD. 2020. *Is Childcare Affordable?* Paris: OECD.

Olivetti, Claudia, and Barbara Petrongolo. 2017. “The Economic Consequences of Family Policies: Lessons from a Century of Legislation in High-Income Countries.” *Journal of Economic Perspectives* 31(1):205–30.

Permanyer, Iñaki, Albert Esteve, and Joan Garcia. 2019. “Decomposing Patterns of College Marital Sorting in 118 Countries: Structural Constraints versus Assortative Mating.” *Social Science Research* 83:102313. doi: 10.1016/j.ssresearch.2019.06.004.

Poo, Ai-Jen. 2016. *The Age of Dignity. Preparing for the Elder Boom in a Changing America*. New York: The New Press.

Press, Julie E., Jay Fagan, and Lynda Laughlin. 2006. “Taking Pressure Off Families: Child-Care Subsidies Lessen Mothers’ Work-Hour Problems.” *Journal of Marriage and Family* 68(1):155–71. doi: https://doi-org.proxy.library.upenn.edu/10.1111/j.1741-3737.2006.00240.x.

Rao, Aliya. 2020. *Crunch Time: How Married Couples Confront Unemployment*. Berkeley: University of California Press.

Ribar, David C. 1992. “Child Care and the Labor Supply of Married Women: Reduced Form Evidence.” *The Journal of Human Resources* 7(1):134–65. doi: https://doi.org/10.2307/145915.

Ribar, David C. 1995. “A Structural Model of Child Care and the Labor Supply of Married Women.” *Journal of Labor Economics* 13(3):558–97.

Ruppanner, Leah, Caitlyn Collins, Liana Christin Landivar, and William J. Scarborough. 2021. “Norms, Childcare Costs, and Maternal Employment.” *Gender & Society* 35(6):910–39. doi: 10.1177/08912432211046988.

Ruppanner, Leah, Stephanie Moller, and Liana Sayer. 2019. “Expensive Childcare and Short School Days = Lower Maternal Employment and More Time in Childcare? Evidence from the American Time Use Survey.” *Socius: Sociological Research for a Dynamic World* 5:1–14. doi: https://doi.org/10.1177%2F2378023119860277.

Russo, Anna. 2017. “A Head Start for the Whole Family: Assessing the Labor Supply Response of Mothers of Head Start Participants.” Yale University.

Scarborough, William J., Caitlyn Collins, Leah Ruppanner, and Liana Christin Landivar. 2021. “Head Start and Families’ Recovery From Economic Recession: Policy

Recommendations for COVID -19." *Family Relations* 70(1):26–42. doi: 10.1111/fare.12519.

Schneider, Daniel, Orestes P. Hastings, and Joe LaBriola. 2018. "Income Inequality and Class Divides in Parental Investments:" *American Sociological Review*. doi: 10.1177/0003122418772034.

Schofield, Deborah, and Josh Polette. 2002. "Measuring the Impact of Child Care Subsidies on the Incomes of Mothers Returning to Work." *The Australian Economic Review* 31(1):47–62. doi: https://doi-org.proxy.library.upenn.edu/10.1111/1467-8462.00050.

Schwartz, Christine R. 2010. "Earnings Inequality and the Changing Association between Spouses' Earnings." *American Journal of Sociology* 115(5):1524–57.

Sigle-Rushton, Wendy, and Jane Waldfogel. 2007. "The Incomes of Families with Children: A Cross-National Comparison." *Journal of European Social Policy* 17(4):299–318. doi: https://doi.org/10.1177%2F0958928707082474.

Stanczyk, Alexandra B. 2020. "The Dynamics of U.S. Household Economic Circumstances Around a Birth." *Demography* 57(4):1271–96. doi: 10.1007/s13524-020-00897-1.

Sudo, Naoki. 2017. "The Effects of Women's Labor Force Participation: An Explanation of Changes in Household Income Inequality." *Social Forces* 95(4):1427–50.

Swinth, Kristen. 2018. *Feminism's Forgotten Fight*. Cambridge: Harvard University Press.

Tekin, Erdal. 2007a. "Childcare Subsidies, Wages, and Employment of Single Mothers." *Journal of Human Resources* 42(2):453–87. doi: doi: 10.3368/jhr.XLII.2.453.

Tekin, Erdal. 2007b. "Childcare Subsidies, Wages, and Employment of Single Mothers." *Journal of Human Resources* XLII(2):453–87. doi: 10.3368/jhr.XLII.2.453.

Ullrich, Rebecca, Stephanie Schmit, and Ruth Cosse. 2019. *Inequitable Access to Child Care Subsidies*. CLASP: Policy Solutions that Work for Low-Income People.

U.S. Census Bureau. 2001. "Survey of Income and Program Participation Users' Guide. Third Edition."

Western, Bruce, Deirdre Bloome, Benjamin Sosnaud, and Laura M. Tach. 2016. "Trends in Income Insecurity Among U.S. Children, 1984–2010." *Demography* 53(2):419–47. doi: 10.1007/s13524-016-0463-0.

Wikström, Magnus, Elena Kotyrlo, and Niklas Hanes. 2015. "Childcare Reform: Effects on Earnings and Employment among Native Swedish and Immigrant Mothers." *Research in Labor Economics* 42:93–130.

Table 1. Descriptive statistics for the analytical sample

	Pre-birth	Post-birth
Employment	66%	58%
Work hours (weekly)	24.15	20.23
	(19.84)	(19.86)
Earnings (monthly)	2043.80	1817.25
	(2930.19)	(3198.44)
Men's employment	90%	91%
Men's work hours (weekly)	39.26	40.03
	(19.84)	(19.87)
Men's earnings (monthly)	3874.50	4321.56
	(4586.25)	(5438.07)
Family income (monthly)	5900.73	6180.73
	(6129.89)	(6897.62)
N (persons)	1,878	
N (person-months)	81,733	
Observations (mean)	46.88	
Age (mean)	30.44	
College education	42%	

Source: SIPP 2008–2018.
Note: Earnings and income are expressed in 2010 dollars.

Table 2. Panel regression analyses of birth penalties on weekly paid work hours

	Model 1		Model 2		Model 3		Model 4	
	No college	College	No college	College	No college	College	No college	College
Panel A. Women								
Birth (β_1)	-9.490***	-6.913***	-9.562***	-7.280***	-9.125***	-6.134***	-9.124***	-6.202***
	(1.545)	(1.000)	(1.585)	(1.040)	(1.834)	(1.661)	(1.830)	(1.659)
Childcare costs (β_2)	0.924	0.408	0.939	0.369	0.714	0.311	0.718	0.342
	(0.502)	(0.330)	(0.505)	(0.324)	(0.580)	(0.318)	(0.582)	(0.323)
Birth * Childcare cost (β_3)	-0.717*	-0.137	-0.707*	-0.117	-0.664*	-0.0369	-0.680*	-0.0639
	(0.283)	(0.175)	(0.287)	(0.176)	(0.283)	(0.180)	(0.287)	(0.179)
Three-way interaction (pooled model)	0.580		0.590		0.627		0.616	
	(0.353)		(0.355)		(0.358)		(0.358)	
Panel B. Men								
Birth (β_1)	1.141	0.988	1.050	1.190	2.018	0.586	2.025	0.525
	(0.899)	(0.769)	(0.884)	(0.757)	(1.042)	(1.334)	(1.038)	(1.345)
Childcare costs (β_2)	-0.154	-0.0501	-0.134	-0.0278	-0.208	-0.0594	-0.218	-0.0341
	(0.496)	(0.269)	(0.482)	(0.267)	(0.478)	(0.261)	(0.482)	(0.259)
Birth * Childcare cost (β_3)	0.296	-0.0875	0.308	-0.0973	0.369	-0.0821	0.393	-0.105
	(0.223)	(0.198)	(0.224)	(0.200)	(0.228)	(0.211)	(0.229)	(0.207)
Three-way interaction (pooled model)	-0.384		-0.405		-0.451		-0.498	
	(0.340)		(0.338)		(0.358)		(0.356)	
N observations	81733		81733		81733		81733	
N couples	1878		1878		1878		1878	

Source: SIPP 2008–2018

Notes: The three-way interaction coefficients come from the pooled and fully interacted models including interactions between birth, childcare costs, and women's education. This interaction tests for the difference between β_3 for women without a college degree and β_3 for women with a college degree, i.e., 0.580 = (-.137) - (-.717). All models include state, year, and month fixed effects, and control for women's age and age squared. Model 2 adds a control identifying additional birth transitions during the survey. Model 3 includes two-way interactions between birth and partner's education, women's age at birth, and marital status. Model 4 controls for state-level year-to-year changes in GDP per capita, women's employment, and women's wages. Robust standard errors clustered at the state level. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 3. Panel regression analyses of birth penalties on monthly earnings (logged)

	Model 1		Model 2		Model 3		Model 4	
	No college	College	No college	College	No college	College	No college	College
Panel A. Women								
Birth (β_1)	-1.946***	-1.189***	-1.999***	-1.262***	-1.810***	-1.117**	-1.803***	-1.133**
	(0.280)	(0.192)	(0.283)	(0.196)	(0.344)	(0.349)	(0.342)	(0.350)
Childcare costs (β_2)	0.125	0.0466	0.107	0.0392	0.0985	0.0197	0.0948	0.0265
	(0.0726)	(0.0781)	(0.0671)	(0.0775)	(0.0816)	(0.0771)	(0.0828)	(0.0769)
Birth * Childcare cost (β_3)	-0.113*	0.0356	-0.104*	0.0395	-0.108*	0.0564	-0.109*	0.0512
	(0.0489)	(0.0257)	(0.0478)	(0.0262)	(0.0513)	(0.0285)	(0.0518)	(0.0294)
Three-way interaction (pooled model)	0.148**		0.150**		0.165**		0.161**	
	(0.0554)		(0.0559)		(0.0596)		(0.0598)	
Panel B. Men								
Birth (β_1)	0.321	0.0605	0.319	0.0644	0.497*	0.0653	0.496*	0.0505
	(0.167)	(0.0953)	(0.170)	(0.0976)	(0.206)	(0.186)	(0.206)	(0.188)
Childcare costs (β_2)	0.0714	-0.0295	0.0719	-0.0291	0.0567	-0.0304	0.0573	-0.0237
	(0.0707)	(0.0380)	(0.0698)	(0.0379)	(0.0679)	(0.0376)	(0.0668)	(0.0363)
Birth * Childcare cost (β_3)	-0.0139	0.0261	-0.0136	0.0259	-0.00485	0.0268	-0.00495	0.0210
	(0.0358)	(0.0254)	(0.0361)	(0.0255)	(0.0385)	(0.0265)	(0.0390)	(0.0252)
Three-way interaction (pooled model)	0.040		0.040		0.032		0.026	
	(0.0493)		(0.0497)		(0.0511)		(0.0506)	
N observations	81733		81733		81733		81733	
N couples	1878		1878		1878		1878	

Source: SIPP 2008–2018

Notes: The three-way interaction coefficients come from the pooled and fully interacted models including interactions between birth, childcare costs, and women's education. This interaction tests for the difference between β_3 for women without a college degree and β_3 for women with a college degree, i.e., 0.148 = (.0356) - (-.113). All models include state, year, and month fixed effects, and control for women's age and age squared. Model 2 adds a control identifying additional birth transitions during the survey. Model 3 includes two-way interactions between birth and partner's education, women's age at birth, and marital status. Model 4 controls for state-level year-to-year changes in GDP per capita, women's employment, and women's wages. Robust standard errors clustered at the state level. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

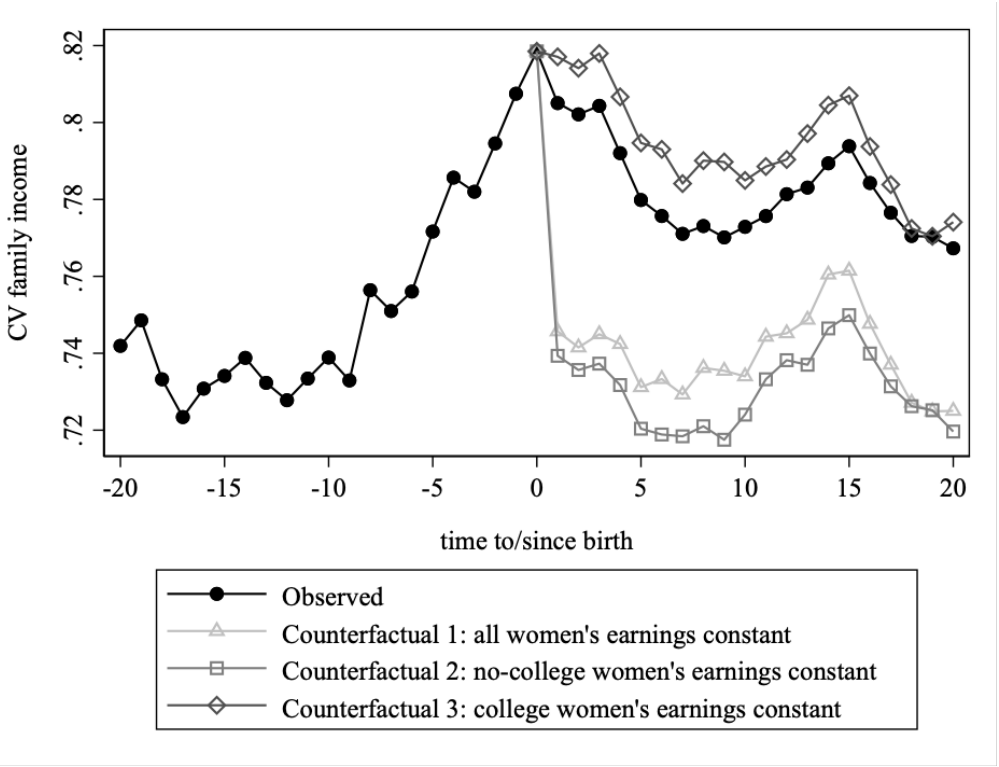
Table 4. Panel regression analyses of birth penalties on family income (logged)

	Model 1		Model 2		Model 3		Model 4	
	No college	College	No college	College	No college	College	No college	College
Birth (β_1)	-0.249	-0.123*	-0.264*	-0.126*	-0.196	-0.0996	-0.188	-0.103
	(0.129)	(0.0549)	(0.128)	(0.0546)	(0.148)	(0.0722)	(0.147)	(0.0709)
Childcare costs (β_2)	0.0334	-0.0223	0.0366	-0.0227	0.0307	-0.0229	0.0245	-0.0216
	(0.0587)	(0.0188)	(0.0590)	(0.0189)	(0.0589)	(0.0190)	(0.0579)	(0.0193)
Birth * Childcare cost (β_3)	-0.0573**	0.00769	-0.0553**	0.00785	-0.0526*	0.00898	-0.0525*	0.00819
	(0.0207)	(0.0101)	(0.0204)	(0.0101)	(0.0210)	(0.0103)	(0.0205)	(0.0100)
Three-way interaction (pooled model)	0.0649**		0.0632**		0.0616*		0.0606*	
	(0.0229)		(0.0226)		(0.0234)		(0.0228)	
N observations	81733		81733		81733		81733	
N couples	1878		1878		1878		1878	

Source: SIPP 2008–2018

Notes: The three-way interaction coefficients come from the pooled and fully interacted models including interactions between birth, childcare costs, and women's education. This interaction tests for the difference between β_3 for women without a college degree and β_3 for women with a college degree, i.e., 0.0649 = (.00769) - (-.0573). All models include state, year, and month fixed effects, and control for women's age and age squared. Model 2 adds a control identifying additional birth transitions during the survey. Model 3 includes two-way interactions between birth and partner's education, women's age at birth, and marital status. Model 4 controls for state-level year-to-year changes in GDP per capita, women's employment, and women's wages. Robust standard errors clustered at the state level. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

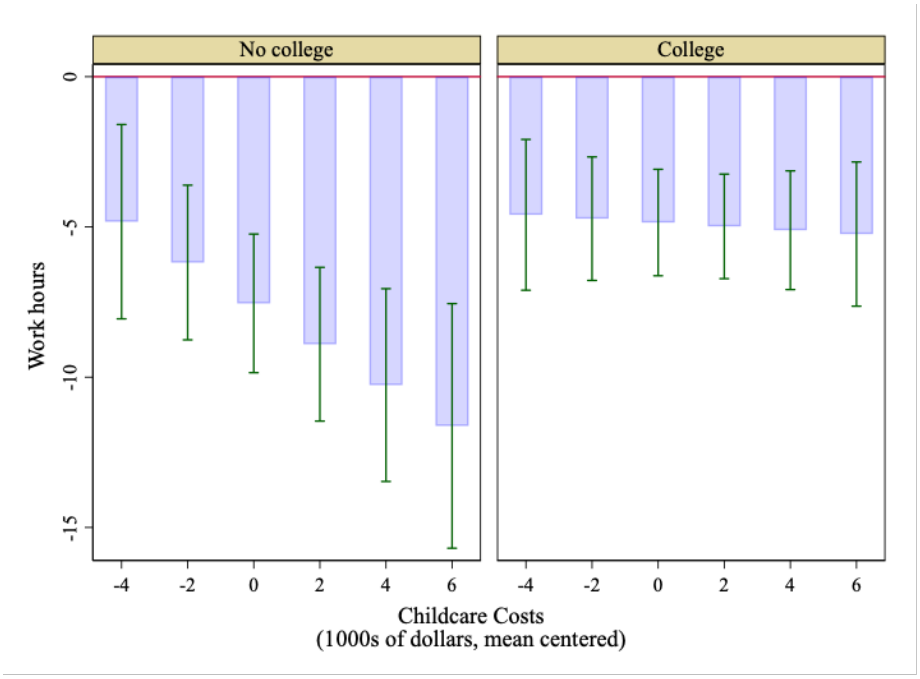
Figure 1. Family income inequality around birth events



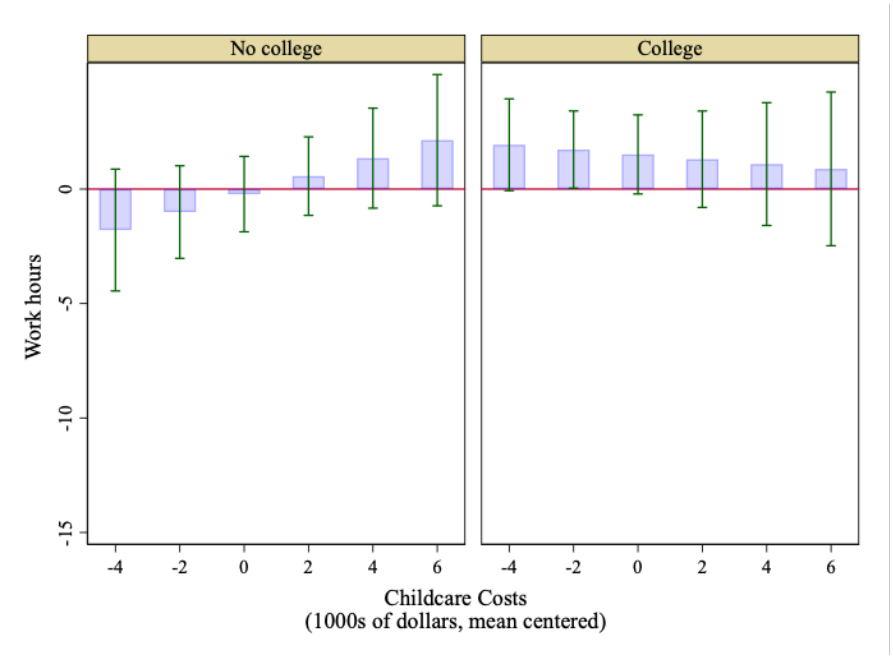
Source: SIPP 2008–2018
Note: Figure 1 plots the coefficient of variation (CV) for family income among families who experience a birth during the panel. Counterfactual trends illustrate how the coefficient of variation would change if women's earnings did not change with birth events. Counterfactual 1 sets all women's earnings constant to their pre-birth values, counterfactual 2 sets only the earnings of women without a college degree constant to their pre-birth values, and counterfactual 3 sets only the earnings of women with a college degree constant to their pre-birth values.

Figure 2. Birth penalties on weekly paid work hours by mothers' education and childcare costs

Panel A. Women



Panel B. Men

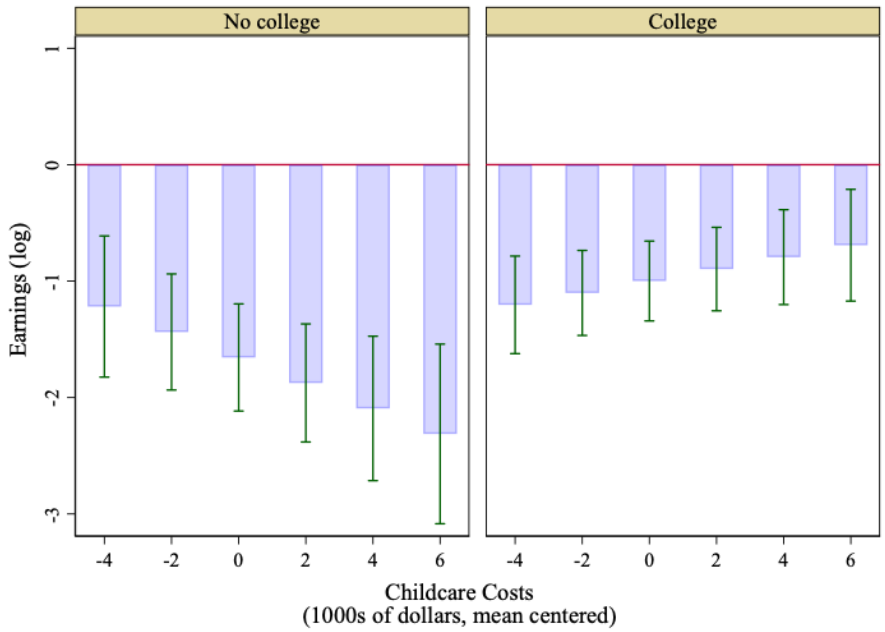


Source: SIPP 2008–2018

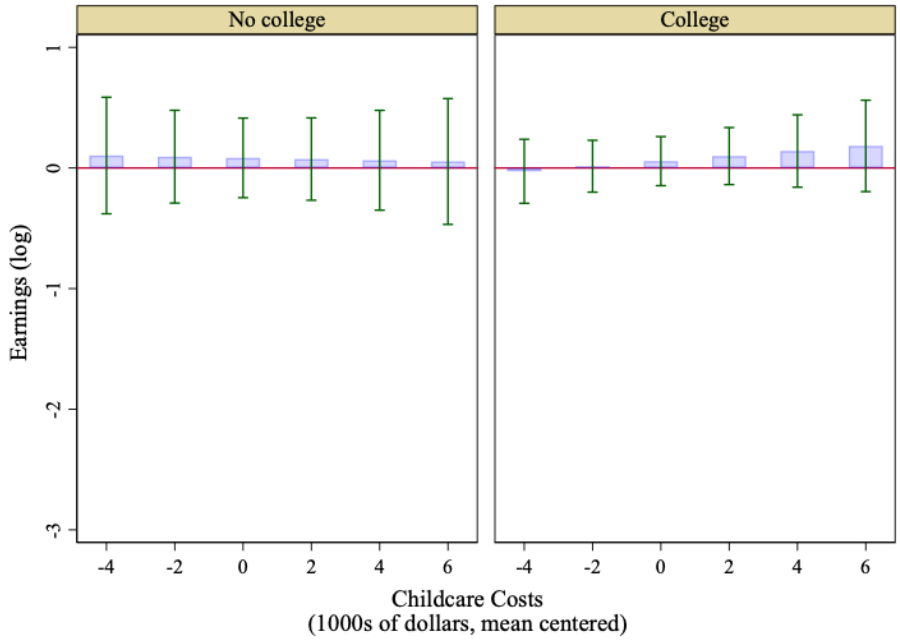
Note: Figure 2 plots the average marginal effect of births on women's and men's weekly paid work hours across levels of childcare costs based on the regression analysis reported in Table 2 Model 4. The x-axis unit is annual childcare cost in 1000s of dollars (2010 dollars) centered at the mean ($9,500), i.e., the value -4 indicates that annual childcare costs are $4,000 below the mean. The range covers 90% of the observed distribution in childcare prices. The y-axis unit is weekly hours of work, the value -5 indicates that births are associated with a 5-hour decline in weekly paid work hours.

Figure 3. Birth penalties on monthly earnings (logged) by mothers' education and childcare costs

Panel A. Women



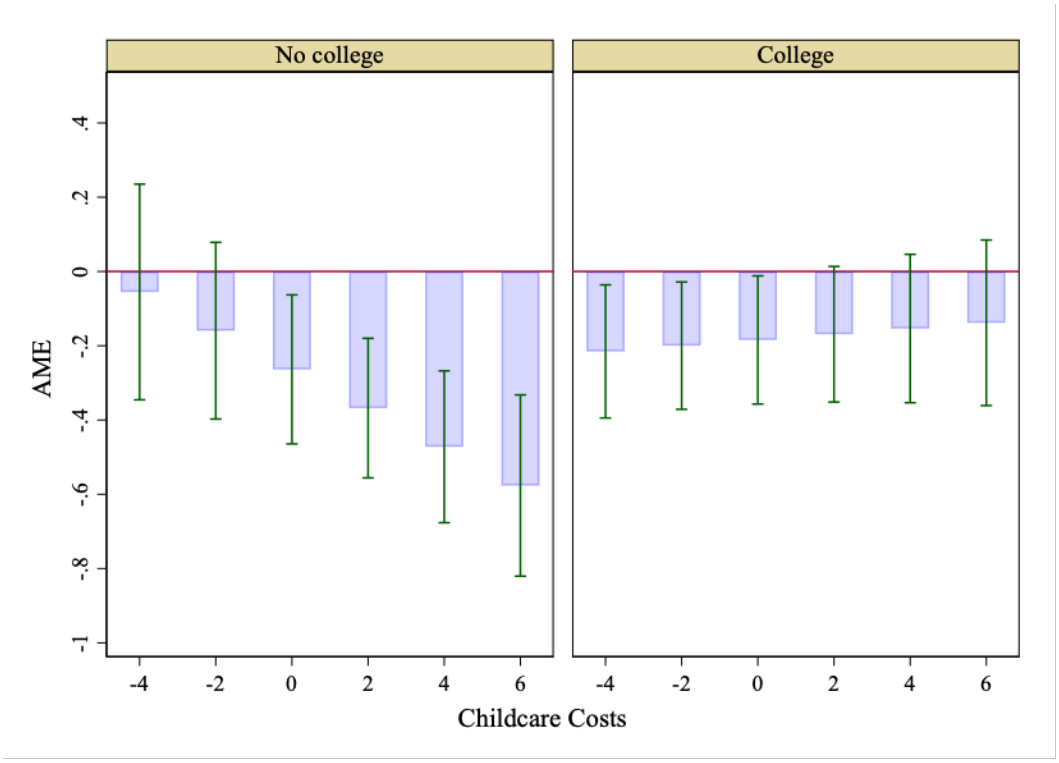
Panel B. Men



Source: SIPP 2008–2018

Note: Figure 3 plots the average marginal effect of births on women's and men's monthly earnings across levels of childcare costs based on the regression equation reported in Table 3 Model 4. The x-axis covers 90% of the distribution in annual childcare cost (1000s of dollars in 2010 dollars) centered at the mean ($9,500). The y-axis unit is monthly logged earnings, the value -1 represents a decline of one unit in monthly earnings on the log scale, or a decline of about 63 percent in monthly earnings, exp(-1)-1 = -.63.

Figure 4. Birth penalties on family monthly income (logged) by mothers' education and childcare costs



Source: SIPP 2008–2018

Note: Figure 4 plots the average marginal effect of births on family income (logged) across levels of childcare costs based on the regression equation reported in Table 4 Model 4. The x-axis covers 90% of the distribution in annual childcare cost (1000s of dollars in 2010 dollars) centered at the mean ($9,500). The y-axis unit is monthly family logged income, the value -.2 represents a decline of .2 in family income on the log scale, or a decline of about 18% percent, exp(-.2)-1 = -.18.

Proposed Online Appendix

ANALYSES WITH CPS AND COUNTY-LEVEL CHILDCARE COSTS MEASURES

The analyses presented in the main manuscript rely on state-level measures of childcare costs that might mask important within-state heterogeneity in childcare prices. To address this concern, we conducted sensitivity tests using panel data from the Current Population Survey (CPS) and data on county-level childcare prices collected by the Women's Bureau at the U.S. Department of Labor. The CPS provides a larger sample size and county-level indicators that the SIPP does not have. However, the CPS does not include sufficient repeated observations nor comprehensive measures on earnings or information, limiting this sensitivity analyses to labor supply outcomes only. Furthermore, the CPS covers a narrower window of observation around birth events, as respondents are only observed for eight months over the span of 16 months (respondents enter the sample for four consecutive month-waves, leave the sample for eight waves, and then enter the sample again for four consecutive waves).

Table S1 presents the descriptive statistics corresponding to the CPS analytical sample. The sample is defined following the same criteria we applied to the SIPP data. Table S2 presents the results for panel regression analyses on work hours and employment. The findings are remarkably consistent with the SIPP. We find that childcare costs exacerbate birth penalties on mothers without a college degree but not for mothers with a college degree, or for men.

ANALYSES WITH THE FULL SAMPLE OF PARTNERED AND UNPARTNERED MOTHERS

The analyses presented in the manuscript focus on the sample of mothers partnered to men to present parallel results for mothers and their male partners. We conducted supplementary analyses on a broader sample that includes women partnered to either men or women and unpartnered women.

Table S3 presents the descriptive statistics for this broader analytical sample including partnered and unpartnered women. Note that the unpartnered mothers represent a larger share of mothers without a college degree. The share of women partnered to women is comparatively very small. Table S4 reports results from regression analyses using this sample for all core outcome variables. We report results for the equivalent of Model 4 in Tables 2-4 in the main manuscript. For this analysis, measures about mothers' partners include a category identifying mothers without partners, i.e., partners' education variable becomes a 3-category variable (0 = without a college degree, 1 = college degree, 9 = without a partner). All these variables are entered as factor variables.

The results show that the main pattern of findings applies to this broader sample. The values of the interaction coefficient between births and childcare costs are somewhat smaller compared to the results for partnered mothers only, suggesting that the sensitivity to childcare costs might be somewhat lower among unpartnered mothers. Overall, the results confirm that childcare costs also shape family income inequality in this broader sample.

BIRTH PENALTIES ON HOURLY WAGES

Birth penalties in earnings can come from both changes in labor supply as well as wages. The main analyses focus on changes in earnings stemming from reductions in labor supply but we also examined how hourly wages change with birth events. Table S5 presents results for logged hourly wages using the sample of partnered women and models analogous to Model 4 in Table 2. We do not find evidence of statistically significant declines in hourly wages for either group of women. This result is consistent with recent studies suggesting that motherhood wage penalties are declining and becoming not statistically significant (Pal and Waldfogel 2016). However, we find that for women without a college degree childcare costs generate statistically significant birth penalties on hourly wages. This indicates that birth penalties in earnings reported in Table 3 are driven by both reductions in labor supply reported in Table 2 and declines in hourly wages that grow with childcare costs.

SENSITIVITY TO HETEROGENEITY BY RACE CATEGORIES

Table S6 presents results that include controls for birth penalty heterogeneity by race category. We report results for women's outcomes for simplicity. The models reported correspond to Models 4 in Tables 3-5 in the main manuscript. The results show that the main pattern of findings is robust to controlling for variation in how birth penalties impact outcomes across race categories.

SENSITIVITY TO CONTROLS FOR NUMBER AND AGES OF KIDS IN THE HOUSEHOLD

Table S7 presents results that include controls for time-varying measures of number of children in the household and age of the oldest child under 16 in the household. We report results for women's outcomes for simplicity. The models reported correspond to Models 4 in Tables 3-5 in the main manuscript. The results show that the main pattern of findings is robust to controlling for variation in the number and ages of children already in the household at the time of birth events.

Table S1. Descriptive Statistics CPS analytical sample

	Pre-birth	Post-birth
Employment	70%	61%
Work hours (weekly)	25.75	21.61
	(19.08)	(19.32)
Men's employment	90%	90%
Men's work hours (weekly)	38.87	38.68
	(19.08)	(19.32)
N (persons)	5462	
N (person-months)	44879	
Observations (mean)	8	
Age (mean)	30.97	
College education	52%	

Source: CPS 2008-2018

Table S2. Panel regression analyses of birth penalties on weekly paid work hours and employment with county-level childcare price measures

	Women				Men			
	Weekly work hours		Employment		Weekly work hours		Employment	
	No College	College	No College	College	No College	College	No College	College
Birth (β_1)	-3.547***	-2.978***	-0.0586***	-0.0484***	0.729	0.490	-0.00256	0.00136
	(0.543)	(0.450)	(0.0143)	(0.0105)	(0.629)	(0.485)	(0.00944)	(0.0122)
Childcare costs (β_2)	-0.202	-0.353	-0.00957	-0.00536	0.0468	0.541	-0.00348	0.0113*
	(0.268)	(0.288)	(0.00815)	(0.00950)	(0.304)	(0.358)	(0.00683)	(0.00468)
Birth * Childcare cost (β_3)	-0.107*	0.0142	-0.00425**	0.000252	0.0144	-0.0175	0.000127	-0.00106
	(0.0479)	(0.0424)	(0.00133)	(0.000920)	(0.0284)	(0.0235)	(0.000890)	(0.000736)
Three-way interaction (pooled model)	0.121		0.00450**		-0.0319		-0.00119	
	(0.06)		(0.001)		(0.04)		(0.00)	
N observations	44,879		44,879		44,879		44,879	
N couples	5,462		5,462		5,462		5,462	

Source: CPS 2008-2018

Notes: The three-way interaction coefficients come from the pooled and fully interacted models including interactions between birth, childcare costs, and women's education. This interaction tests for the difference between β_3 for women without a college degree and β_3 for women with a college degree, i.e., 0.121 = (.0142) - (-.107). All models include state, year, and month fixed effects, and control for women's age and age squared, two-way interactions between birth and partner's education, women's age at birth, and marital status, and state-level year-to-year changes in GDP per capita, women's employment, and women's wages. Robust standard errors clustered at the county level. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S3. Descriptive statistics for SIPP analytical sample including unpartnered women

	Pre-birth	Post-birth
Employment	66%	58%
Work hours (weekly)	24.20	20.25
	(19.83)	(19.86)
Earnings (monthly)	2047.46	1819.13
	(2931.57)	(3199.44)
Men's employment	90%	91%
Men's work hours (weekly)	39.29	40.05
	(19.83)	(19.87)
Men's earnings (monthly)	3879.68	4324.63
	(4588.09)	(5439.67)
Family income (monthly	5908.29	6186.05
	(6132.35)	(6899.25)
N (persons)	2710	
N (person-months)	108447	
Observations (mean)	46.25	
Age (mean)	29.42	
Cohabits with a partner	75%	
College education	34%	

Source: SIPP 2008-2018.
Note: Earnings and income are expressed in 2010 dollars.

Table S4. Panel regression analyses of birth penalties on weekly paid hours, monthly labor earnings, and family income for the sample including unpartnered women

	Weekly work hours		Monthly earnings		Family income	
	No college	College	No college	College	No college	College
Birth (β_1)	-8.185***	-6.411***	-1.603***	-1.120***	-0.428**	-0.236
	(1.671)	(1.689)	(0.319)	(0.315)	(0.130)	(0.182)
Childcare costs (β_2)	0.549	0.321	0.0884	0.0166	0.0560	-0.0292
	(0.431)	(0.326)	(0.0686)	(0.0723)	(0.0527)	(0.0211)
Birth * Childcare cost (β_3)	-0.510*	-0.0858	-0.0633*	0.0434	-0.0422*	0.0127
	(0.194)	(0.202)	(0.0216)	(0.0330)	(0.0185)	(0.0129)
Three-way interaction (pooled model)	0.424		0.107*		0.0549*	
	(0.306)		(0.0470)		(0.0234)	
N observations	108,447		108,447		108,447	
N couples	2,710		2,710		2,710	

Source: SIPP 2008-2018

Notes: The three-way interaction coefficients come from the pooled and fully interacted models including interactions between birth, childcare costs, and women's education. This interaction tests for the difference between β_3 for women without a college degree and β_3 for women with a college degree, i.e., 0.424 = (-.0858) - (-.510) . All models include state, year, and month fixed effects, and control for women's age and age squared, subsequent birth transitions during the survey, two-way interactions between birth and partner's education, women's age at birth, and marital status, and state-level year-to-year changes in GDP per capita, women's employment, and women's wages. Robust standard errors clustered at the state level. *** p < 0.001, ** p < 0.01, * p < 0.05

Table S5. Panel regression analyses of birth penalties on hourly wages (logged)

	Women		Men	
	No college	College	No college	College
Birth (β_1)	-0.0434	-0.0293	0.0557	-0.0241
	(0.0586)	(0.0564)	(0.0479)	(0.0429)
Childcare costs (β_2)	-0.0343	-0.00213	0.0398*	-0.00726
	(0.0261)	(0.0138)	(0.0188)	(0.0146)
Birth * Childcare cost (β_3)	-0.0265**	0.00164	-0.00233	0.0104
	(0.00898)	(0.00853)	(0.00956)	(0.00709)
Three-way interaction (pooled model)	0.0281*		0.0128	
	(0.014)		(0.011)	
N observations	58588		58588	
N couples	1878		1878	

Source: SIPP 2008-2018

Notes: The three-way interaction coefficients come from the pooled and fully interacted models including interactions between birth, childcare costs, and women's education. This interaction tests for the difference between β_3 for women without a college degree and β_3 for women with a college degree, i.e., 0.0281 = (.00164) - (-.0265). Note that this analysis only includes regression with positive values for wages. All models include state, year, and month fixed effects, and control for women's age and age squared, subsequent birth transitions during the survey, two-way interactions between birth and partner's education, women's age at birth, and marital status, and state-level year-to-year changes in GDP per capita, women's employment, and women's wages. Robust standard errors clustered at the state level. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S6. Panel regression analyses of birth penalties on mothers' work hours, monthly earnings, and family income for models that control for birth penalty heterogeneity across race categories

	Work hours		Monthly earnings (logged)		Family income	
	No college	College	No college	College	No college	College
Birth (β_1)	-9.706***	-6.230***	-1.920***	-1.131**	-0.144	-0.167**
	(1.975)	(1.612)	(0.366)	(0.353)	(0.134)	(0.0601)
Childcare costs (β_2)	0.738	0.425	0.0977	0.0299	0.0250	-0.0258
	(0.587)	(0.356)	(0.0852)	(0.0809)	(0.0517)	(0.0215)
Birth * Childcare cost (β_3)	-0.685*	-0.0665	-0.112*	0.0463	-0.0482*	0.00817
	(0.284)	(0.173)	(0.0506)	(0.0282)	(0.0200)	(0.0101)
Three-way interaction (pooled model)	0.619		0.158**		0.0564*	
	(0.343)		(0.059)		(0.022)	
N observations	81733		81733		81733	
N couples	1878		1878		1878	

Source: SIPP 2008-2018

Notes: The three-way interaction coefficients come from the pooled and fully interacted models including interactions between birth, childcare costs, and women's education. This interaction tests for the difference between β_3 for women without a college degree and β_3 for women with a college degree, i.e., 0.619 = (-.0665) - (-.685). All models include state, year, and month fixed effects, and control for women's age and age squared, subsequent birth transitions during the survey, two-way interactions between birth and partner's education, women's age at birth, marital status, and women's race category (0 = white non-Hispanic, 1 = Black non-Hispanic, 2 = Hispanic, 3 = Other) and state-level year-to-year changes in GDP per capita, women's employment, and women's wages. Robust standard errors clustered at the state level. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S7. Panel regression analyses of birth penalties on mothers' work hours, monthly earnings, and family income for models that control for number and ages of kids in the household

	Work hours		Monthly earnings (logged)		Family income	
	No college	College	No college	College	No college	College
Birth (β_1)	-8.217**	-3.919	-1.618***	-0.689	-0.00253	-0.101
	(2.392)	(2.017)	(0.422)	(0.426)	(0.168)	(0.0756)
Childcare costs (β_2)	0.717	0.328	0.0946	0.0240	0.0232	-0.0290
	(0.578)	(0.328)	(0.0823)	(0.0796)	(0.0517)	(0.0206)
Birth * Childcare cost (β_3)	-0.683*	-0.0662	-0.110*	0.0508	-0.0487*	0.00769
	(0.287)	(0.177)	(0.0518)	(0.0296)	(0.0201)	(0.0103)
Three-way interaction (pooled model)	0.618		0.161*		0.0557*	
	(0.349)		(0.062)		(0.023)	
N observations	81733		81733		81733	
N couples	1878		1878		1878	

Source: SIPP 2008-2018

Notes: The three-way interaction coefficients come from the pooled and fully interacted models including interactions between birth, childcare costs, and women's education. This interaction tests for the difference between β_3 for women without a college degree and β_3 for women with a college degree, i.e., 0.618 = (-.0662) - (-.683). All models include state, year, and month fixed effects, and control for women's age and age squared, subsequent birth transitions during the survey, time-varying measures for the number of kids in the household and the age of the oldest child under 16, two-way interactions between birth and partner's education, women's age at birth, marital status, and state-level year-to-year changes in GDP per capita, women's employment, and women's wages. Robust standard errors clustered at the state level. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$