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DISCUSSION PAPER SERIES

IZA DP No. 18237

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ABSTRACT

Cohabitation, Child Development, and College Costs*

US college-educated couples with children marry at higher rates than those without a college degree. We argue that marriage, which entails lower separation risk and more equitable asset division if separation occurs, provides insurance to the lower-earning spouse, facilitating child investment. Investing in children is more valuable for college-educated couples, who are more likely to send their children to college. Using an OLG model of marriage, cohabitation, wealth accumulation, and educational investments where college is costly and completion is risky, we find that high college costs reduce incentives to marry among couples without a college degree. These differences in union choice by education heighten differences in children's educational attainment and reduce intergenerational mobility.

JEL Classification: D15, E24, J12, J22, J24

Keywords: cohabitation, marriage, child development, human capital accumulation, college costs, intergenerational mobility

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1 Introduction

Cohabitation has become a common setting for raising children in the United States, and it is disproportionately concentrated among parents without a college degree. Rising cohabitation may have implications that extend beyond family structure: cohabiting unions are less stable and offer weaker legal and financial protections than marriage. Consequently, they may be less conducive to the long, coordinated investments in children that sustain intergenerational mobility. Lundberg and Pollak (2014) view marriage as a commitment device that insures the lower-earning partner and facilitates joint investment in children. If this insurance mechanism is weaker among cohabiting couples, differences in union type by education can magnify differences in child investment, leading to increased inequality in children's educational attainment.

How the choice between marriage and cohabitation relates to children's educational attainment and, ultimately, intergenerational mobility is a central question in this paper. We provide empirical evidence that marriage, by providing insurance to the lower-earning spouse, facilitates child investment. We then develop an overlapping generations model in which couples draw a marriage preference shock and choose their marital status along with child investments and savings. Children may attend college, which entails a monetary cost, and subsequently become the next generation of parents. In the model, the value of marriage is linked to the value of parental time and money investments in children. These investments improve children's long-run outcomes by increasing the likelihood that they obtain a college degree. Consistent with our theory and empirical findings, we show that non-college educated parents marry less and invest less in children, which magnifies the differences in child college attendance and completion rates and in turn reduces intergenerational mobility in education. The main insight of the paper is that high college costs in the US reduce intergenerational mobility in education by not only directly reducing the affordability of college, but also by reducing the incentives of non-college educated parents to marry and invest in children.

We first turn to the data to explore whether the empirical evidence is consistent with our theory. To show that marriage, by providing insurance, induces investments in children, we explore the impact of alimony reforms across US states from 2006 to 2018 using American Time Use Survey (ATUS) and Consumer Expenditure Survey (CEX) data. Reductions in the generosity or duration of alimony payments may reduce the insurance value of marriage, thereby making marriage and cohabitation more similar to each other. Using a difference-in-differences approach, we find that alimony reductions do in fact lead to decreased parental time with children and increased hours worked

among married mothers. As a result, the gap in time allocations between married and cohabiting mothers narrows. Notably, the decline in time allocated to children includes active investment time, which is crucial for the development of children's human capital. Similar effects can be observed for money investments in children. To support the link between marital status and college completion rates later in life, we leverage the Panel Study of Income Dynamics (PSID) and the Transition into Adulthood Supplement (PSID-TAS) to show that parental marital status is correlated with child outcomes later in life. Children of parents who were married at their birth are more likely to complete college by their mid-twenties compared to children born to cohabiting parents.

Motivated by these findings, we develop an overlapping generations (OLG) model with stochastic aging in which college- and non-college-educated parents choose to cohabit or marry, how much time and money to invest in their children and whether to send them to college, which is costly. Parents are altruistic toward their children and care about their lifetime utility. The lifecycle is characterized by four stages. Parents start their lives as new couples with young children. They draw a marriage preference shock and decide whether to marry or cohabit. The preference shock captures unobserved heterogeneity in couples that leads some couples to choose marriage for reasons other than the fact that marriage facilitates child investment. Over the first two stages of the lifecycle, parents face separation risk. Each period, they choose their labor supply, savings, and how much time and money to invest in their children. Time and money investments in children increase children's human capital. At the end of the second investment stage, parents decide whether to send their children to college. If so, they pay a college cost and receive warm glow utility from children attending college. College completion is uncertain and the probability that a child will complete college depends on the human capital accumulated during the first two stages of the lifecycle. After the college stage, children grow up and make decisions as the parents of the next generation. During the third stage of the lifecycle, parents are middle-aged and work, and during the last stage, they are retired. In the event of separation, both parents continue to care about the child's development. To simplify post-separation decisions, we assume that children stay with the mother, who makes all subsequent child investment decisions, while the father transfers child support payments.

In the model, marriage and cohabitation differ along two key dimensions. First, asset division upon separation is more favorable to the lower-earning partner in marriage than in cohabitation. In the US, asset division in divorce, under both equitable distribution and community property regimes, usually results in an approximately 50/50 split. In contrast, cohabiting couples lack a formal legal framework, and asset division typi-

cally favors the higher-earning partner. Accordingly, married couples in the model are entitled to equal division of assets upon divorce, while the lower earner in a cohabiting relationship receives a smaller share of accumulated wealth upon separation. We assume the woman earns less than her partner, as is the case for most US couples with children.

Second, cohabiting couples in the model face a higher risk of separation than married couples. This assumption is consistent with empirical evidence on the effects of legal reforms that made it easier for individuals to exit a marriage without their partner's consent, thereby making marriage more similar to cohabitation. Studies show that such reforms led to higher divorce rates. For example, Wolfers (2006) and Rasul (2006) find that the shift from mutual consent to unilateral divorce in most US states during the 1970s increased divorce rates among couples who were already married at the time of the reform. Similarly, Binner and Dnes (2001) and González and Viitanen (2009) show that comparable reforms in Europe also led to higher divorce rates among existing married couples.

The model is calibrated to 2015 US data. While some parameters are set directly to data counterparts, others are chosen by minimizing the distance between model moments and data counterparts. Moments targeted in the minimization include the average cohabitation rate, average time and money investments in children, and children's college attendance and completion rates by parental education. The calibration does not directly target the education-specific cohabitation rates in the data. Despite this, the calibrated model successfully generates a higher degree of cohabitation among non-college-educated as compared to college-educated couples. The cohabitation rate of college-educated couples in the model is 5.3 percent compared to 3.3 percent in the data. For non-college-educated couples, the cohabitation rate is 18.3 percent in the model compared to 17.2 percent in the data. The model also replicates the observed differences in time and money investments by parental education and marital status, and the empirical gradient in college completion rates by parental marital status for children of non-college-educated parents.

Our analysis leads to three main findings. First, to understand the drivers of marriage and cohabitation rates within the model, we start by assessing the quantitative importance of children for marriage decisions. When we shut down the mechanism through which parental investments contribute to the skill development of children, thereby removing all incentives to invest in children from the model, we observe a notable decline in the marriage rate of college-educated couples. With the incentives to invest in children's skill accumulation removed, the cohabitation rate among college-educated

couples rises from 5.3 percent to 31.4 percent. In contrast, the cohabitation rate of non-college-educated parents drops from 18.3 percent to 13.4 percent. Hence, the fact that marriage provides insurance enabling more substantial investments in children is a key driver of the higher marriage rates among college-educated couples in the model.

Second, we show that parents' choices to marry or cohabit in the model are influenced by the cost of sending children to college. To better understand this relationship, we conduct a series of experiments that vary college costs. We find that when college costs are removed, the marriage rate differential between college- and non-college-educated households reverses. The cohabitation rate among non-college-educated decreases from 18.3 percent to 4.6 percent and the cohabitation rate of college-educated parents increases from 5.3 percent to 16.0 percent. Among non-college-educated couples, we observe a monotonic decline in marriage rates as college costs rise. As fewer parents can afford to send their children to college, the incentive to invest in children's skill accumulation to improve their chances of college completion declines, resulting in lower marriage rates. For college-educated couples, this effect is not quantitatively important for the range of college cost values that we observe in US data. However, a similar decline in marriage rates can be observed when college costs become exceedingly high. We validate the elasticity of marriage rates with respect to college costs implied by the model using cross-state variation in marriage rates and tuition fees for US colleges between 2011 and 2019. Specifically, we show that the model closely replicates the magnitude of the decline in marriage rates of non-college-educated parents with increasing college costs.

Third, we investigate how marriage and cohabitation choices influence inequality in children's educational outcomes. Through two experiments, we assess the impact of equalizing the risk of separation, asset division, and child support provisions between marriage and cohabitation. In the first experiment, we make cohabitation as stable as marriage, with equal asset splits and more generous child support, leading to improved college attendance and completion rates for children from non-college-educated families. Specifically, college completion rates for children from non-college-educated families rise from 25.6 percent to 29.9 percent under these conditions. In the second experiment, we make marriage as unstable as cohabitation, with unequal asset splits and less child support, resulting in a significant decline in educational outcomes, particularly for children of non-college-educated parents. College completion rates for this group drop sharply, from 25.6 percent to just 5.4 percent. Together, these findings highlight the central role of family structure in shaping educational inequality. They demonstrate that features of marriage, such as couple stability, legal protection, and financial support,

act as key mechanisms for promoting parental investments in children and educational attainment. By quantifying these effects, our model shows how changes in parental marital decisions can amplify intergenerational gaps in human capital accumulation.

Related Literature This paper lies at the intersection of three strands of macroeconomic literature: one that focuses on child development, one that analyzes the determinants of intergenerational mobility, and one that studies marriage and divorce. Macroeconomic studies on the effects of parental investments on children have grown substantially in recent years, though this literature typically does not distinguish how the parental decision to marry or cohabit impacts child outcomes. Abbott et al. (2019), Bolt et al. (2023), Yum (2023), and Daruich (2025) develop overlapping generations frameworks to study the effects of parental investments on child development. Blandin and Herrington (2020) show that the probability of a child completing college depends on parental investments in children, and that low-educated and low-resource households invest less in their children. Moschini (2023) proposes a framework in which different family types, among them cohabiting and married couples, have access to distinct child skill accumulation technologies. In contrast, our framework highlights how the insurance value of marriage, relative to cohabitation and single parenthood, drives differences in children's human capital accumulation. Following the work of Caucutt and Lochner (2020), Caucutt et al. (2023), and Molnar (2024), our model features dynamic complementarity between time and financial investments in children. Finally, our research intersects with that of Fuchs-Schündeln et al. (2022), and more recently Krueger et al. (2025), who study the role of public investment through schooling using a human capital production function that features complementarity between child inputs.

Our research is also closely related to the work of Lee and Seshadri (2019), who shows that both cross-sectional inequality among children and the persistence of intergenerational inequality are driven by early childhood investments. Pedtke (2025) finds that the rise in single parenthood in the US contributes to the persistence of intergenerational inequality. Hendricks et al. (2025) study how college admissions preferences for lower-income students affect intergenerational earnings mobility. Relatedly, Zhou (2025) finds that education subsidies increase intergenerational mobility but are less effective in boosting fertility. Our work contributes to this literature by emphasizing the role of parental marriage decisions and college costs in shaping child outcomes and the persistence of inequality across generations.

In the literature on marriage and divorce, our paper contributes to work studying the effects of US divorce law reforms and alimony policies on marriage decisions. Marcassa (2013) shows that changes in property division rules and alimony transfers ac-

count for a significant portion of the increase in the US divorce rate. Guvenen and Rendall (2015) find that divorce law reforms led to higher educational attainment among married women and interpret the increase in human capital accumulation as a form of self-insurance for women in the event of divorce. Fernández and Wong (2017) show that these reforms reduced the welfare of married women, particularly those with low income. Blasutto and Kozlov (2020) meanwhile argue that the enactment of unilateral divorce laws reduced the gains from risk-sharing in marriage and are an important driver of rising cohabitation in the US.

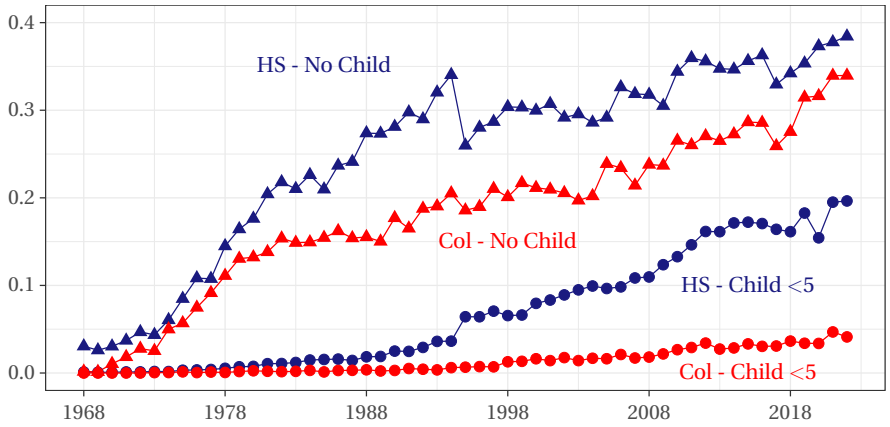
More broadly, numerous studies in economics explore the drivers and implications of marriage versus cohabitation. Brien et al. (2006), Adamopoulou (2010), Gemici and Laufer (2012), and Wong (2016) were among the first to examine the distinct choices made by married and cohabiting couples, emphasizing the importance of cohabitation as a separate family structure. Lundberg and Pollak (2014) argue that the primary gains from marriage arise from higher levels of child investment, as marriage functions as a commitment device. More recently, Blasutto (2023) shows that approximately 15 percent of the cohabitation rate gap between U.S. college-educated and non-college-educated couples can be attributed to education-related differences in the gender wage gap. Voena (2015) and Bayot and Voena (2014) provide early analyses of how asset division laws upon divorce affect couples' consumption and labour supply choices, though they do not explicitly model the role of children. Lafortune and Low (2023) take a step in this direction by formalizing how asset division rules influence spouses' specialization during marriage and investment in a public good, interpreted as children. Brown et al. (2023) develop a model of marriage, fertility, and parenting to examine how family law affects children's cognitive development. Calvo (2025) studies the role of marriage and cohabitation for intra-household inequality and child outcomes, focusing on the role of child custody laws. In contrast, our model introduces a discrete college enrollment decision with college costs and uncertain completion, linking parental marital and cohabitation choices directly to children's educational attainment. We then show that this mechanism has important implications for intergenerational mobility.

2 Stylized Facts

Cohabitation, or living together without being formally married, has become an increasingly important family form. Yet, empirical data that would allow one to easily trace the evolution of cohabitation over the past five decades in the United States are lacking. To address this challenge, we use data from the CPS Annual Social and Eco-

nomic Supplement (March CPS) to identify trends in cohabitation over time. A couple's cohabitation status at the time of interview is used to categorize them as either informally living together or married.[1]

Figure 1: Cohabiting Couples as a Share of Couples Living Together



Notes: Data from CPS-ASEC 1968–2022. The sample is restricted to individuals aged 25–44 living in couples.

Figure 1 plots the resulting time series of cohabiting couples from the CPS data. Unsurprisingly, cohabitation rates have increased over time. Yet, one group stands out relative to the others: college-educated couples with children. They have continued to marry at high rates, their cohabitation rate remaining below 5 percent through 2022. While less-educated couples with children married at similarly high rates until the late 1980s, since then their tendency to cohabit has steadily increased. Cohabitation rates for both high- and low-educated couples without children started to rise even earlier, beginning in the 1970s and are similar for both groups.[2]

2.1 Time and Money Investments in Children

A possible explanation for the differential evolution of cohabitation rates by education and the presence of children is that college-educated couples expect higher returns

[1] Prior to 2007, we cannot directly distinguish between cohabiting and married couples in the CPS data. We thus impute cohabitation status based on household composition, accounting for both cohabiting couples in which one partner is the household head and cohabiting couples where neither is because, for instance, the couple is living with one of the partners' parents. See Appendix A.1 for details.

[2] Appendix Figure A.1 shows that the same cohabitation patterns are observed when distinguishing by race. Appendix Table A.1 shows that educational gradients in cohabitation rates among couples with small children are similar in European countries, while gradients for childless couples are less pronounced.

from child investment, and marriage fosters specialization that facilitates this investment. To explore this idea, Appendix A.2 presents an event-study analysis using PSID data to compare earnings trajectories around the birth of the first child for married and cohabiting women. The results show that while both groups experience substantial earnings declines after childbirth, the penalties are larger and more persistent for married women, consistent with greater specialization within marriage. Higher earnings penalties among married women suggest that they may allocate more time to their children. In Appendix A.3.1, using 2003–2019 data from the American Time Use Survey (ATUS), we confirm that marital status and time allocated to children are positively correlated. After adjusting for a range of demographic and geographic factors, cohabiting women allocate, on average, more than two additional hours per week to market work and nearly two fewer hours per week to children compared to married women. The reduced time spent with children by cohabiting mothers is more pronounced among college-educated mothers and driven by women whose youngest child is between the ages of 0 and 9. The gaps in time spent with children by marital status are substantial. For instance, the average gap between married and cohabiting mothers (1.7 hours) is 40 percent of the average gap in time spent with children between college- and non-college-educated mothers (4.3 hours) in our data.

A growing literature documents that time investments in children are complemented by monetary investments (see Agostinelli and Wiswall, 2025, for example). Accordingly, in Appendix A.3.2, we investigate whether married couples also make higher monetary investments using 2003–2019 data from the Consumer Expenditure Survey (CEX). Using a comprehensive measure of expenditures on children that includes components of household expenditures to approximate total annual child-rearing expenses, we show that married couples indeed spend more money on their children compared to cohabiting couples. Among couples whose youngest child is between the ages of 0 and 11, cohabiting couples spend approximately $2,300 less per year than married couples controlling for several demographic and geographic factors. Among couples whose youngest child is between the ages of 12 and 17, cohabiting couples spend about $1,000 less per year. This corresponds to annual expenditures that are 22 percent lower for young children and 12 percent lower for older ones compared to the respective children of married couples.

2.1.1 Insurance Value of Marriage: Evidence from Alimony Reforms

So far, we have documented that married couples invest both more time and more money in their children compared to cohabiting couples, indicating that marriage may facilitate greater investment in children. These correlations between marital status and child investment may, however, be driven instead by unobserved differences between individuals selecting marriage versus cohabitation. Such unobserved heterogeneity would challenge our claim that the insurance value from marriage contributes to the differences in child investment.

To address this issue, we analyze alimony reforms implemented in eight US states between 2006 and 2018.[3] Alimony is a series of court-ordered transfer payments post divorce, usually from the higher-earning spouse to the lower-earning one. It is meant to protect the lower-earning spouse against declining household income after divorce and is contingent on marriage. Alimony cannot be imposed when separation occurs from cohabitation. The 2006 to 2018 reforms, which reduced the amount of alimony and/or its duration, effectively made marriage more similar to cohabitation.

Note that the prevalence of alimony is often overstated. In the early 2000s, only about 10 to 15 percent of divorces resulted in alimony awards, and these were more likely to be granted to older women and those in longer marriages (Fernández-Kranz and Roff, 2021). In the 2003 to 2019 CPS-ASEC data, only 2 percent of divorced women aged 24–44 with children under 18 received alimony payments. Nevertheless, the public and even legal professionals such as lawyers and judges tend to overestimate how often alimony is awarded (Weitzman and Dixon, 1980). This misperception may influence individual behavior, as people might base their marriage and child investment decisions on an inflated expectation of receiving alimony, even if they divorce earlier in life (Chiappori et al., 2017; Rangel, 2006). Thus, while the actual likelihood of receiving alimony is low, its anticipated availability arguably still influences marriage and investment decisions. We accordingly hypothesize that, post-reforms, the time and expenditure allocations of married couples should more closely resemble those of cohabiting couples.

As in Fernández-Kranz and Roff (2021) and Fernández-Kranz and Roff (2022), we exploit differences in the timing of the reforms and utilize a difference-in-differences approach to compare married women in states that implemented alimony reforms to those in states that did not.[4] We focus on women who were already married at the time

[3] Appendix Figure A.4 highlights the states in which a reform was implemented and Table A.9 describes these reforms in greater detail.

[4] Fernández-Kranz and Roff (2021) study the effect of alimony reform on assortative mating, while Fernández-Kranz and Roff (2022) explore the effect on married women's time use. We extend their work by exploring the impact of alimony reform on time and money investments in children.

the alimony reforms took place and were thus unexpectedly subject to the legal change. This implies that selection into marriage is unlikely to pose a threat to our identification. We estimate the following model:

$$\text{y}_{ist} = \beta_0 + \beta_1 \text{Years since reform}_{ist} + \beta_2 X_{ist} + \eta_s + y_t + u_{ist},$$

where y_{ist} is the outcome variable (hours worked, time or money investments in children), X_{ist} is a vector of controls, i denotes the individual, s the state, and t the year. The treatment effect is defined as the number of years since the reform was implemented in a given state. We adopt this specification because investments in children are unlikely to change immediately as a result of the reform due to dynamic complementarity, which implies that a balanced flow of investments across early and late stages of childhood is optimal. Carneiro et al. (2021) find empirical evidence supporting this claim. Changes in alimony payments should hence lead to a gradual change in investment as opposed to an immediate one-time reduction.

We start by analyzing the effect of alimony reforms on time investments in children in the first five years after the reform, drawing on ATUS data between 2003–2019. We construct a sample of married women aged 20–44 who married before the reform and have at least one child age 0–19. As the ATUS data do not include information about year of marriage or age of the oldest child, we impute the former using age of the youngest child and total number of children. Specifically, we assume a two-year spacing between each birth, and that marriage occurred in the year prior to the birth of the oldest child.[5]

The findings in Table 1 are consistent with the hypothesis that a reduction in alimony lowers the insurance value of marriage and, as a result, increases hours worked. The first row of the table shows that, during the first five years after an alimony reform, weekly childcare time decreases by half an hour and time spent on market work per week increases by 1.25 hours in each subsequent year since the reform. The extra time spent working stems from reductions in childcare time but also leisure time. College-educated mothers, in addition, significantly reduce non-market work time by half an hour per week for each year since the reform. Appendix Table A.10 shows that the reduction in childcare time in column (2) is detected for both mothers of younger (0-9) and mothers of older children (10-19).

Our results indicate that alimony reforms reduce childcare time by 17.6 percent after 5 years. Fernández-Kranz and Roff (2022) report a reduction in the sum of child-

[5]This assumption is supported by evidence from the PSID Childbirth and Adoption History and Marital History files. For most couples, first births take place within a year after marriage (mode of the distribution) and the most frequent interval between each birth is two years (see Appendix Figure A.5).

Table 1: Alimony Reforms - Mothers' Time Investments

	Dependent Variable: **Weekly Hours**			
	(1) Market Work	(2) Childcare	(3) Non-market Work	(4) Leisure
	A. All Mothers			
Years since reform	1.25***	−0.50***	−0.25	−0.56**
	(0.24)	(0.15)	(0.22)	(0.27)
Mean hours	18.14	14.20	25.34	41.42
Observations	16,711	16,711	16,711	16,711
	B. College-educated Mothers			
Years since reform	1.34***	−0.55***	−0.51***	−0.25
	(0.36)	(0.18)	(0.18)	(0.29)
Mean hours	19.38	16.36	23.80	40.77
Observations	8,204	8,204	8,204	8,204
	C. Non-college-educated Mothers			
Years since reform	1.06***	−0.29	0.09	−0.95***
	(0.38)	(0.30)	(0.54)	(0.34)
Mean hours	16.95	12.11	26.82	42.04
Observations	8,506	8,506	8,506	8,506

Notes: ATUS data, 2003–2019. Time is measured in weekly hours. Sample: Women aged 25–44 with at least one child aged 0-19, who married before the alimony reform was implemented. Controls include a college dummy, age, age squared, number of children, age of youngest child, race, metropolitan area, and year and state fixed effects. Sample weights are adjusted for the day of the week when the time-use diaries were recorded. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01. We perform a set of placebo exercises by changing the year of the reform. See Appendix Table A.13.

care time and non-market work time of 5.3 percent after 5 years. In comparison, in our sample, the sum of childcare time and non-market work time declines by 6 percent, closely aligning with their result.[6] It is worth noting that we restrict the sample to women with children, while Fernández-Kranz and Roff (2022) consider a much larger universe that includes all married women. Our findings are also consistent with those of Rangel (2006) and Chiappori et al. (2017). Both studies analyze the opposite setting, where alimony payments increase after a reform. Consistent with the idea that alimony payments provide insurance after divorce, they find that hours worked for married women decline as a result of the reforms.

We further decompose total childcare time into passive (physical care) and active (human capital investment) time following Bastian and Lochner (2022). Appendix Table

[6]Note that we do not find a statistically significant effect on non-market work using the sample with all mothers included (Panel A, column 3 of Table 1).

A.11 shows that the decline in time allocated to children includes investment time that is crucial for children's human capital development. In Appendix Table A.12 we show that fathers do not compensate for mothers' reduced childcare time; in fact, their time allocation is not affected by the reforms.

If time and money investments are, to some extent, substitutable, a decrease in time investments following the reforms might be offset by increased money investments. We test this hypothesis using imputed household-level expenditure data on children from the CEX for the years 2003 to 2019.[7] Our analysis focuses on married women aged 20 to 44 who were married before the reforms and have at least one child. The results in Table 2 challenge the notion that monetary investments increased to compensate for diminished time investments. In fact, alimony reforms led to a decrease in educational spending on children, with the effect concentrated among households with a non-college-educated head and younger children. Educational spending on older children remained relatively unchanged, perhaps reflecting their relatively more important role at this stage (Del Boca et al., 2014; Bono et al., 2016; Attanasio et al., 2020b).

2.2 Child Outcomes: College Completion

Finally, we examine the link between parents' marital status while children were young and children's long-run outcomes—namely, whether or not they obtain a college degree. If marriage facilitates investment in children, this form of union should be positively associated with the likelihood of children completing college. We test this hypothesis by combining data from the PSID's Child Development Supplement (CDS) and its Transition into Adulthood Supplement (TAS), resulting in a unique dataset that contains information on whether a child completed a 4-year college degree and the parents' marital status at the child's birth. Through a series of logistic regressions, we explore the relationship between children's college completion and parents' education level, marital status (married/cohabiting), and homeownership in the year the child was born.

The results reported in Table 3 are consistent with our theory. Children whose parents were married as opposed to cohabiting at the time of their birth are indeed more likely to complete college. The second column shows that the positive coefficient of marriage is still present when controlling for the education of the mother and the father. Unsurprisingly, parents' education itself is a strong positive predictor of children's college completion. Nonetheless, the independent positive coefficient on marriage remains.

[7] See Section 2.1 for a detailed description of how we measure household expenditures on children.

Table 2: Alimony Reforms - Money Investments in Children's Education

	Dependent Variable: **Annual Educational Expenditures**		
	(1) Children Age 0-17	(2) Children Age 0-11	(3) Children Age 12-17
	A. All Families		
Years since reform	−42.87	−51.50**	−20.70
	(27.05)	(21.87)	(52.49)
Mean expenditures	439.95	384.31	548.49
Observations	10,088	6,664	3,421
	B. College Educated Head		
Years since reform	−41.94	−46.34	24.66
	(42.31)	(29.44)	(150.35)
Mean expenditures	647.97	563.95	937.95
Observations	3,968	3,073	893
	C. Non-college Educated Head		
Years since reform	−41.95**	−45.50**	−30.59
	(18.73)	(19.06)	(22.30)
Mean expenditures	305.08	230.58	410.89
Observations	6,120	3,591	2,527

Notes: CEX data, 2003–2019. The sample is restricted to couples aged 25–44 with children. Controls: college, age, age squared, number of children, age of youngest child, race, metropolitan area, year and state fixed effects. We apply sample weights. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01. Appendix Table A.14 reports placebo exercises that exclude the possibility that the estimated effects of alimony reforms are driven by time trends.

In the third column, we add a control for whether parents owned a home at the time of the child's birth, a proxy for household wealth. The positive correlation of marriage with children's college completion remains even after controlling for parental homeownership. This is consistent with our findings in Section 2.1.1 using alimony reforms, which indicate that marriage induces higher investments in children's human capital. There is also a strong, positive association between homeownership and a child's likelihood of completing college, perhaps because parental wealth makes college more affordable, though this might also be because homeownership within marriage facilitates child investment, a channel that would align with the findings of Lafortune and Low (2023), who show that homeownership, by providing insurance to the lower-earning spouse, promotes specialization and investment in household public goods.

According to our theoretical framework, marriage is positively related with the likelihood that children complete college because it increases children's skill accumulation. Therefore, controlling for a measure of children's skill level toward the end of high school

Table 3: Likelihood a Child Completes College

	Dependent Variable: **College Completion**			
	(1)	(2)	(3)	(4)
Parents married at birth	0.26***	0.20**	0.17*	0.13
	(5.30)	(2.96)	(2.12)	(1.33)
Mother college & Father non-college		0.22***	0.25*	0.17*
		(3.35)	(3.68)	(2.33)
Mother non-college & Father college		0.28***	0.27***	0.19*
		(4.16)	(3.90)	(2.49)
Mother college & Father college		0.55***	0.54***	0.45***
		(9.33)	(8.89)	(6.40)
Assets: parents own home at birth			0.12***	0.12**
			(3.39)	(3.18)
Child's adjusted test score (age 15-19)				0.52***
				(5.66)
Observations	940	921	883	883

Notes: Data come from the PSID CDS and TAS. The table reports average marginal effects from a logistic regression. The dependent variable is whether the child has obtained a 4-year college degree when observed in the 25–30-year-old age range. Additional controls include year fixed effects and the age of the child at assessment. *p<.10; **p<.05; ***p<.01. Standard errors in parentheses.

(test scores taken between ages 15 and 19) should diminish the importance of marital status for college completion probabilities. This hypothesis holds true in our analysis: the marital status coefficient becomes smaller and non-significant when we control for children's skill level.

For the above analysis, individuals must be observed from childbirth to college completion, which places significant demands on the dataset and results in a relatively small sample size. To strengthen our findings, Appendix Table A.15 replicates the analysis using data from the Add Health study—a longitudinal survey of a nationally representative sample of US high school students (ages 13–19), followed into adulthood (ages 26–32). Consistent with our previous results, a child's probability of college completion is positively correlated with their parents marital status.[8] This association remains significant even after controlling for school fixed effects, but disappears once we control for the child's high school GPA, a proxy for child's skill level in the Add Health dataset.

3 Model

To rationalize the empirical findings, we develop an overlapping generations model with stochastic aging that links parents and children. The lifecycle consists of four

[8]Here, parental marital status is measured during adolescence.

stages: (1) parents of young children, (2) parents of older children, (3) middle age, and (4) retirement. Each adult has a gender (male or female) and an education level (college or non-college). New young adults form heterosexual couples, draw a preference shock for marriage, and choose whether to marry or cohabit. Matching by education is perfectly assortative.[9] The preference shock captures reasons couples marry other than to facilitate child investments. Each couple has two children: a boy and a girl. Children are identical aside from gender and are treated identically. At the end of the second stage, children leave the household and parents choose whether or not to send their children to college. Parents are altruistic toward their children and can increase the probability that they earn a college degree by investing in their human capital.

A couple's state is defined by their current life stage, $t \in \{1,2,3,4\}$; marital status, $s \in \{M,C\}$, where M denotes married or previously married and C denotes cohabiting or previously cohabiting; assets, a; children's human capital, k; and the couple's education level, $e \in \{col, ncol\}$, where col denotes college-educated and $ncol$ denotes non-college-educated. With probability $1-\eta_t$, the couple remains in the same stage next period and with probability η_t, they advance to the next stage. During the first two stages of life, the couple faces a probability p^s of breaking up (divorcing if married or separating if cohabiting) each period. To capture in a simple way the fact that divorce is more costly than separation from cohabitation–and thus less likely—we assume that the probability of breakup is higher when parents choose to cohabit rather than marry.[10] Upon splitting, the man receives share α^s of the couple's assets, which depends on marital status s. The woman receives share $1-\alpha^s$.

We simplify the model by assuming that fathers always work. This assumption captures the fact that the majority of time invested in children continues to be borne by mothers in the US, even among college-educated couples. During stages 1 and 2, mothers choose how much to work and how much to invest in their children. For simplicity, we abstract from other time uses, such as home production and leisure. Both college-educated and non-college-educated mothers are endowed with the same amount of discretionary time—time that can be freely allocated between children (τ_f) and market

[9] We simplify the model along this dimension because 84 percent of couples living together share the same education type (non-college or college) in the CPS-ASEC data between 2013 and 2019.

[10] Breakup probabilities are exogenous for tractability. Endogenizing separations would be conceptually straightforward, but require adding a persistent love shock and thereby increase the size of the state space. Assuming that the cost of separation is higher in marriage than in cohabitation, married couples would have a lower separation probability than cohabitors. All else equal, couples with higher initial love shocks would marry at higher rates as they face a lower risk of breaking up due to low match quality in the future. In such a setup, separation rates would differ by marriage versus cohabitation due to both a causal effect of marriage on separation rates and a selection effect.

work ($l_f = 1 - \tau_f$). Yet, in our ATUS sample, college-educated mothers spend more time on both. For instance, when children are young (ages 0–9), they spend about 15 hours more per week than non-college-educated mothers on children and market work combined. To account for this difference, we assume that college-educated women work an extra fixed amount of hours each period, $\upsilon_{t,f}$, in stage $t \in \{1,2\}$ and earn the corresponding extra amount of income.

Child Development in Stages 1 and 2 Denote the initial human capital of children as k_0. Children's human capital in the next period, k', depends on the amount of time the mother spends with them, τ_f, the amount of money investments, d, and their current level of human capital, k. The human capital production function in each stage $t \in \{1,2\}$ is denoted by $F_t\left[x_t(\tau_f, d), k\right]$. It consists of a CES production function with an inner and an outer nest following Fuchs-Schündeln et al. (2022) and Krueger et al. (2025). The parameters of the production function are allowed to differ between stage 1 and stage 2 to capture differences in parental time and money investments when children are younger versus older. Equation (1) refers to the inner nest, where $x_t(\tau_f, d)$ for $t \in \{1,2\}$ is the investment aggregator combining parental time and money investments:

$$x_t(\tau_f, d) = \pi_t^0 \left[\pi_t^1 (\tau_f/\bar{\tau}_{f,t})^{\pi_t^2} + (1-\pi_t^1)(d/\bar{d}_t)^{\pi_t^2})\right]^{\frac{1}{\pi_t^2}}. \tag{1}$$

Time and money investments are divided by $\bar{\tau}_{f,t}$ and $\bar{d}_t$, which will be set to the average time mothers spend with children and average expenditure on children in stages 1 and 2, respectively. Starting from the initial level k_0, children's human capital evolves according to the outer nest,

$$k' = F_t\left[x_t(\tau_f, d), k\right] = \psi_t^0 \left[\psi_t^1 (k/\bar{k}_t)^{\psi_t^2} + (1-\psi_t^1) x_t(\tau_f, d)^{\psi_t^2}\right]^{\frac{1}{\psi_t^2}}. \tag{2}$$

The production function of children's human capital, equation (2), does not depend directly on parents' education. In particular, we assume that a unit of time spent with a college- or high-school-educated mother has the same effect on a child's human capital development. Caucutt et al. (2023) estimate a model of child skill production using PSID-CDS data and find little effect of parental education on the child production technology. Thus, differences in children's human capital by education in the model will be due to differences in parental time and money investments.

Note that the human capital production function for children exhibits dynamic complementarity in that, as the human capital of a child increases, so does the marginal product of either time or good investments in the child. It has been empirically doc-

umented that child investments and existing human capital are complements in the production of later human capital; see, for example, Heckman (2000), Todd and Wolpin (2007), Aizer and Cunha (2012) and more recently, Caucutt and Lochner (2020) and Fuchs-Schündeln et al. (2022).

Stage 1: Parents of Young Children

Couple's Problem In each period of stage 1, couples decide how much to consume and save, as well as the amount of time, τ_f, and money, d, to invest in their young children. A couple's current utility is the weighted average of their individual utilities, weighing the man's utility by θ^m and the woman's by θ^f, where $\theta^m + \theta^f = 1$. Utility, $u(c_g)$, depends on consumption c_g where $g \in \{m, f\}$ denotes either the male (m) or the female (f). The future is discounted at rate β.

At the end of each period, couples transition from being parents of young children (stage 1) to being parents of older children (stage 2) with probability η_1, and break up with probability p^s. If the couple breaks up they split assets according to the asset-splitting rule, which designates share α^s to the man. In stages 1 and 2 the value of the couple upon breaking up is given by the weighted average of their individual values,

$$S_t^s(a,k;e) = \theta^m \tilde{S}_t^{s,m}\big(\alpha^s a;(1-\alpha^s)a,k;e\big) + \theta^f \tilde{S}_t^{s,f}\big((1-\alpha^s)a,k;e\big), \tag{3}$$

where individuals' value functions (defined below) are distinguished from couples' value functions by a tilde.

The couple's value in stage 1 is given by

$$\begin{aligned} V_1^s(a,k;e) = \max_{c_m,c_f,a',\tau_f,d} \quad & \theta^m u(c_m) + \theta^f u(c_f) + \beta(1-\eta_1)\Big\{p^s S_1^s(a',k';e) + (1-p^s)V_1^s(a',k';e)\Big\} \\ & + \beta\eta_1\Big\{\underbrace{p^s S_2^s(a',k';e)}_{\text{breaking up}} + \underbrace{(1-p^s)V_2^s(a',k';e)}_{\text{staying together}}\Big\}, \\ \text{subject to} \quad & (c_f^\zeta + c_m^\zeta)^{\frac{1}{\zeta}} + a' + d = (1+r)a + w_{1,m}^e + (w_{1,f}^e - \lambda)[1 - \tau_f + \upsilon_{1,f}\mathbb{I}(e = col)], \end{aligned}$$

with $k' = F\left[x_1(\tau_f, d), k\right]$ and $S_t^s(\cdot)$ given by equation (3). Here, $w_{1,m}^e$ is the man's earnings in stage 1, which depends on his education e, and $w_{1,f}^e$ is the woman's hourly wage. Couples have to pay for childcare when women work at the hourly rate λ. The parameter ζ captures economies of scale in the couple, following Voena (2015).[11]

[11] $\zeta > 1$ implies that couples need fewer expenditures to achieve the same living standard compared to a world without economies of scale.

Divorce and Separation When a couple breaks up, the children always stay with the mother, but both parents still care about the children. Breakups are costly for both men and women, albeit for different reasons. For women, breaking up may lead to relatively larger declines in income and wealth, as well as the continued burden of investing time and money in the children. For men, breaking up leads to child support payments, as well as the loss of the ability to impact child investments. While this assumption is strong, it reflects the empirical fact that children, especially when young, typically live with one separated parent, most often the mother. Fathers, therefore, often lose the ability to invest in their children to the same extent as mothers. Breaking up also lowers consumption for both parents due to the loss of economies of scale.

We abstract from re-marriage and re-cohabitation to keep the model tractable. Thus, divorced and separated individuals remain single for the rest of their lives. Each period, $\iota_t^{s,e}$ consumption units of child support are transferred from the father to the mother.[12] The problem of a divorced or separated woman with young children is

$$\begin{aligned}\tilde{S}_1^{s,f}(a,k;e) = \max_{c_f,a',\tau_f,d} \quad & u(c_f) + \beta(1-\eta_1)\tilde{S}_1^{s,f}(a',k';e) + \beta\eta_1\tilde{S}_2^{s,f}(a',k';e), \\ \text{subject to} \quad & c_f + a' + d = (1+r)a + \iota_1^{s,e} + (w_{1,f}^e - \lambda)(1-\tau_f + \upsilon_{1,f}\mathbb{I}(e=col)).\end{aligned}$$

Since divorced and separated men continue to care about their children, their expected lifetime utility depends on their wife's assets and the children's current human capital. The problem of a divorced or separated man with young children is

$$\begin{aligned}\tilde{S}_1^{s,m}(a;a^f,k,e) = \max_{c_m,a'} \quad & u(c_m) + \beta(1-\eta_1)\tilde{S}_1^{s,m}(a';\hat{a}^{f'},\hat{k}',e) + \beta\eta_1\tilde{S}_2^{s,m}(a';\hat{a}^{f'},\hat{k}',e), \\ \text{subject to} \quad & c_m + a' + \iota_1^{s,e} = (1+r)a + w_{1,m}^e.\end{aligned}$$

Note that in the problem of a separated man, we define $\hat{a}^{f'}$ as his ex-partner's policy function for assets and $\hat{k}'$ as her policy function for children's human capital (which is indirectly determined through child investments). Women's decisions are made independently, but they affect men's welfare, as men still value the children after separation.

Marriage and Cohabitation A couple's marital decision at the beginning of stage 1 depends on each spouse's expected discounted value from marriage versus cohabitation.

[12] Alimony is not included in the model because it is much less common than child support. In the early 2000s, just 10 to 15 percent of divorces resulted in alimony awards (Fernández-Kranz and Roff, 2021). In addition, as explained in Section 2.1.1, reforms in eight US states implemented between 2006 and 2018 reduced alimony payments and their duration. In the 2003 to 2019 CPS-ASEC data, only 2 percent of divorced women aged 24–44 with children under 18 received alimony payments, while 43 percent received child support.

The value of being a young mother of marital status $s \in \{M, C\}$ is given by

$$\tilde{V}_1^{s,f}(a,k;e) = u(\hat{c}_f) + \beta(1-\eta_1)\Big\{p^s \tilde{S}_1^{s,f}\big((1-\alpha^s)\hat{a}', \hat{k}'; e\big) + (1-p^s)\tilde{V}_1^{s,f}(\hat{a}', \hat{k}'; e)\Big\}$$
$$+ \beta\eta_1\Big\{p^s \tilde{S}_2^{s,f}\big((1-\alpha^s)\hat{a}', \hat{k}'; e\big) + (1-p^s)\tilde{V}_2^{s,f}(\hat{a}', \hat{k}'; e)\Big\},$$

Similarly, the value of being a young father is given by

$$\tilde{V}_1^{s,m}(a,k;e) = u(\hat{c}_m) + \beta(1-\eta_1)\Big\{p^s \tilde{S}_1^{s,m}\big(\alpha^s\hat{a}'; (1-\alpha^s)\hat{a}', \hat{k}', e\big) + (1-p^s)\tilde{V}_1^{s,m}(\hat{a}', \hat{k}'; e)\Big\}$$
$$+ \beta\eta_1\Big\{p^s \tilde{S}_2^{s,m}\big(\alpha^s\hat{a}'; (1-\alpha^s)\hat{a}', \hat{k}', e\big) + (1-p^s)\tilde{V}_2^{s,m}(\hat{a}', \hat{k}'; e)\Big\}.$$

In these value functions, $\hat{c}_f$, $\hat{c}_m$, $\hat{a}'$, and $\hat{k}'$ are the optimal choices of consumption, assets, and child quality.

All young couples begin stage 1 endowed with initial asset level a_0 and initial human capital level of their children k_0. They draw a marriage preference shock, ω, from the distribution $\Omega(\cdot)$. Upon realization of the preference shock, the couple marries if their combined value from marriage, defined as the average of their individual values, exceeds their combined value from cohabitation or,

$$\theta^f \tilde{V}_1^{M,f}(a_0,k_0;e) + \theta^m \tilde{V}_1^{M,m}(a_0,k_0;e) + \omega \;\geq\; \theta^f \tilde{V}_1^{C,f}(a_0,k_0;e) + \theta^m \tilde{V}_1^{C,m}(a_0,k_0;e).$$

The decision to marry is given by $i_M(\omega;e)$, which is equal to 1 if the couple marries and 0 if they cohabit. The expected lifetime utility of a young individual with education $e \in \{col, ncol\}$ and gender $g \in \{f, m\}$ who has yet to match with a partner and draw a marriage preference shock is

$$\tilde{V}_1^g(e) = \int_\omega \Big\{i_M(\omega;e)\big(\tilde{V}_1^{M,g}(a_0,k_0;e) + \omega\big) + [1 - i_M(\omega;e)]\tilde{V}_1^{C,g}(a_0,k_0;e)\Big\}d\Omega(\omega).$$

Parents form expectations about their children's lifetime utilities. These expected values impact their decisions about whether or not to send their children to college at the end of stage 2. In equilibrium, parents' expectations about their children's lifetime utilities will equal the actual expected lifetime utilities of new young parents. The expected value of a new young parent of education type e is simply the average value of a young mother and a young father of education type e:

$$\tilde{V}_1(e) = \frac{1}{2}\tilde{V}_1^f(e) + \frac{1}{2}\tilde{V}_1^m(e). \tag{4}$$

Stage 2: Parents of Older Children

Couple's Problem A couple's problem in stage 2 has the same structure as in stage 1. However, parents no longer pay childcare costs if mothers work and, at the end of this stage, parents choose whether or not to send their children to college. Let $W(a,k;e)$ denote the couple's value just before the college decision is made if they are together. If the couple breaks up in the last period of stage 2, this occurs before the college decision is made. In this case, the couple's value, $Y^s(a,k;e)$ is a weighted average of their individual values after breaking up and splitting assets but before the college decision, or

$$Y^s(a,k;e) = \theta^m \tilde{Y}^m(\alpha^s a;(1-\alpha^s)a,k,e) + \theta^f \tilde{Y}^f((1-\alpha^s)a,k;e), \tag{5}$$

where the individual value functions are defined below. In each period of stage 2, a couple solves

$$\begin{aligned} V_2^s(a,k;e) = \max_{c_m,c_f,a',\tau_f,d} \quad & \theta^m u(c_m) + \theta^f u(c_f) + \beta(1-\eta_2)\Big\{p^s S_2^s(a',k';e) + (1-p^s)V_2^s(a',k';e)\Big\} \\ & + \beta\eta_2\Big\{p^s Y^s(a',k';e) + (1-p^s)W(a',k';e)\Big\}, \\ \text{subject to} \quad & (c_f^\zeta + c_m^\zeta)^{\frac{1}{\zeta}} + a' + d = (1+r)a + w_{2,m}^e + w_{2,f}^e[1-\tau_f + \upsilon_{2,f}\mathbb{I}(e=col)], \end{aligned}$$

with $k' = F\left[x_2(\tau_f,d),k\right]$, $S_2^s(\cdot)$ given by equation (3) and $Y^s(\cdot)$ given by equation (5).

Each spouse's individual values in stage 2, $\tilde{V}_2^{s,g}(a,k;e)$ for $g \in \{f,m\}$, are defined in a similar way to their individual values in stage 1. These values are formally presented in Appendix B.

Divorce and Separation The problem of a divorced or separated woman with older children is

$$\begin{aligned} \tilde{S}_2^{s,f}(a,k;e) = \max_{c_f,a',\tau_f,d} \quad & u(c_f) + \beta(1-\eta_2)\tilde{S}_2^{s,f}(a',k';e) + \beta\eta_2\,\tilde{Y}^f(a',k';e), \\ \text{subject to} \quad & c_f + a' + d = (1+r)a + \iota_2^{s,e} + w_{2,f}^e(1-\tau_f) + \upsilon_{2,f}w_{2,f}^c\mathbb{I}(e=col), \end{aligned}$$

and the problem of a divorced or separated man is

$$\begin{aligned} \tilde{S}_2^{s,m}(a;a^f,k,e) = \max_{c_m,a'} \quad & u(c_m) + \beta(1-\eta_2)\tilde{S}_2^{s,m}(a';\hat{a}^{f'},\hat{k}',e) + \beta\eta_2\,\tilde{Y}^m(a';\hat{a}^{f'},\hat{k}',e), \\ \text{subject to} \quad & c_m + a' + \iota_2^{s,e} = (1+r)a + w_{2,m}^e. \end{aligned}$$

Like before, $\hat{a}^{f'}$ and $\hat{k}'$ represent optimal choices of the woman.

College Choice

At the end of stage 2, parents choose whether or not to send their children to college. To this end, they form expectations about their children's lifetime utility with and without a college degree. Recall that, in equilibrium, the expected lifetime utility of a child with education $e \in \{col, ncol\}$ must be equal to the actual expected lifetime utility of a new young parent with the same education level, $\tilde{V}_1(e)$, which is defined in equation (4).

Sending a child to college does not guarantee that they will get a college degree. The probability children complete college is given by $p^{col}(k) \in (0,1)$ and is increasing in their human capital k. The expected lifetime utility of a child who attends college is

$$\tilde{V}^{kid}_{col}(k) = \Big\{ p^{col}(k)\tilde{V}_1(col) + [1 - p^{col}(k)]\tilde{V}_1(ncol) + \xi \Big\},$$

and the expected lifetime utility of a child who does not attend college is

$$\tilde{V}^{kid}_{ncol} = \tilde{V}_1(ncol).$$

In addition to caring about their children's lifetime utility, parents get warm glow utility ξ from having children that attend college. This parameter helps us to match the high attendance rates of children with non-college-educated parents, even though their college completion probability is relatively low.

Attending college is costly. If parents choose to send their children to college, they pay a one-time college fee, κ^e, out of current wealth. Thus, the expected lifetime utility of a couple at the beginning of stage 3 is

$$W(a,k;e) = \max \Big\{ V_3(a - \kappa^e; e) + \beta^K \tilde{V}^{kid}_{col}(k); \quad V_3(a;e) + \beta^K \tilde{V}^{kid}_{ncol} \Big\}.$$

Similarly, the expected utility of a single mother at the beginning of stage 3 is

$$\tilde{Y}^f(a,k;e) = \max \Big\{ \tilde{S}^f_3(a - \kappa^e; e) + \beta^K \tilde{V}^{kid}_{col}(k); \quad \tilde{S}^f_3(a;e) + \beta^K \tilde{V}^{kid}_{ncol} \Big\}.$$

Finally, a single father takes the decision as to whether or not his children attend college as given, so

$$\tilde{Y}^m(a; a^f, k, e) = \begin{cases} \tilde{S}^m_3(a;e) + \beta^K \tilde{V}^{kid}_{col}(k), & \text{if college,} \\ \tilde{S}^m_3(a;e) + \beta^K \tilde{V}^{kid}_{ncol}, & \text{if non-college.} \end{cases}$$

While divorced and separated fathers provide child support, they cannot help pay for

college directly. For this reason, the college decision does not impact the father's wealth. Even though single fathers lose the ability to affect investments in their children and the choice to send them to college, they still derive utility if their child attends college.

Stage 3: Middle Age

Starting in middle age, couples no longer face the risk of breaking up. Hence, a couple that is married or cohabiting at the beginning of stage 3 remains together for the rest of their lives. Middle-aged households consume and save. Couples solve

$$\begin{aligned} V_3(a;e) = \max_{c_m,c_f,a'} \quad & \theta^m u(c_m) + \theta^f u(c_f) + \beta(1-\eta_3)V_3(a';e) + \beta\eta_3 V_4(a';e), \\ \text{subject to} \quad & c_m + c_f + a' = (1+r)a + w^e_{3,m} + w^e_{3,f}. \end{aligned}$$

A separated or divorced individual of gender $g \in \{f,m\}$ solves

$$\begin{aligned} \tilde{S}^g_3(a;e) = \max_{c_g,a'} \quad & u(c_g) + \beta(1-\eta_3)\tilde{S}^g_3(a';e) + \beta\eta_3\tilde{S}^g_4(a';e), \\ \text{subject to} \quad & c_g + a' = (1+r)a + w^e_{3,g}. \end{aligned}$$

The values of each middle-aged spouse in a couple, $\tilde{V}^g_3(a;e)$, are defined in Appendix B.

Stage 4: Retirement

Like middle-aged households, retired households consume and save. Each period, they receive a constant fraction, b, of their potential earnings as a retirement benefit. The problem of a retired couple is given by

$$\begin{aligned} V_4(a;e) = \max_{c_m,c_f,a'} \quad & \theta^m u(c_m) + \theta^f u(c_f) + \beta(1-\eta_4)V_4(a';e), \\ \text{subject to} \quad & c_m + c_f + a' = (1+r)a + bw^e_{4,m} + bw^e_{4,f}. \end{aligned}$$

A separated or divorced retired individual of gender $g \in \{f,m\}$ solves

$$\begin{aligned} \tilde{S}^g_4(a;e) = \max_{c_g,a'} \quad & u(c_g) + \beta(1-\eta_4)\tilde{S}^g_4(a';e), \\ \text{subject to} \quad & c_g + a' = (1+r)a + bw^e_{4,g}, \end{aligned}$$

where $w^e_{4,g}$ represents the individual's average earnings over stages 1–3. The values of each retired spouse in a couple, $\tilde{V}^g_4(a;e)$, are defined in Appendix B.

Equilibrium

An equilibrium has the following three features. First, couples and singles choices are determined by their maximization problems. Second, parents' expectations about their children's lifetime utility with and without a college degree are consistent with the expected lifetime utilities of a new young parent. Third, the fraction of college-educated individuals in each parent generation is equal to the fraction of college-educated individuals in each child generation, such that there is a stationary distribution of college- and non-college-educated individuals in the economy.

The key equilibrium objects of the model are the lifetime values of young parents with a college and a high school degree ($\tilde{V}_1(e)$, as defined in equation (4)). When making investments in their children, parents need to take into account how much an increased likelihood of completing college increases their children's lifetime utility. At the same time, the equilibrium level of investments affects children's lifetime utility, since children will be parents themselves. As a result, solving the model requires fixed-point iteration to determine $\tilde{V}_1(e)$.

4 Calibration

We calibrate the model to the US economy in 2015 in two stages. First, we set the values of some parameters directly based on independent data estimates or the existing literature. We then calibrate the rest of the parameters by minimizing the distance between data targets and their model counterparts. To increase sample sizes, many moments and parameters are determined using data from the period 2003 to 2019.

Even though the calibration is done in two separate stages and the moments targeted in the minimization are impacted by multiple model parameters, we discuss related parameters, as well as the targeted moments that identify them together. For each parameter set in the minimization, Appendix Table C.2 reports the targeted moment that identifies it. Moment values and model counterparts are reported in Table 4.

Initial Conditions and Aging Probabilities At age 25, young couples begin stage 1 with zero assets ($a_0 = 0$). All newborn children have the same innate human capital ($k_0 = 0.4341$), independent of their parents' education. Both stage 1 and stage 2 are child development stages and each has an average duration of 10 years. The probabilities of transitioning out of these stages are set to $\eta_1 = \eta_2 = (1/10) = 0.10$. Children leave the household when parents are on average 45 years old. Parents then complete the rest of their working lives (another 20 years on average) and retire at age 65. Retirement also

lasts 20 years on average such that individuals are expected to die at age 85. Thus, the probabilities of transitioning out of stage 3 to stage 4, and out of stage 4 to death are set to $\eta_3 = \eta_4 = (1/20) = 0.05$.

Preferences The momentary utility function is given by

$$u(c_g) = \frac{c_g^{1-\gamma}}{1-\gamma},$$

with γ set to 2. The annual discount factor, β, is set to 0.96. Utility weights are exogenous and both spouses have equal weight, $\theta^m = \theta^f = 0.5$. New couples draw a marriage preference shock ω from distribution $\Omega(\cdot)$, which is set to a mean-zero normal distribution with variance σ_ω^2. The variance is chosen such that the model generates a fraction of couples that cohabit that is in line with the data. As Table 4 shows, the model matches this moment well: 12.6 percent of couples cohabit in the model compared to 11.2 percent in the data. The weight on children, β^K, is pinned down by the unconditional fraction of children attending college. In our PSID-CDS and PSID-TAS sample the fraction of children attending a 4-year college before the age of 27 is 84.7 percent. The fraction of children attending college in the model is 84.5 percent.

Interest Rate and Economies of Scale The annual real interest rate r is given by $r = 1/\beta - 1$ (4.2 percent). While living as a couple, spouses benefit from returns to scale in consumption independent of their marital status. We set ζ to 1.753, the estimated equivalence scale for food, housing, clothing, and health care in the US for a family of 4 (2 parents and 2 children) constructed by Daley et al. (2019).

Parental Wages, Retirement Benefits, and Childcare Costs We use CPS-ASEC data from 2003–2019 to calibrate men's earnings, $w_{t,m}^e$, in each stage $t \in \{1,2,3\}$ and for each education group $e \in \{col, ncol\}$. For instance, earnings of college-educated men in stage 1 are set to the average earnings of college-educated men ages 25–34 in the data. To calibrate women's wages, $w_{t,f}^e$, we multiply men's earnings by the average hourly wage gap between men and women for each education group in the data. Retirement benefits, b, are set to 35.2 percent of average lifetime earnings, assuming full-time work for both sexes to capture spousal benefits in a simple way. Both earnings and wages are normalized by dividing them by the average earnings of college-educated men (USD 106,931).

Childcare costs are estimated using Child Support Supplement (CPS-CSS) data for parents aged 25–34 with young children, and amount to 19 percent of a woman's stage 1 earnings. We adjust hourly child care costs to account for the fact that about 40 percent of non-college-educated women use informal care as their primary form of childcare

(see Guner et al. (2012)), and young children, on average, spend 30 hours per week in center- based care (Department of Education, 2005). The resulting value of the childcare cost parameter, λ, is 0.0622. Appendix Section C.1 describes the calibration of wages, retirement benefits, and childcare costs in more detail.

Separation and Divorce Probabilities We calibrate the separation probability for cohabitors (p^C) and the divorce probability for married couples (p^M) using National Survey on Family Growth (NSFG) data from 2011 to 2019. By age 19, 62.1 percent children's once-married parents remain married, and 25.6 percent of once-cohabiting parents still live together (see Appendix Figure C.1 for a breakdown by age of the child). To be consistent with these shares, we set the annual breakup rates to 2.47 percent for married couples and 6.88 percent for cohabiting couples.

Asset Splitting Asset division in U.S. divorce cases depends on state law, which generally follows either community property or equitable distribution rules.[13] Community property states (about 25 percent of the U.S. population) split marital assets 50/50. Most states follow equitable distribution, which aims for a fair, but not necessarily equal, division of assets based on factors such as marriage length, financial status, and contributions. For two reasons, this often leads to a roughly equal split. First, some equitable distribution states, such as Florida, allow spouses to opt into a community property system. Second, other states, such as Arkansas and Wisconsin, require a 50/50 distribution unless the court rules this division to be inequitable based on a specific set of criteria. We abstract from these legal differences and assume equal asset division in divorce by setting $\alpha^M = 0.5$.

No US state has adopted a formal legal framework for dividing assets upon separation from cohabitation. Courts rely on case law, typically awarding individuals the assets they owned or purchased. This tends to favor the higher-earning partner (Atwood and Cahn, 2022). To reflect this, we set $\alpha^C = 0.65$, based on the average earnings share of cohabiting men in CPS-ASEC data.

Child Support We estimate annual child support payments by education and marital status using CPS-CSS from 2003 to 2019. In the model, child support is only received during stages 1 and 2, when children are present in the household. We restrict parental ages in the sample accordingly and limit it to households with children under 18 and 1–4 children. We convert child support into 2017 USD and normalize annual child support payments by stage-4 wages of college-educated men. Appendix Table C.1 summarizes

[13] See Freed and Foster Jr (1981) for an overview of US divorce laws.

the results. Marital status has little effect for college-educated parents, but among non-college-educated parents, separated individuals receive significantly less than divorced ones, which is accounted for in the calibration.

Time Investments in Children In the model, women allocate time between market work and childcare. Using ATUS data from 2003 to 2019, we compute time use by education and marital status for mothers with children ages 0–9 (stage 1) and ages 10–19 (stage 2). Since the number of children varies in the data but is fixed at two in the model, we adjust childcare time by dividing by the average number of children and multiplying by two. Column (5) of Appendix Table C.3 reports the adjusted childcare time.

Column (6) shows the combined weekly hours spent on market work and adjusted childcare. In stage 1, college-educated mothers spend more than 48 hours per week on these activities, while non-college-educated mothers spend just over 33 hours.[14] Since the model includes only market work and childcare, we fix discretionary time at 33.25 hours. We assign college-educated mothers an additional 15 hours of market work, which implies $\upsilon_1 = 0.455$. Given this, non-college-educated mothers allocate 44.5 percent of discretionary time to childcare, college-educated mothers 74.3 percent, and the average share is 53.7 percent. We set the stage-1 time investment normalization parameter to $\bar{\tau}_1 = 0.537$. In stage 2, using a discretionary time budget of 32.81 hours, non-college-educated mothers allocate 16.5 percent to childcare, college-educated mothers 20.1 percent, and the average is 17.6 percent. Because time use differences by education in the data are small, we set $\upsilon_2 = 0$ (see Appendix Table C.5).

Money Investments in Children Using 2003–2019 CEX data, we compute money investments in children. The CEX reports some child-specific expenditures (e.g., clothing, childcare, school expenses), while broader categories (housing, food, transportation, health care) are reported at the household level. Following Lino et al. (2017), we allocate a share of these broader expenses to children using USDA budget shares. Detailed expenditure data are shown in Appendix Table C.6. Since the number of children varies by education and marital status in the data, but the model assumes two children per couple, we compute per-child expenditures by education group and scale them to two children. All values are converted to 2017 USD using the PCE index, and then into model units using the average annual earnings of college-educated men (USD 106,931).

Appendix Table C.7 summarizes expenditures by child age and parental education. Panel A shows that non-college-educated couples spend 7.5 percent of the annual average earnings of college-educated men on young children, while college-educated cou-

[14] Non-college-educated women allocate more time to non-market work, leisure, and other activities (see Appendix Table C.4).

ples spend nearly double (15 percent). The average, 9.3 percent, informs the stage-1 money investment normalization, $\bar{d}_1 = 0.093$. Panel B shows that college-educated couples spend similarly across child ages, while non-college-educated couples spend more when children are older. On average, investment in older children is 10.3 percent. However, childcare expenditures become much less important and education expenditures more than triple (Appendix Table C.8). We set $\bar{d}_2 = 0.103$.

Children's Human Capital Accumulation To measure children's human capital, we use Letter-Word test scores from the 2002, 2007, and 2014 PSID CDS waves. The test comprises 57 questions that vary in difficulty; each correct answer earns one point. Following Lee and Seshadri (2019), we weight questions by difficulty to construct an overall score. Since test scores are unavailable for children under age 3, we estimate initial human capital at birth (k_0) via a Tobit regression of test scores on child age and its square, interacted with parental education and marital status at birth.[15] We use the regression coefficients to predict test scores from age 0 to 17. We set initial human capital to the predicted score at birth, $k_0 = 0.4341$. Averaging predicted scores for ages 0–9 and 10–17 yields $\bar{k}_1 = 0.7260$ and $\bar{k}_2 = 1.1768$, which normalizes human capital in stages 1 and 2.

Human capital production in each stage consists of nested CES functions. The outer nest combines current human capital k with an investment aggregator $x_t(\tau_f, d)$, using Cobb-Douglas specifications ($\psi_1^2 = \psi_2^2 = 0$), with normalized TFP parameters ($\psi_1^0 = \psi_2^0 = 1$). The weight on current human capital is calibrated to the human capital levels in stage 1 and 2 in the data. As shown in Table 4, the model overshoots stage-1 human capital (1.209 vs. 0.726 in the data) and to a lesser extent stage-2 human capital (1.463 vs. 1.177). The inner CES nests differ by stage. In stage 1, we assume strong complementarity between time and money inputs, setting the elasticity $\pi_1^2 = -3.0$, consistent with estimates from Abbott (2022), Caucutt et al. (2023), and Molnar (2024). In stage 2, we allow greater substitutability, setting $\pi_2^2 = 1.0$, following Agostinelli and Sorrenti (2022). Both stages exhibit dynamic complementarity: as child human capital k rises, the marginal products of time and money investments increase.

The TFP parameters in the inner CES production functions, π_1^0 and π_2^0, are set to match average time investments in the data. In stage 1, 53.7 percent of discretionary time is allocated to childcare in the data compared to 51.1 percent in the model. In stage 2, the shares are 17.6 percent and 9.0 percent, respectively. The weights on time investments relative to good investments in each stage are set to match average money investments. Recall that 9.3 percent of the average annual earnings of college-educated men are spent on young children, and 10.3 percent on older childre in the data. In the

[15] The test score variable is left-censored at zero. See Appendix C.5 for details.

model, average money investments are 7.2 percent in stage 1 and 35.2 percent in stage 2. The model significantly overstates stage-2 spending, which is likely due to abstracting from public schooling.

Table 4: Targeted Moments

Moment	Model	Data
I. Parents		
Cohabitation rate (%)	12.6	11.2
Child Investments (married/cohabiting couples only)		
Average time investment stage 1	0.511	0.537
Average time investment stage 2	0.090	0.176
Average money investment stage 1	0.072	0.093
Average money investment stage 2	0.352	0.103
II. Children's Outcomes		
Average Human Capital		
Stage 1	1.209	0.726
Stage 2	1.463	1.177
College Attendance (%)		
Children of non-college-educated parents	72.8	79.0
Children of college-educated parents	99.6	98.9
College Completion (%)		
Children of non-college-educated parents	25.6	22.0
Children of college-educated parents	67.7	69.2

Notes: The cohabitation rates are the fraction of couples that choose to cohabit at the beginning of stage 1 (model) and the fraction of couples living together and with children under 5 who are cohabiting in the CPS-ASEC in 2015 (data). Average time and money investments are those of married and cohabiting couples only in both the model and the data (investments made by divorced/separated mothers are not included). Data sources: time investments, 2003–2019 ATUS; money investments, 2003–2019 CEX; college completion and attendance rates, PSID CDS-TAS.

College Costs We calculate college costs using data from the Integrated Postsecondary Education Data System (IPEDS) on tuition and room and board at 4-year public and private colleges, published by the U.S. Department of Education. We construct enrollment-weighted averages from 2003 to 2019 and adjust all costs to 2017 USD. The average annual cost is USD 45,750 at private colleges and USD 20,330 at public colleges. Since families often receive financial aid, especially those with lower incomes, we estimate net tuition using income-specific subsidy rates from Marto and Wittman (2024): 0.44 for families with non-college-educated parents and 0.33 for those with college-educated parents. We multiply the resulting net costs by eight (two children attending college for four years) and normalize by the average earnings of college-educated men (USD 106,931).

This yields normalized college attendance costs of 1.12 for non-college-educated families and 1.35 for college-educated families.

College Attendance and Completion The probability that a child completes college is given by a logistic function as in Blandin and Herrington (2020),

$$P(k) = \frac{\chi_2}{1 + \exp(-\chi_0 + \chi_1 k)},$$

where χ_2 is the maximum probability of college completion, set to $\chi_2 = 1$. We calibrate χ_0 and χ_1 to match observed college completion rates by parental education. In the PSID-TAS, 22.0 percent of children from non-college-educated households and 69.2 percent from college-educated households complete a 4-year degree. The model replicates this gap closely, with completion rates of 25.6 percent and 67.7 percent, respectively (Table 4).

In contrast, college attendance rates are much less sensitive to parental education. In the data, 98.9 percent of children with college-educated parents attend college, compared to 79.0 percent for those with non-college-educated parents. This discrepancy between attendance and completion, especially for children from less-educated households, highlights the riskiness of college as an investment. The overall college attendance rate in the data pins down the weight on children's utility, β^K. Since children from non-college-educated families tend to have lower human capital at the end of stage 2, their completion probability is lower. Thus, the decision to send them to college is more sensitive to the warm-glow utility parameter, ξ, which we calibrate using the observed attendance gap. The model matches attendance rates well: 72.8 percent for children of non-college-educated parents and 99.6 for those of college-educated parents.

5 Benchmark Economy

The benchmark economy successfully replicates key differences observed in the data between college- and non-college-educated couples. Recall that the model only targets the average marriage rate in the economy. As shown in Table 5, the model correctly predicts higher cohabitation and lower marriage rates among non-college-educated couples. The observed cohabitation rate is 13.9 percentage points higher for non-college-educated couples, compared to a 13.0 percentage point gap in the model.

The model also captures the general patterns of time and money investments by parental education and marital status. Table 5 reports average annual investments, aggregated across model stages 1 and 2 and limited to currently married and cohabiting

Table 5: Non-targeted Moments, Model Assessment

			Non-College	College	Gap
I. Parents					
Cohabitation Rate (%)		Model	18.3	5.3	13.0
		Data	17.2	3.3	13.9
Avg. Time Investment	Married	Model	0.245	0.394	-0.149
		Data	0.311	0.478	-0.168
	Cohabiting	Model	0.098	0.393	-0.295
		Data	0.272	0.344	-0.072
Avg. Money Investment	Married	Model	0.182	0.258	-0.076
		Data	0.085	0.145	-0.060
	Cohabiting	Model	0.104	0.263	-0.159
		Data	0.072	0.156	-0.084
II. Children's Outcomes					
College Attendance (%)	Married/Divorced Parents	Model	77.5	99.6	-22.1
		Data	81.9	98.9	-17.0
	Cohabiting/Separated Parents	Model	52.2	99.0	-46.8
		Data	68.6	99.3	-30.7
College Completion (%)	Married/Divorced Parents	Model	29.8	67.8	-38.0
		Data	25.3	70.0	-44.7
	Cohabiting/Separated Parents	Model	6.9	65.9	-59.0
		Data	10.0	42.9	-32.9

Notes: Cohabitation rates are the fraction of couples that choose to cohabit at the beginning of stage 1 (model) and the fraction of couples living together with children under 5 who are cohabiting in the CPS-ASEC in 2015 (data). Time and money investments are the averages of annual investments in stage 1 (when children are aged 0–9) and in stage 2 (when children are aged 10–19). Time and money investments are those of married and cohabiting couples only, in both the model and the data (investments made by divorced/separated mothers are not included). College completion/attendance rates are reported for children of married or divorced parents, and children of cohabiting or separated parents. The last column summarizes the gap between moments for non-college- and college-educated families. Data sources: time investments, 2003–2019 ATUS; money investments, 2003–2019 CEX; college completion/attendance rates, PSID CDS-TAS.

couples.[16] While the model reproduces the qualitative investment patterns, it overstates the gap in time and money investments between married and cohabiting non-college-educated couples and understates the variation by marital status among college-educated couples.

The model shows that, for non-college-educated couples, marriage significantly facilitates child investment. In contrast, among college-educated couples, time investments are similar across marital statuses, and money investments are actually higher for cohabiting couples. This reflects their effort to offset the greater risk of splitting up. As shown in Table 6, child investments fall sharply following separation or divorce, as

[16] Divorced and separated couples are excluded due to data limitations in identifying separated mothers.

Table 6: Time and Money Investments in the Model

Edu	Marital Status			
	Married	Cohabiting	Divorced	Separated
A. Average Time Investment				
ncol	0.245	0.098	0.000	0.000
col	0.394	0.393	0.315	0.312
B. Average Money Investment				
ncol	0.182	0.104	0.000	0.000
col	0.258	0.263	0.245	0.243

Notes: Time and money investments are the averages of annual investments in stage 1 (when children are aged 0–9) and in stage 2 (when children are aged 10–19).

the cost of investing rises.[17] Cohabiting parents respond differently to the risk of separation depending on education. Non-college-educated parents, who are more financially constrained, reduce both investments in children and the likelihood of sending them to college. In contrast, college-educated cohabiting parents increase investments to mitigate breakup risk and maintain college attendance rates comparable to their married counterparts. As a result, in both the model and the data, cohabitation primarily affects the college attendance of children with non-college-educated parents. Their attendance rate drops from 77.5 percent (married) to 52.2 percent (cohabiting) in the model, a larger decline than observed in the data (81.9 percent to 68.6 percent). For college-educated parents, the drop is minimal and less than one percentage point in both the model and the data.

Lower investments and attendance translate into significantly lower college completion rates for children of cohabiting, non-college-educated parents: 6.9 percent versus 29.8 percent for those with married parents. These rates closely match those observed in the data. For children of college-educated cohabiting parents, completion rates are also lower (65.9 percent) than for married couples, though still higher than in the data (42.9 percent). This may reflect the model's omission of financial aid dynamics, which affect dropout risk (Vardishvili, 2020). It is worth noting that cohabiting college-educated households are rare in both the model and the data and constitute less than 3 percent of all couples.

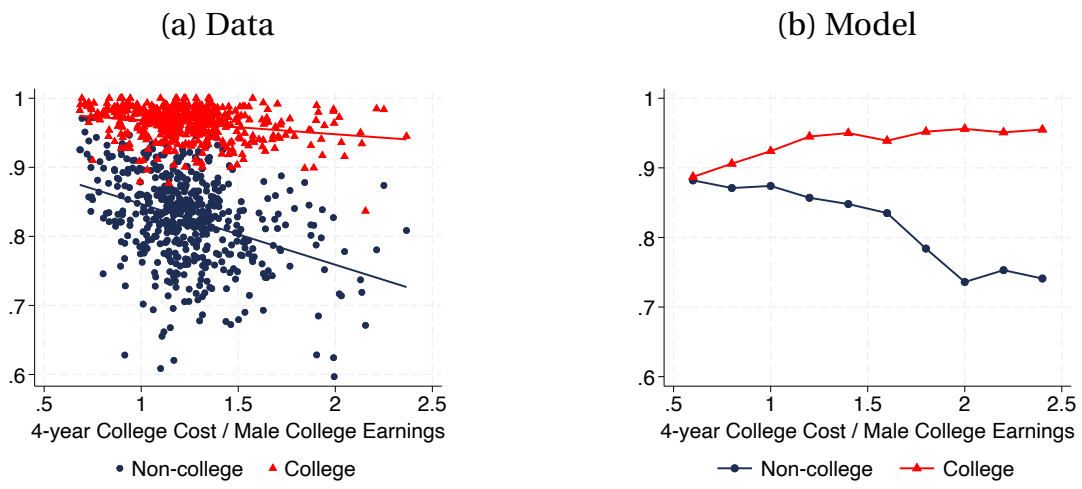
We further assess the model by comparing its predictions on the relationship between college costs and marriage rates to empirical patterns. To do so, we compile

[17] This aligns with Kearney (2023), who documents lower educational outcomes for children in single-parent households.

a dataset of state-level marriage rates and college costs for college- and non-college-educated couples in the U.S. College costs per child, covering tuition, room, and board, are calculated as enrollment-weighted averages across public and private four-year institutions, based on IPEDS data.[18] We multiply per-child costs by two, convert them to 2017 USD, and normalize by the annual earnings of college-educated men aged 25–44. Earnings and state-level marriage rates by education group are computed from the CPS-ASEC.

Figure 2 shows that the model reproduces the observed relationship between marriage rates and college costs by parental education. In both the data and the model, marriage rates among college-educated couples are largely unaffected by rising college costs. For non-college-educated couples, however, there is a clear negative relationship: marriage rates decline as college costs rise. A regression of marriage rates on normalized college costs shows that, in the data, the marriage rate of non-college-educated couples falls by 9.4 percentage points when college costs double from their baseline value of 1.12.[19] The model closely replicates this pattern and predicts a 10.6 percentage point decline when college costs double.

Figure 2: Marriage Rates and College Costs



Notes: Panel (a) shows state-level variation in the cost of sending two children to a 4-year college (converted to 2017 USD) and normalized by the average earnings of college-educated men in the given state for the years 2010 to 2019. Male college earnings and marriage rates by education are computed using the corresponding years in the CPS data. Panel (b) reports marriage rates for a series of counterfactual experiments where we vary college costs in the baseline model economy. The cost of sending two children to college in the baseline economy relative to the average earnings of college-educated men (USD 106,931) is 1.12 for non-college-educated parents and 1.35 for college-educated parents.

[18]The U.S. Department of Education provides state-level tuition data through the Integrated Postsecondary Education Data System (IPEDS). See the calibration section on college costs for details.

[19]See Appendix Table C.10 for details.

5.1 Cohabitation and the Importance of Children

In our theory, children are a key motive for marriage. Recall that couples also draw a marriage preference shock at the beginning of life. We use the model to investigate whether couples choose to marry due to the positive impact of their marital status on children's skill accumulation. To this end, we perform a series of decomposition exercises, each removing one model ingredient related to children while keeping the preference shock distribution constant. In each experiment, we solve for parents' optimal choices, including the decision to marry versus cohabit, while holding the education distribution fixed at the baseline level.

Table 7: The Effect of Children on Cohabitation Rates (%) in the Model

		Non-College	College	Gap
	Data	17.2	3.3	13.9
	Baseline	18.3	5.3	13.0
(1)	All aspects of children (2) - (5) removed	13.4	31.4	−18.0
(2)	No skill accumulation of children	10.0	29.5	−19.5
(3)	No childcare cost	17.5	6.9	10.6
(4)	No child support	18.6	4.3	14.2
(5)	No warm glow from college attendance	28.9	10.3	18.6

Notes: Cohabitation rates of new non-college- and college-educated parents in the model when we shut down various model features related to the presence of children. The last column reports the gap in cohabitation rates by education. A positive gap implies that non-college couples cohabit at higher rates. In each experiment, we keep the education distribution of the parental generation fixed at the baseline level.

Table 7 reports parents' cohabitation rates in the decomposition exercises. In Experiment (1), we remove all aspects of children from the parental decision problem: the endogenous accumulation of skills, childcare costs, child support, and the warm glow utility from children's college attendance. Absent these features, mothers work full-time, expected child utility becomes constant (and independent of parents' education), and parents allocate all resources to consumption. This has a large impact on the relative value of marriage: the cohabitation rate of non-college-educated couples drops slightly, from 18.3 percent to 13.4 percent, but that of college-educated couples increases by a factor of six, from 5.3 percent to 31.4 percent. With children removed, marriage loses its role in supporting child investment. Since all resources are spent on consumption, the economies of scale become more salient, particularly for low-income couples, leading to a reversal in the education gradient of cohabitation.

Next, we isolate the effect of each individual model component related to children.

Experiment (2) shows that shutting down only skill accumulation yields similar results to Experiment (1), including the counterfactual reversal in the cohabitation gradient.[20] By contrast, Experiments (3) and (4), which eliminate childcare costs and child support, respectively, have minimal impacts on cohabitation rates relative to the baseline. In Experiment (5), removing the warm-glow utility from college attendance raises cohabitation rates for both education groups, though the education gradient remains intact, with college-educated parents still marrying at higher rates. Overall, these findings highlight that endogenous child skill accumulation is key for the model to generate higher marriage rates among college-educated couples.

5.2 The Role of Asset Division and Separation Probabilities

Marriage and cohabitation differ along three dimensions in the model. First, married couples are less likely to divorce than cohabiting couples are to separate. Second, marriage provides more insurance to women, as assets are divided equally upon divorce, while separations leave a larger share of assets with the man. Third, child support payments are more generous in divorce than in separation from cohabitation. As shown in Section 5.1, child support has limited impact on cohabitation rates. Here, we investigate the importance of the equitable asset division and the reduced likelihood of breaking up for the decision to marry or cohabit and child outcomes.

Table 8: The Effect of Asset Splits and Separation Probabilities

		Cohabitation rates (%)			College completion rates (%)	
		Non-College	College	Gap	Non-College	College
	Data	17.2	3.3	13.9	22.0	69.2
	Baseline	18.3	5.3	13.0	25.6	67.7
	Equalizing Asset Splits					
(1)	$\alpha^M = \alpha^C = 0.50$	21.2	12.0	9.2	25.9	67.6
(2)	$\alpha^M = \alpha^C = 0.65$	23.1	8.6	14.5	24.2	67.2
	Equalizing Separation Probabilities					
(3)	$p^M = p^C = 0.0247$	46.7	39.5	7.2	29.8	67.7
(4)	$p^M = p^C = 0.0688$	38.3	34.7	3.6	4.7	66.1

Notes: Cohabitation rates and college completion rates when either asset splits (Experiments (1) and (2)) or separation probabilities (Experiments (3) and (4)) are equalized between marriage and cohabitation. The third column reports the gap in cohabitation rates between non-college- and college-educated parents. A positive gap implies that non-college couples cohabit at higher rates. In each experiment, we keep the education distribution of the parental generation fixed at the baseline level.

We first alter asset-splitting rules. In Experiment (1), both married and cohabiting

[20] Cohabitation rates are slightly lower than in Experiment (1) because parents still derive warm-glow utility from college attendance, motivating some to remain coupled to finance college costs.

couples face equal (50–50) asset division, while in Experiment (2), both face the baseline cohabitation rule (65–35). Table 8 shows that cohabitation rates rise under both scenarios. When asset division no longer depends on marital status, marriage loses part of its insurance value for women, making marriage less attractive. Under a 65-35 asset-splitting rule for all couples, child investment and college completion rates decline slightly. With a universal 50-50 asset split, two opposing effects emerge. On the one hand, holding marriage rates fixed, the incentive to invest in children increases. On the other hand, cohabitation rates increase, which lowers child investment. The net effect on children's college completion rates is small.

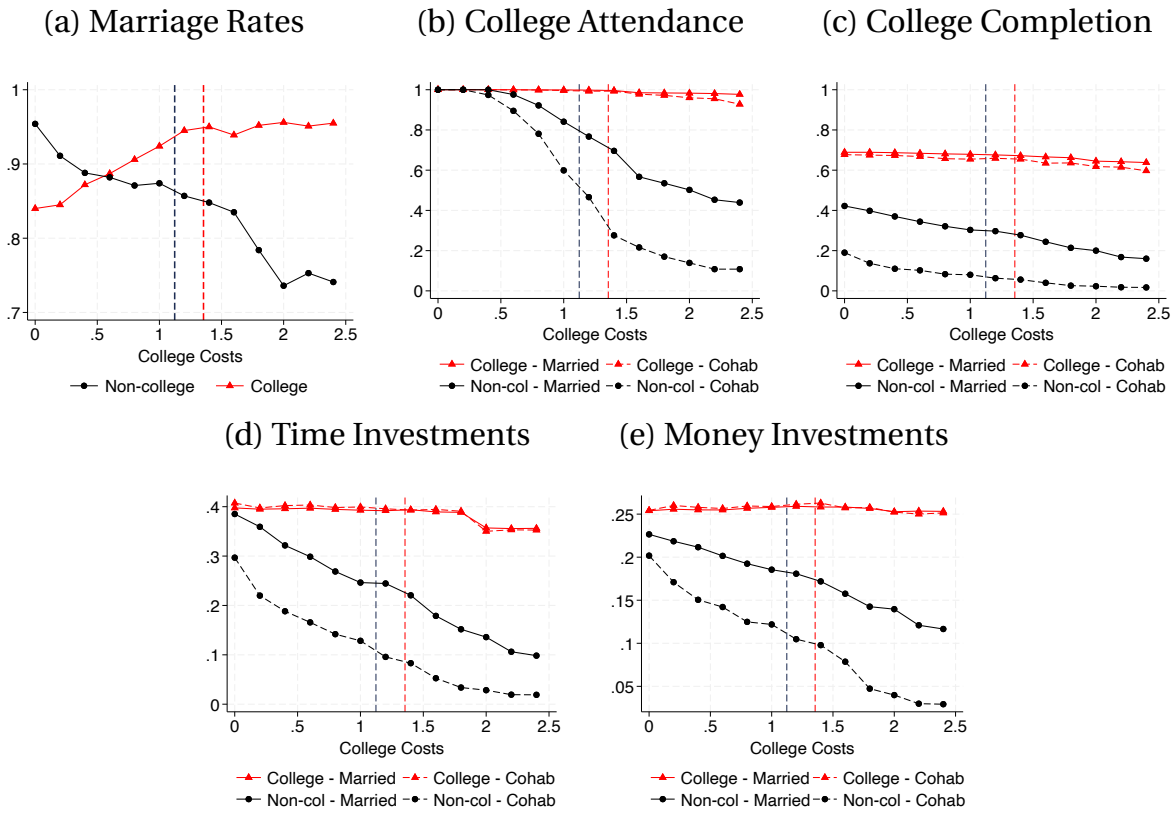
In Experiments (3) and (4), we equalize separation probabilities across marital status. In Experiment (3), both married and cohabiting couples face the lower baseline divorce rate (2.47 percent); in Experiment (4), both face the higher cohabitation separation rate (6.88 percent). In both cases, cohabitation rises significantly. Yet, the college completion rate for children of college-educated parents remains stable. Even when marriage is as unstable as cohabitation, married couples' children's completion rate declines only slightly (from 67.7 percent to 66.1 percent). This reflects a key feature of the model: when faced with greater instability, college-educated parents, who have higher earnings, behave like cohabiting parents in the baseline, and increase money investments to offset their higher breakup risk. Consequently, cohabitation has only a small impact on their children's college completion rates.

In contrast, non-college-educated parents reduce investments under instability. In the baseline, children with married non-college-educated parents have a college completion rate of 25.6 percent, while those with cohabiting parents have a completion rate of only 6.9 percent. In Experiment (4), when marriage is no longer more stable than cohabitation, all non-college-educated parents behave like cohabitors, and completion rates fall drastically to 4.7 percent. Taken together, Experiments (1)–(4) highlight that both equal asset-splitting and increased relationship stability enhance the appeal of marriage. These features, in particular marriage's lower breakup risk, promote child investment. College-educated parents can compensate for the loss of these benefits; non-college-educated parents cannot. Thus, marriage is especially critical for the educational outcomes of children from less-educated families, a point we return to in Section 6.2.

6 Cohabitation and Child Outcomes

6.1 How College Costs Shape Cohabitation Rates

Figure 3: The Effects of Rising College Costs



Notes: Marriage rates (a), children's college attendance (b) and completion (c) rates, and average time (d) and money (e) investments by parental education and marital status in the model as college costs vary. Marriage rates are the fraction of couples that marry at the beginning of stage 1. College completion/attendance rates are reported for children of married or divorced parents (solid lines), and children of cohabiting or separated parents (dashed line). Time and money investments are the averages of annual investments in stages 1 and 2 for currently married (solid lines) and currently cohabiting (dashed lines) couples only (investments made by divorced/separated mothers are not included). College costs are the 4-year costs of sending two children to college and are converted to 2017 USD and normalized by the average earnings of college-educated men (106,931 USD). Real college costs range from 0 to 278,021 USD along the x-axes. The dashed vertical lines are the college costs for non-college-educated (dark blue) and college-educated (red) parents in the baseline economy.

We explore how college costs shape parents' marriage decisions in the model by varying college attendance costs, κ^e, from zero to the highest observed in US data.[21] Figure 3 shows how marriage rates, children's college attendance and completion rates, and average time and money investments respond to changes in college costs. Attendance and completion rates are reported by parents' education and marital status at birth. For instance, the solid blue line in panel (b) traces college attendance for children with non-

[21] In the baseline, college costs vary by parental education. Here, all couples face the same cost.

college-educated, married parents. Investment measures are averaged over periods 1 and 2 for currently married and cohabiting couples; divorced and separated couples are excluded. The vertical lines in each panel show the baseline college costs faced by non-college-educated (blue) and college-educated (red) parents.

The first point in each panel reflects a zero-cost college scenario. In this case, marriage patterns by education reverse: non-college-educated parents, now able to afford college, increase time and money investments. Their marriage rate increases from 82 percent to over 95 percent. Marriage supports investment by improving couple stability and the mother's resources post separation.

For college-educated parents, who are already able to afford college in the baseline, free college has little impact on their children's college attendance rates. Free college instead acts like a positive wealth effect, allowing them to allocate more resources to consumption and child investments. The effect on child investments for currently married and cohabiting college-educated couples is small. This is because the effect is primarily on time and money investments in children with divorced and separated mothers. Since these mothers no longer have to pay for college, they can allocate more resources to their children's human capital, reducing the gap in child investments between children with parents who are together and those whose parents have split up.[22] This lowers the value of stability through marriage. The value of economies of scale in consumption when living as a couple falls as well. As a result, the value of marriage declines and the marriage rate of college-educated couples falls from 95 percent in the baseline to 83 percent.

Panel (a) shows that rising college costs have opposite effects by education. For college-educated couples, marriage becomes more attractive due to higher returns from economies of scale in consumption and the impact of college costs on child investments in the event that the couple splits up. Rising college costs have little effect on child investments conditional on being currently married as shown in panels (d) and (e). But, by marrying, college-educated couples reduce the probability of splitting up and increase the resources that the mother will have to both invest in children and pay for college should a break-up occur. Notice in panel (c) that there is a widening gap in college completion rates between children with married and cohabiting college-educated parents as college costs rise.

In contrast, the marriage rate of non-college-educated couples drops as college costs increase, since they quickly become unable to pay for college. If children are unlikely to attend college, parents have less incentive to invest in them. They also have more

[22] Table 6 shows this gap in the baseline economy.

resources for consumption. Both lower the value of marriage, leading more couples to cohabit. The college attendance rates of children with college-educated parents are less sensitive to college costs but only to a certain extent. If we continue to increase college costs, we observe similar effects on college-educated couples, but only at much higher levels of college costs than observed in the data.

6.2 Cohabitation and Inequality in Child Outcomes

Finally, we investigate how parents' decisions to cohabit or marry shape inequality in the next generation through their effect on children's college attendance and completion. We perform two experiments that eliminate the differences between cohabitation and marriage. In the first experiment, we make cohabitation equivalent to marriage by introducing three changes relative to the benchmark. First, we reduce the separation probability in cohabitation to match that of marriage ($p^C = 0.0247$). Second, we equalize assets division upon separation ($\alpha^C = 0.50$) and, third, we set child support levels of separated couples equal to those of divorced couples. The second experiment does the opposite: we make marriage equivalent to cohabitation by raising the divorce probability ($p^M = 0.0688$), imposing unequal assets division ($\alpha^M = 0.65$), and setting child support as low as in cohabitation.

We distinguish two types of equilibrium in this exercise: short run and long run. In the short run, couples re-optimize but the parental education distribution remains fixed at its baseline. In the long run, this distribution converges to its new steady state. Table 9 summarizes the results. Note that, aside from the preference shock, parents are indifferent between cohabitation and marriage in both experiments, resulting in a 50 percent cohabitation rate in both education groups.

The results of both experiments are reported in Table 9. In Experiment I, where cohabitation is made equivalent to marriage, inequality in educational outcomes falls, and college completion rises. As shown in columns (1) and (2), there is little change in college outcomes for children of college-educated parents. This is not surprising given that nearly 95 percent of college-educated parents are married in the baseline. In contrast, college attendance and completion increase by about 4 percentage points for children from non-college-educated families. As a result, the overall college completion rate rises from 44.2 percent to 46.7 percent, and the gap in college completion between children with parents of different education levels falls from 42.1 to 38 percentage points. In the long run, the college completion rate rises to 48.2 percent.

In Experiment II marriage is, instead, made equivalent to cohabitation. Since most

Table 9: Impact of Separation Probabilities and Asset Splits on College Completion

	Benchmark	**Experiments**			
		Short-run		Long-run	
		I	II	I	II
	(1)	(2)	(3)	(4)	(5)
A.Cohabitation Rate (%)					
All	12.6	50.0	50.0	50.0	50.0
Non-college	18.3	50.0	50.0		
College	5.3	50.0	50.0		
B. College Attendance (%)					
All	84.7	87.3	72.3	88.1	57.7
Non-college	72.8	77.5	51.2		
College	99.6	99.6	99.0		
Attendance Gap	*26.8*	*22.1*	*47.8*		
C. College Completion (%)					
All	44.2	46.7	32.0	48.2	13.5
Non-college	25.6	29.9	5.4		
College	67.7	67.9	65.6		
Completion Gap	*42.1*	*38.0*	*60.2*		

Notes: In Experiment I, cohabitation is the same as marriage: (a) low separation probability, (b) equal asset split, and (c) more generous child support after separation/divorce. Conversely, in Experiment II, marriage is the same as cohabitation: (a) high separation probability, (b) unequal asset split, and (c) less generous child support after separation/divorce. In the short-run experiment, we keep the parental education distribution fixed. The long-run experiment is the new steady state. Education-specific cohabitation, college attendance, and college completion rates are the same in the long run as in the short run.

couples are married in the baseline, the impacts of this change are more pronounced, especially for children with non-college-educated parents. For children with college-educated parents, the impacts are small—higher wages and larger child support transfers help offset the income loss if the couple splits up. As a result, they are able to sustain higher levels of investments in children and pay for college despite the lost insurance from marriage. For children of non-college-educated parents, however, college attendance plummets from 72.8 percent to 51.2 percent, and completion rates drop significantly from 25.6 percent to 5.4 percent, widening the gaps in college attendance and completion by around 20 percentage points. The overall college completion rate drops to 32.0 percent in the short run, and 13.5 percent in the long run.

The experiments show that parents' marital status has important consequences for children's educational outcomes. In particular, when non-college-educated parents cohabit, their children are significantly less likely to complete college. Thus, rising co-

habitation rates among non-college-educated couples may be contributing to growing inequality in children's educational attainment.

7 Conclusion

Cohabitation rates are substantially higher among non-college-educated couples with young children than among their college-educated counterparts. We provide empirical evidence that marriage, by offering insurance to the lower-earning spouse, facilitates greater investment in children. To interpret these findings, we develop an overlapping generations model in which couples choose whether to cohabit or marry, alongside decisions about savings, child investments, and whether to pay for their children to attend college.

A key insight from the model is that parental choices to marry or cohabit are impacted by the cost of education. Calibrating the model to the US economy in 2015, we find that college-educated couples value child investments, and hence marriage, more than non-college-educated couples due to the high cost of college in the US. We also show that, in the context of high college costs, college-educated parents' decision to marry widens the gap in college completion rates between their children and those of non-college-educated parents and thus perpetuates intergenerational inequality. Our findings highlight the interplay between family structure, educational costs, and intergenerational mobility. Based on these findings, policies that lower barriers to higher education or provide insurance to low-income families in the event of separation could increase intergenerational mobility and remain an important avenue for future research.

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Online Appendix (not for publication)

A Data Appendix

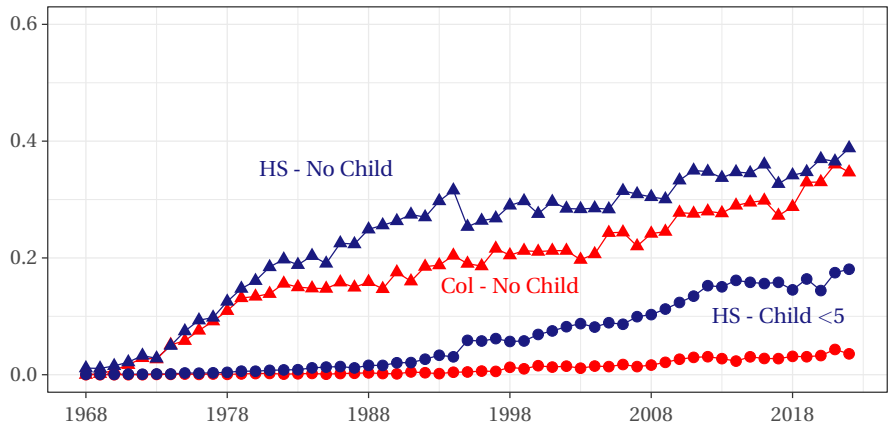
A.1 Cohabitation Rates

2-step Identification of Cohabitors First, we identify couples in which one partner is recorded as the household head and the head's marital status is *not* 'married with a spouse present.' We further restrict the sample to households with one additional opposite-sex adult who is within 15 years of the household head's age and not identified as a relative. This step identifies 98.35 percent of all cohabiting couples.[23] In the second step, we identify couples in households where neither spouse is recorded as the household head. This time, we consider households in which the household head has the marital status 'married with a spouse present' (excluded in the previous step). We then check whether two opposite-sex adults are present in this household and whether at least one of them is a non-relative of the household head. The most typical type of household we identify this way is a son or daughter living with their parents and their cohabiting romantic partner. We check the imputed cohabitation rates against the ones reported in the CPS after 2007 to assess the validity of our results.

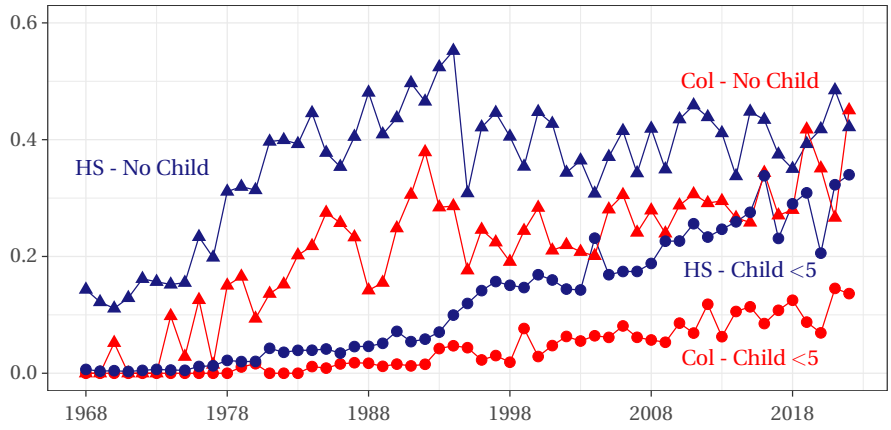
[23] Between 1995 and 2007, we validate our findings using the 'relate' variable to ensure that all cohabiting couples, where one member is the household head, are accurately identified.

Figure A.1: Cohabiting Couples as a Share of Couples Living Together - By Race

(a) Whites Only



(b) Blacks Only



Notes: CPS-ASEC data, 1968-2022. The sample is limited to white individuals in panel (a) and to Black individuals in panel (b). Authors' calculations.

Table A.1: Marriage Rates across Countries

	Couples with Children Aged 0-5			Couples without Children		
Country	Non-college	College	Gap	Non-college	College	Gap
AT	0.716	0.732	0.015	0.653	0.665	0.013
BE	0.558	0.563	0.005	0.554	0.590	0.035
CH	0.861	0.887	0.026	0.644	0.721	0.077
CY	0.941	0.974	0.033	0.905	0.938	0.032
CZ	0.736	0.880	0.144	0.730	0.779	0.049
DE	0.837	0.905	0.068	0.707	0.732	0.025
DK	0.688	0.790	0.102	0.616	0.691	0.075
EE	0.535	0.535	0.000	0.530	0.530	0.000
ES	0.812	0.885	0.073	0.755	0.783	0.029
FI	0.704	0.781	0.077	0.588	0.655	0.067
FR	0.455	0.554	0.099	0.474	0.521	0.047
HU	0.745	0.913	0.167	0.722	0.820	0.098
IE	0.811	0.871	0.060	0.746	0.778	0.032
IT	0.855	0.906	0.051	0.844	0.839	−0.005
LT	0.949	1.000	0.051	0.929	1.000	0.071
LU	0.806	0.747	−0.059	0.819	0.769	−0.051
LV	0.733	0.959	0.227	0.713	0.814	0.101
NL	0.710	0.742	0.032	0.639	0.642	0.003
NO	0.551	0.667	0.115	0.545	0.631	0.086
PL	0.942	0.948	0.006	0.917	0.891	−0.026
SE	0.527	0.578	0.051	0.477	0.505	0.028
SI	0.525	0.672	0.147	0.554	0.684	0.130
SK	0.865	0.974	0.109	0.857	0.924	0.067
UK	0.711	0.848	0.137	0.636	0.666	0.030
Mean			0.072			0.042

Notes: EU-SILC data, 2013-2018. The sample is limited to individuals aged 25–44. Authors' calculations.

A.2 Earnings Penalties in Marriage and Cohabitation

A possible explanation for the differential evolution of cohabitation rates by education and presence of children is that college-educated couples expect higher returns from child investment, and marriage fosters specialization that makes this investment easier. We explore this idea by examining earnings penalties for married and cohabiting women. If marriage does facilitate specialization, we would expect married women to face larger earnings penalties after childbirth compared to cohabiting women. It is well-established in the economics literature that having children imposes significant career costs and earnings penalties on women, but not on men (Adda et al., 2017).[24] Less, however, is known about how these penalties vary by marital status, particularly whether the earnings of cohabiting women are affected differently than those of married women after the birth of their first child.

To assess this hypothesis, we adopt the quasi-experimental approach of Kleven et al. (2019a) and estimate event studies around the birth of the first child using 1976–2018 PSID data. We use marital status at childbirth ($t = 0$) to define a woman as married or cohabiting. In line with Kleven et al. (2019b), we assign a value of zero to earnings for non-working individuals and limit the sample to men and women who became parents for the first time between the ages of 20 and 45. Additionally, these individuals are observed both before and after childbirth, and at least eight times over the event-study period.[25] We estimate the effect of children on earnings relative to the year before the birth of the first child, making $t = -1$ the reference year.

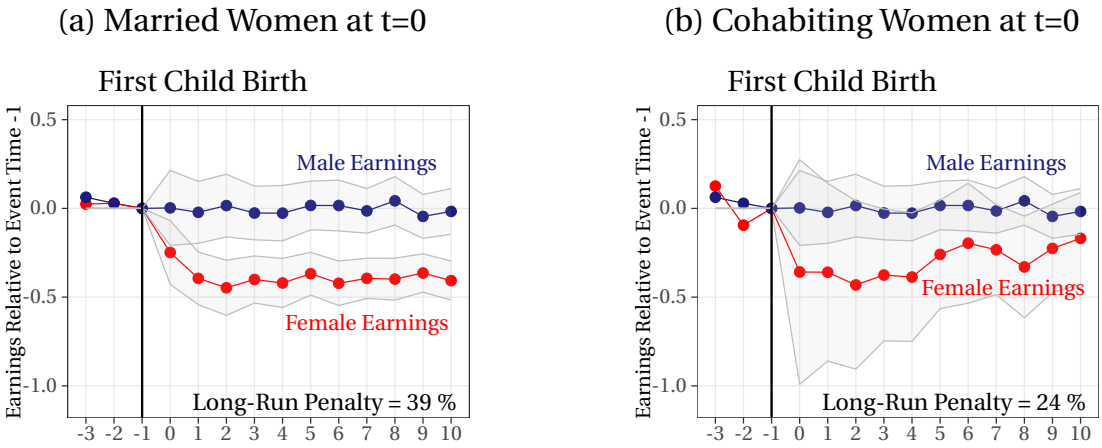
Appendix Figure A.2 displays the differential impacts of childbirth on the earnings of married and cohabiting women.[26] Consistent with existing research, our analysis reveals no discernible child penalty on men's earnings. In contrast, women experience a significant decline in earnings post-childbirth, an effect that is much more pronounced for married women. Specifically, while the earnings penalties for cohabiting women are similar in initial magnitude to those of married women, they are both more variable and less persistent. In the long run (5 to 10 years after childbirth), earnings are still 39 percent below their pre-birth levels for married women compared to 24 percent below for cohabiting women. These findings indicate that cohabiting women may indeed spe-

[24] Child penalties in women's earnings are widespread, in both developed (Kleven et al. (2019b), Berniell et al. (2020)) and developing countries (Berniell et al. (2021), Kleven et al. (2024, rdae104)). These penalties have likewise been documented among highly educated women in the US (Kuziemko et al. (2018)).

[25] We closely follow the specification of Kleven et al. (2019b) and include event-time dummies, age dummies (to control for life-cycle trends), and year dummies (to control for time trends). We thank Kleven et al. (2019b) for sharing their code with us.

[26] Because we rarely observe highly educated cohabiting women, we cannot further distinguish the sample by education.

Figure A.2: Earnings Penalties after Childbirth



Notes: PSID data 1976–2018. Percentage effects of parenthood on earnings across event time t. Long-run child penalties are the average penalty from event time five to ten. Earnings are total labor income before taxes and transfers, including farm income, business income, wages, bonuses, overtime pay, commissions, as well as income from professional practice and roomers and boarders. They are set to zero for non-working individuals. Since reported earnings in the PSID refer to the year before the interview, we assign them to the previous year.

cialize less and remain more attached to the labor market after childbirth. Calvo (2025) documents similar patterns for cohabiting and married women in the NLSY.

One concern is that child penalties may be driven by the fact that the underlying sample of married and cohabiting individuals differs along many dimensions. Appendix Table A.2, panel A, shows that married individuals are older, earn more, and are more likely to be college graduates and employed at childbirth compared to cohabiting ones. In addition, Blacks have lower marriage rates than whites and account for more than two-thirds of cohabiting couples in the sample. To ensure that our results are not purely driven by differences in racial compositions, we repeat the event studies excluding Blacks from the sample. Panel B in Appendix Table A.2 shows that differences in the characteristics of married and cohabiting individuals decline after the exclusion of Blacks from the sample. Figure A.3 reports the child penalties in this restricted sample. We observe that child penalties increase for both married and cohabiting women but a substantial difference remains between the two groups. In particular, child penalties amount to 53 percent among married women, while among cohabiting they reach 44 percent and are less persistent. This is reassuring as the two groups in the restricted sample are much more similar in terms of socio-economic characteristics.

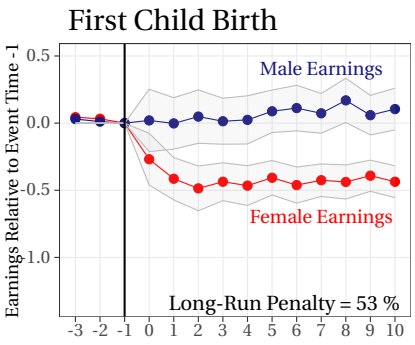
Table A.2: Summary statistics of the PSID sample used in the event studies

A. All			
	(1)	(2)	(3)
	Married at $t = 0$	Cohabiting at $t = 0$	Difference (1)-(2)
	mean (sd)	mean (sd)	coef (t-stat)
Age	27.776	23.346	4.431***
	(3.855)	(5.160)	(8.436)
Annual earnings	16190.258	6516.907	9673.352***
	(13457.315)	(10064.439)	(8.564)
Hourly wage	8.224	3.694	4.530***
	(6.055)	(5.163)	(8.033)
Employed (%)	0.867	0.467	0.400***
	(0.340)	(0.501)	(7.908)
College graduates (%)	0.658	0.364	0.293***
	(0.475)	(0.484)	(5.752)
Observations	550	107	657
B. Excluding Blacks			
	(1)	(2)	(3)
	Married at t=0	Cohabiting at t=0	Difference (1)-(2)
	mean (sd)	mean (sd)	coef (t-stat)
Age	27.847	25.800	2.047*
	(3.868)	(5.391)	(2.048)
Annual earnings	16768.070	13302.333	3465.737
	(13875.982)	(13270.419)	(1.384)
Hourly wage	8.411	7.467	0.944
	(6.168)	(6.738)	(0.748)
Employed (%)	0.868	0.733	0.135
	(0.339)	(0.450)	(1.612)
College graduates (%)	0.655	0.433	0.222*
	(0.476)	(0.504)	(2.345)
Observations	485	30	515

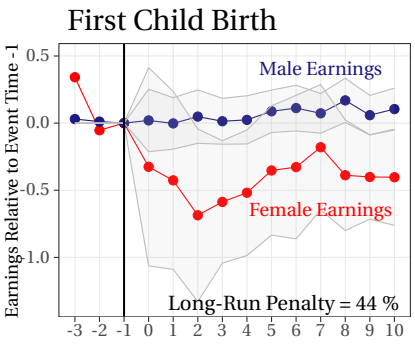
Notes: PSID data, 1976–2018. The table reports descriptive statistics of the sample used in the event studies. Column (1) shows the means and standard deviations for individuals who were married at childbirth, column (2) shows the means and standard deviations for individuals who were cohabiting at childbirth, and column (3) shows the differences between columns (1) and (2) and the associated t-test.

Figure A.3: Child Penalties - Robustness excluding Blacks

(a) Married Women at t=0



(b) Cohabiting Women at t=0



Notes: PSID data 1976–2018, excluding Black individuals. Percentage effects of parenthood on earnings across event time t. Long-run child penalties are defined as the average penalty from event time five to ten. Earnings are set to zero for non-working individuals. Earnings are defined as total labor income before taxes and transfers, including farm income, business income, wages, bonuses, overtime pay, commissions, as well as income from professional practice and roomers and boarders. We split women by marital status at first child birth in panels (a) and (b) and report their earnings relative to those of all men in the sample. Since reported earnings in the PSID refer to the year before the interview, we assign them to the previous year.

A.3 Time and Money Investments

A.3.1 Time Investments

To analyze time investments on children by marital status, we use 2003–2019 data from the American Time Use Survey (ATUS). Our sample contains women aged 25 to 44 in a couple who have at least one biological or adopted child aged 0 to 19 in the household.[27] Our analysis focuses on weekly hours dedicated to market work, children, non-market work, and leisure. Time spent with children is total time spent with them in the household as a primary activity, including activities such as reading and playing, helping with homework, and providing physical care.

We run linear regressions of weekly hours allocated to each time-use category on a binary indicator of cohabitation and a set of control variables. Since cohabitation status at first birth is not observed in the ATUS, we use current self-reported cohabitation status. Controls include age, education, race, number of children, age of youngest child, metropolitan area, state, and year fixed effects. Following Aguiar and Hurst (2007), we use sample weights adjusted for the days of the week when the time-use diaries were recorded.[28]

Table A.3 shows that, after adjusting for a range of demographic and geographic factors, cohabiting women allocate, on average, more than two additional hours per week to market work and nearly two fewer hours per week to children compared to married women. This difference in hours worked by marital status aligns with the observation that married women face higher earnings penalties than cohabiting women, as reported in Figure A.2. The reduced time spent with children by cohabiting mothers is driven by women whose youngest child is between the ages of 0 and 9 (see Table A.4).

When we analyze the data by mother's education level, the lower amount of time spent with children for cohabiting women is especially evident among college-educated mothers, who spend nearly 4 hours less per week on childcare. While we do not detect a statistically significant gap in other time-use categories, particularly in market work for these mothers,[29] the marked difference in childcare time suggests that married college-educated women invest more time in their children than cohabiting ones. While still significant, the gap between non-college-educated cohabiting and married mothers is

[27] We chose this age range since the model includes two developmental stages: younger children ages 0–9 and older children ages 10–19.

[28] Time use data are not representative of a normal week, since half of the 24-hour time-use diaries are recorded during weekends. The day weights take into account the fact that weekends only represent 2/7 of total weekly time.

[29] We omit time spent on education, medical care, government services, civic activities, helping and caring for non-household members, or sleep from our analysis.

Table A.3: Time Investments in Children by Mothers

	Dependent Variable: **Weekly Hours**			
	(1) Market Work	(2) Children	(3) Non-market Work	(4) Leisure
	A. All Mothers			
Cohabiting (rel. to Married)	2.05***	−1.71***	−1.40***	1.68***
	(0.76)	(0.35)	(0.48)	(0.52)
Mean hours	18.14	13.86	25.29	41.63
Observations	21,202	21,202	21,202	21,202
	B. College-educated Mothers			
Cohabiting (rel. to Married)	1.14	−3.91***	−0.25	1.64
	(1.75)	(0.80)	(0.99)	(1.13)
Mean hours	19.45	16.11	23.70	40.96
Observations	10,011	10,011	10,011	10,011
	C. Non-college-educated Mothers			
Cohabiting (rel. to Married)	2.42***	−1.34***	−1.66***	1.55**
	(0.86)	(0.39)	(0.58)	(0.62)
Mean hours	16.97	11.84	26.71	42.23
Observations	11,191	11,191	11,191	11,191

Notes: ATUS data, 2003–2019. Time is measured in weekly hours. Sample: Women aged 25–44 with at least one own child aged 0-19 in the household. Additional controls: college dummy, age, age^2, age^3, number of children, age of the youngest child, race, metropolitan area, state, and year fixed effects. Sample weights are adjusted for the day of the week when the time-use diary was recorded. *p<.10; **p<.05; ***p<.01.

much smaller, with cohabiting women investing 1.34 fewer hours in children per week. Importantly, fathers do not compensate for the gaps in childcare time between cohabiting and married mothers. Table A.5 shows no significant differences regarding childcare time between cohabiting and married men.

The average gap between married and cohabiting mothers in our data (1.7 hours) is 40 percent of the average gap in time spent with children between college- and non-college-educated mothers (4.3 hours). Previous studies find similarly sized gaps by education. For instance, Guryan et al. (2008) find, similar to us, that college-educated mothers spend about 4.5 more hours per week with children than those with a high school diploma or less.[30] Given that over 80 percent of cohabiting couples are non-college-educated, differences in childcare time by parental education may, in part, reflect differences in parental marital arrangements.

[30]Using the Multinational Time Use Study, Dotti Sani and Treas (2016) find that in 2004, non-college-educated mothers and fathers in the US invested about 60 percent of the time that college-educated parents invested. In our sample, the time investment gradient for fathers is roughly the same, but non-college-educated mothers' time investments are about 74 percent of those of college-educated mothers.

Table A.4: Time Investments in Children 0–9

	Dependent Variable: **Weekly Hours**			
	(1) Market Work	(2) Childcare	(3) Non-market Work	(4) Leisure
	A. All Mothers			
Cohabiting (rel. to Married)	2.11**	−1.80***	−1.39***	1.76***
	(0.83)	(0.41)	(0.52)	(0.58)
Mean hours	17.21	16.05	25.09	40.70
Observations	17,058	17,058	17,058	17,058
	B. College-educated Mothers			
Cohabiting (rel. to Married)	1.20	−4.49***	0.78	1.82
	(1.92)	(0.93)	(1.08)	(1.24)
Mean hours	18.76	17.91	23.47	40.27
Observations	8,535	8,535	8,535	8,535
	C. Non-college-educated Mothers			
Cohabiting (rel. to Married)	2.64***	−1.47***	−1.92***	1.63**
	(0.93)	(0.48)	(0.64)	(0.69)
Mean hours	15.65	14.18	26.71	41.14
Observations	8,523	8,523	8,523	8,523

Notes: ATUS data, 2003–2019. Time is measured in weekly hours. Sample: Women aged 25–44 with at least one own child aged 0–9 in the household. Additional controls: college dummy, age, age^2, age^3, number of children, age of the youngest child, race, metropolitan area, state, and year fixed effects. Sample weights are adjusted for the day of the week when the time-use diary was recorded.

A.3.2 Money Investments

We investigate whether married couples also make higher monetary investments using 2003–2019 data from the Consumer Expenditure Survey (CEX). The relationship between marital status and monetary investments in children is estimated by regressing couples' annual expenditures on children on a binary indicator of cohabitation.[31]

Since skill development of children is multidimensional (Attanasio et al., 2020a), and depends on the quality of childcare (Walters, 2015), schooling (Agostinelli et al., 2020), nutrition (Maluccio et al., 2009), and health (Case et al., 2002, 2005), we develop a comprehensive measure of expenditures on offspring, including components of household expenditures, to approximate total annual child-rearing expenses. The CEX collects child-specific expenditure data (clothing, childcare, education), while other budgetary components are reported at the household level (housing, food, health care, and transportation). We allocate a share of these components to monetary expenditures on children following Lino et al. (2017) (see A.3.3 for details).

Given the different material needs of younger versus older children, the relationship

[31] As marital status at first birth is not available in the CEX, we use current cohabitation status as in the analysis with the ATUS data.

Table A.5: Time Investments in Children by Fathers

	Dependent Variable: **Weekly Hours**			
	(1) Market Work	(2) Childcare	(3) Non-market Work	(4) Leisure
	A. All Fathers			
Cohabiting (rel. to Married)	−5.82***	0.14	1.44***	2.82***
	(1.01)	(0.31)	(0.50)	(0.66)
Mean hours	33.79	8.28	16.06	44.69
Observations	17,593	17,593	17,593	17,593
	B. College-educated Fathers			
Cohabiting (rel. to Married)	−1.84	−0.28	0.70	1.87
	(2.54)	(0.83)	(1.18)	(1.58)
Mean hours	33.77	10.29	15.61	43.65
Observations	7,610	7,610	7,610	7,610
	C. Non-college-educated Fathers			
Cohabiting (rel. to Married)	−6.39***	0.19	1.52**	2.89***
	(1.16)	(0.35)	(0.59)	(0.78)
Mean hours	33.81	6.74	16.40	45.48
Observations	9,983	9,983	9,983	9,983

Notes: ATUS data, 2003–2019. Time is measured in weekly hours. Sample: Men aged 25–44 with at least one own child aged 0–19 in the household. Additional controls: college dummy, age, age^2, age^3, number of children, age of the youngest child, race, metropolitan area, state, and year fixed effects. Sample weights are adjusted for the day of the week when the time-use diary was recorded.

between cohabitation status and expenditures on children is estimated separately for couples whose youngest child is between 0–11 years of age and those whose youngest is between the ages of 12–17. In addition to state and year fixed effects, we control for education and age of the household head and spouse, number of children in the household and their age category, and race of the household head. The results presented in Table A.6 indicate that married couples indeed spend more money on their children compared to cohabiting couples. Among couples whose youngest child is between the ages of 0 and 11, cohabiting couples spend approximately $2,300 less per year than married couples. Among couples whose youngest child is between the ages of 12 and 17, cohabiting couples spend about $1,000 less per year. This corresponds to a reduction in annual expenditures of 22 percent for young children and 12 percent for older ones compared to the respective children of married couples. Table A.7 documents the significant negative effect of cohabitation on children's educational expenditures, which is particularly strong for non-college-educated couples. We also observe negative effects for college-educated cohabiting couples, though they are not statistically significant.

Table A.6: Monetary Investments in Children

	Dependent Variable: **Annual Expenditures**		
	(1) Children Aged 0-17	(2) Children Aged 0-11	(3) Children Aged 12-17
		A. All Families	
Cohabiting (rel. to Married)	−1836.48***	−2306.58***	−1043.63***
	(332.78)	(469.49)	(402.93)
Mean expenditures	9647.82	10455.56	8116.85
Observations	11,431	7,483	3,948
		B. College-educated Heads	
Cohabiting (rel. to Married)	−1255.45	−2479.16*	2034.77
	(1154.56)	(1474.05)	(1608.85)
Mean expenditures	13,046.76	13,679.37	10,920.76
Observations	4,304	3,317	987
		C. Non-college-educated Heads	
Cohabiting (rel. to Married)	−1769.28***	−2013.12***	−1335.77***
	(270.63)	(377.93)	(376.55)
Mean expenditures	7595.20	7888.74	7182.22
Observations	7,127	4,166	2,961

Notes: CEX data, 2003–2019. The sample is restricted to couples 25-44 years old with children. Additional controls: household head college, partner college, household head age, household head age^2, household head age^3, partner age, number of children, child age categories, household head race, and state and year fixed effects. We apply sample weights. The CEX does not report the age of the youngest child, but groups children into pre-defined age categories. We chose the age categories closest to the age split used in the ATUS data and that correspond to the development stages in our model. *p<.10; **p<.05; ***p<.01.

A.3.3 Definition of Child Expenditures in the CEX

We follow Lino et al. (2017) to construct a comprehensive measure of expenditures on children. To do so, we combine expenditures that can be directly assigned to children (child goods, childcare, education) and some household-level expenditures of which we assign a share to our measure of child expenditures (housing, food, transport, and health). We calculate child-specific expenditures by averaging across the number of children in the household and multiplying by two. Food, health care, and transportation expenses are allocated based on children's budget shares as reported in Lino et al. (2017). We assign 20 percent of these household expenditures to child expenditures.

Table A.8: CEX 2003-19 UCC codes

Expenditure Type	**Universal Classification Codes (UCCs)**

1. Children's Goods	290420 320130 370110 370120 370130 370125 370211 370212 370213 370220 370311 370312 370313 370901 370902 370903 370904 390110 390120 390210 390221 390222 390230 390310 390321 390322 390901 390902 400210 400220 410110 410120 410130 410140 410901 600310 610110 610120 610130 620904 690111 690112 690113
2. Childcare and Related Expenditures	340210 340211 340212 660900 660901 670310 790430
3. Education of School-age Children	190901 210310 530902 660210 660310 660410 660902 670210 670410 670902 670903 790430
4. Housing	210110 210901 210902 220111 220112 220121 220122 220211 220212 220311 220312 220901 220902 350110 800710 230117 230118 230141 230142 250111 250112 250113 250114 250211 250212 250213 250214 250221 250222 250223 250224 250901 250902 250903 250904 250911 250912 250913 250914 260111 260112 260113 260114 260211 260212 260213 260214 270211 270212 270213 270214 270411 270412 270413 270414 270901 270902 270903 270904 280110 280130 280140 280210 280220 280230 280900 290120 290210 290310 290320 290410 290430 290440 300111 300112 300211 300212 300216 300217 300221 300222 300311 300312 300321 300322 300331 300332 300411 300412 320110 320111 320120 320210 320220 320221 320231 320233 320310 320320 320330 320340 320345 320350 320360 320370 320420 320511 320512 320521 320522 320902 320903 320904 340310 340420 340510 340520 340530 340620 340630 340901 340903 340904 340907 340908 420110 420115 420120 440110 440120 440130 440150 440210 440900 690220 690230 690244 690245 790210 790230 990900 230112 230113 230114 230115 230121 230122 230123 230131 230132 230133 230134 230150 230151 230152 230901 230902 240111 240112 240113 240121 240122 240123 240211 240212 240213 240214 240221 240222 240223 240311 240312 240313 240321 240322 240323 320181 320182 320183 320410 320611 320612 320613 320621 320622 320623 320624 320625 320626 320631 320632 320633 330511 340410 340911 340912 340914 340915 690241 690242 690243 790690 990920 990930 990940 990950
5. Food	220313 220314

6. Transportation	450311 450411 470111 470112 470113 470211 470212 470220 470311 480110 480212 480213 480214 480215 480216 490110 490211 490212 490221 490231 490232 490300 490311 490312 490313 490314 490318 490319 490411 490412 490413 490501 490502 490900 500110 520110 520111 520112 520310 520410 520511 520512 520516 520517 520521 520522 520531 520532 520541 520542 520550 520560 520902 520905 530110 530210 530311 530312 530411 530412 530510 530901 620113 620114 620921 510110 510901 510902 600142 850300 870101 870102 870103 870104 870201 870202 870203 870204 870301 870302 870303 870304 870801 870802 870804 950024 450350 450351 450353 450354
7. Health	540000 550110 550320 550330 550340 560110 560210 560310 560330 560400 560410 560420 570110 570111 570210 570230 570240 570901 570903 580111 580112 580113 580114 580115 580116 580311 580312 580400 580401 580402 580411 580412 580421 580422 580431 580432 580441 580442 580901 580903 580904 580905 580906 580907 580908 580909 580910 640430

Notes: UCCs change across survey waves. In every quarter, some UCCs might be discontinued while new ones might be added to the survey. In addition, new UCCs might not be represented in all quarters. This table reports the UCCs for all survey waves combined.

A.4 Alimony Reforms

We consider alimony reforms in eight states (see Figure A.4) that either reduced the maximum amount of alimony that has to be paid or the duration of alimony or a combination of the two. We exclude Texas as it is the only state that expanded rather than reduced previous caps on alimony payments and their duration. Table A.9 provides a short overview of the year in which alimony rules were reformed and details about the implemented legal change. Fernández-Kranz and Roff (2021) provide a more in-depth background about these reforms in their Appendix A.

We conduct a set of placebo exercises to exclude the possibility that the estimated effects of alimony reforms are driven by time trends. More specifically, we assume that alimony reforms took place four, five, six, or seven years earlier than the actual ones and re-estimate the effects on mothers' time spent with children. Tables A.13 and A.14 present the results. None of the coefficients of the placebo exercises are statistically significant. Moreover, those associated with childcare have the opposite sign of the benchmark estimates (positive instead of negative). Therefore, it is unlikely that pre-trends pose a threat to our identification strategy.

Table A.7: Monetary Education Investments in Children

	Dependent Variable: **Annual Education Expenditures**		
	(1) Children Aged 0-17	(2) Children Aged 0-11	(3) Children Aged 12-17
	A. All Families		
Cohabiting (rel. to Married)	−121.64*	−98.81	−154.92
	(68.00)	(86.78)	(109.75)
Mean expenditures	420.12	365.77	523.12
Observations	11,431	7,483	3,948
	B. College-educated Heads		
Cohabiting (rel. to Married)	−237.82	−225.58	−202.86
	(258.14)	(296.32)	(544.98)
Mean expenditures	637.05	549.15	932.49
Observations	4,304	3,317	987
	C. Non-college-educated Heads		
Cohabiting (rel. to Married)	−106.07**	−72.23	−166.90**
	(46.46)	(56.51)	(79.12)
Mean expenditures	289.11	219.77	386.67
Observations	7,127	4,166	2,961

Notes: CEX data, 2003–2019. The sample is restricted to couples 25-44 years old with children. Additional controls: household head college, partner college, head's age, head's age^2, head's age^3, partner's age, number of children, child age categories, head's race, and state and year fixed effects. We apply sample weights. The CEX does not report the age of the youngest child, but groups children into predefined age groups. We choose age groups that are closest to the age split used in the ATUS data and that correspond to the development stages in our model.

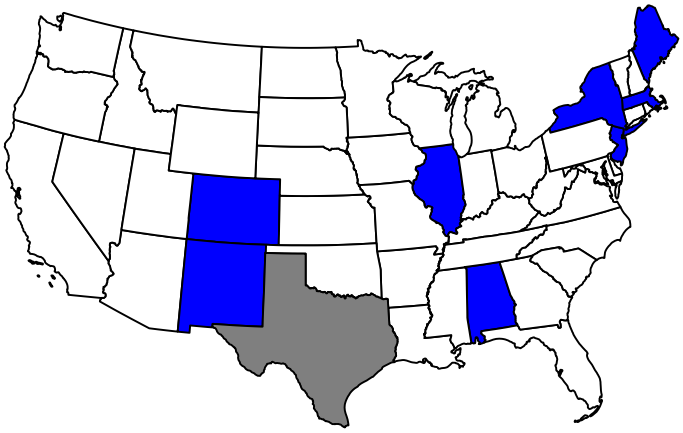
A.5 College Completion Probabilities

Although Add Health contains no information on parental wealth, it does provide rich information about schools.[32] This allows us to control for school quality by including school fixed effects. As school quality is likely to affect college completion, it is worth checking whether the positive coefficient associated with parental marriage is robust to the inclusion of more granular fixed effects. We use information from the in-home surveys in Wave I and Wave IV. The Wave I survey took place in 1994 while children were in high school and also includes demographic information about the child (gender, age, race). The Wave IV survey took place in 2008 and allows us to observe the long-run educational outcomes of these children, including whether they completed college.

In Wave I, a parent, who in the vast majority of cases was the mother, filled in a detailed questionnaire. In this way, we can obtain information not only about her educational attainment and current marital status but also about her history of romantic relationships in the previous 18 years. The latter can serve as a measure of family in-

[32] Due to these features of the Add Health dataset, we are unable to verify the role of parental wealth in college completion and to conduct a separate analysis by CLM/no CLM States.

Figure A.4: Map of Alimony Reform States



Notes: States in blue have reduced alimony since 2006. Texas increased alimony in 2018 and is dropped from the sample.

Table A.9: Overview of Alimony Reforms

Year of Reform	State	Legal Change
2006	New Mexico	released new guidelines on alimony payments
2012	Massachusetts	limited permanent alimony and implemented new caps on maximum payments
2013	Maine	termination of alimony became easier
2014	Colorado	capped maximum amount of alimony paid
2014	New Jersey	limited length of time during which alimony can be awarded
2015	Illinois	capped maximum amount of alimony paid
2016	New York	limited length of time and capped maximum alimony that can be awarded
2018	Alabama	limited length of time during which alimony can be awarded
2011	Texas	expanded previous caps on alimony amount and duration

stability, which is known to hinder child outcomes (Aiyagari et al., 2000; Tartari, 2015). Similar to the PSID, there is also information on household income. By controlling for family instability, we are able to understand whether the decrease in the probability of college completion among children of cohabiting parents is merely capturing the effect of growing up in non-intact families.

We first run a linear probability model of college completion in the spirit of the benchmark regression in column 1 of Table 3.[33] The main regressors are whether the mother was married or cohabiting when the child was attending high school and whether the mother was college-educated. We stick to the benchmark controls of the PSID re-

[33]Since we can include school fixed effects with Add Health, we use a linear probability model instead of a logistic regression to avoid the incidental parameter problem.

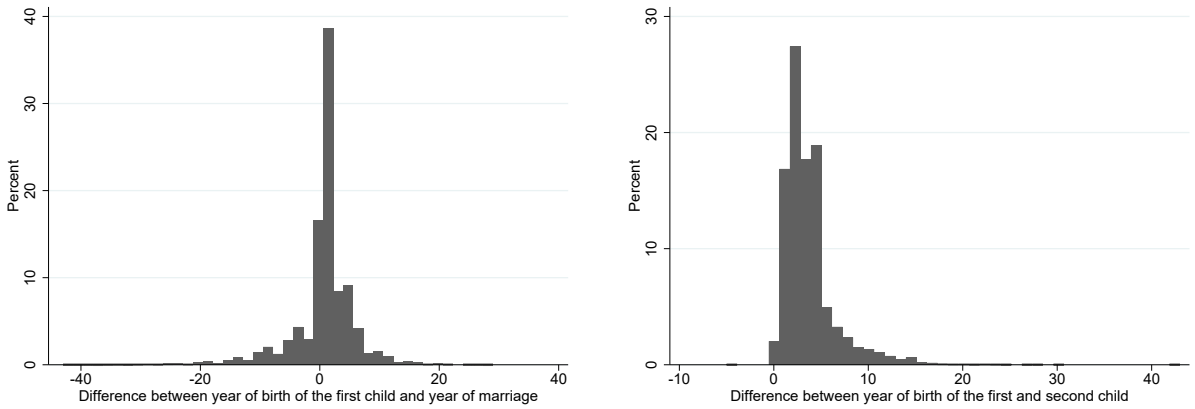


Figure A.5: Intervals between year of marriage, year of birth of first child and year of birth of second child

Note: Authors' calculations on PSID Childbirth and Adoption History and Marital History files.

gression (gender, age, race, and household income) and include state fixed effects. Table A.15, column 1 reports the results. The coefficient of growing up with married parents is positive and statistically significant and remarkably similar in size to that of the benchmark regression. The coefficient of college-educated mother also resembles that of college-educated household head in the benchmark specification.

Given that the two datasets produce very similar results, we can exploit the richness of the Add Health data and conduct some robustness checks. In Table A.15, column 2, we include school instead of state fixed effects. Both coefficients of interest decrease somewhat in size but remain positive and statistically significant. In Column 3, we include a measure of family instability as an additional control, i.e., the number of romantic relationships of the mother since her child was born. On the one hand, the coefficient of family instability is negative and statistically significant, as expected. On the other hand, the coefficient of growing up with married parents decreases in size but remains positive and statistically significant. This result suggests that the negative association between parental cohabitation and child outcomes goes beyond parental separation. To shed light on the underlying mechanism, in Column 4 we include GPA as an additional regressor.[34] The coefficient of growing up with married parents is not statistically significant anymore, while GPA has a strong positive effect on college completion. This suggests that marriage allows parents to invest in their children while at school, leading to an improved GPA and, consequently, a higher probability of completing college.

Our empirical findings based on multiple different datasets imply that parents' marital arrangements and assets are almost as important as their education in determining

[34] GPA is reported in Wave I and is the grade point average in English, math, history, and science.

Table A.10: Alimony Reforms - Mothers' Childcare Time

	Dependent Variable: **Weekly Hours**			
	(1) Market Work	(2) Childcare	(3) Non-market Work	(4) Leisure
A. All Mothers				
A.1 Children 0–9				
Years since reform	1.17***	−0.41***	−0.02	−0.60*
	(0.43)	(0.15)	(0.25)	(0.33)
Mean hours	17.15	16.26	25.14	40.61
Observations	13,663	13,663	13,663	13,663
A.2 Children 10–19				
Years since reform	1.33*	−0.42**	−0.87*	−0.53
	(0.79)	(0.20)	(0.48)	(0.51)
Mean hours	22.61	4.95	26.23	45.03
Observations	3,047	3,047	3,047	3,047
B. College-educated Mothers				
B.1 Children 0–9				
Years since reform	1.03*	−0.40*	−0.18	−0.22
	(0.52)	(0.21)	(0.25)	(0.37)
Mean hours	18.63	17.98	23.63	40.17
Observations	7,116	7,116	7,116	7,116
B.2 Children 10–19				
Years since reform	2.30*	−0.86**	−1.64**	−0.12
	(1.27)	(0.35)	(0.73)	(0.49)
Mean hours	24.27	5.72	24.90	44.69
Observations	1,088	1,088	1,088	1,088
C. Non-college-educated Mothers				
C.1 Children 0–9				
Years since reform	1.30**	−0.31	0.28	−0.99*
	(0.55)	(0.41)	(0.59)	(0.53)
Mean hours	15.54	14.38	26.78	41.09
Observations	6,547	6,547	6,547	6,547
C.2 Children 10–19				
Years since reform	0.21	−0.10	−0.04	−0.84
	(1.22)	(0.23)	(0.80)	(1.00)
Mean hours	21.69	4.52	26.96	45.23
Observations	1,959	1,959	1,959	1,959

Notes: ATUS data, 2003–2019. Time is measured in weekly hours. Sample: Women aged 25–44 with at least one child aged 0–19, who got married before the alimony reforms took place. Additional controls: college, age, age^2, number of children, age of youngest child, race, weekend time-use diary, metropolitan area, year and state fixed effects. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01.

Table A.11: Alimony Reforms - Mothers' Childcare Time

	Dependent Variable: **Weekly Hours**		
	(1) Childcare Total	(2) Childcare Physical	(3) Childcare Human Capital
	A. All Mothers		
Years since reform	-0.50^{***}	-0.21^{**}	-0.28^{***}
	(0.15)	(0.11)	(0.07)
Mean hours	14.20	7.17	6.09
Observations	16,711	16,711	16,711
	B. College-educated Mothers		
Years since reform	-0.55^{***}	-0.32^{***}	-0.20^{*}
	(0.18)	(0.12)	(0.10)
Mean hours	16.36	8.32	7.06
Observations	8,204	8,204	8,204
	C. Non-college-educated Mothers		
Years since reform	-0.29	-0.02	-0.27
	(0.30)	(0.19)	(0.19)
Mean hours	12.11	6.05	5.16
Observations	8,506	8,506	8,506

Notes: ATUS data, 2003–2019. Time is measured in weekly hours. Sample: Women aged 25–44 with at least one child aged 0–19, who married before the alimony reform was implemented. Controls: college, age, age^2, number of children, age of youngest child, race, weekend time-use diary, metropolitan area, year and state fixed effects. Sample weights are adjusted for the day of the week when the time-use diary was recorded. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01.

child outcomes.

B Model Appendix

In this appendix, we provide the explicit definitions of the individual-level value functions in stages 2–4.

Couples of older children Given the couple's optimal decision rules, the value of being a mother of older children with marital status $s \in \{M, C\}$ is given by

$$\tilde{V}_2^{s,f}(a,k;e) = u(\hat{c}_f) + \beta(1-\eta_2)\Big\{p^s \tilde{S}_2^{s,f}((1-\alpha^s)\hat{a}', \hat{k}'; e) + (1-p^s)\tilde{V}_2^{s,f}(\hat{a}', \hat{k}'; e)\Big\}$$
$$+ \beta\eta_2\Big\{p^s \tilde{Y}^f((1-\alpha^s)\hat{a}', \hat{k}'; e) + (1-p^s)\tilde{W}^f(\hat{a}', \hat{k}'; e)\Big\},$$

Table A.12: Alimony Reforms - Fathers' Time Investments

	Dependent Variable: **Weekly Hours**			
	(1) Market Work	(2) Childcare	(3) Non-market Work	(4) Leisure
	A. All Fathers			
Years since reform	−0.42	0.10	−0.21	0.15
	(0.35)	(0.21)	(0.29)	(0.34)
Mean hours	33.74	8.51	16.07	44.63
Observations	13,683	13,683	13,683	13,683
	B. College-educated Fathers			
Years since reform	0.24	−0.06	0.15	−0.58
	(0.94)	(0.17)	(0.38)	(0.43)
Mean hours	33.85	10.45	15.53	43.57
Observations	6,116	6,116	6,116	6,116
	C. Non-college-educated Fathers			
Years since reform	−0.84	0.22	−0.47	0.60
	(0.59)	(0.29)	(0.30)	(0.52)
Mean hours	33.65	6.95	16.50	45.49
Observations	7,567	7,567	7,567	7,567

Notes: ATUS data, 2003–2019. Time is measured in weekly hours. Sample: Men aged 25–44 with at least one child aged 0–19, who got married before the alimony reforms took place. Additional controls: college, age, age^2, number of children, age of youngest child, race, weekend time-use diary, metropolitan area, year and state fixed effects. Sample weights are adjusted for the day when the time-use diary was recorded. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01.

and the value of being a father is given by

$$\tilde{V}_2^{s,m}(a,k;e) = u(\hat{c}_m) + \beta(1-\eta_2)\Big\{p^s \tilde{S}_2^{s,m}(\alpha^s \hat{a}'; (1-\alpha^s)\hat{a}', \hat{k}', e) + (1-p^s)\tilde{V}_2^{s,m}(\hat{a}', \hat{k}'; e)\Big\}$$
$$+ \beta\eta_2\Big\{p^s \tilde{Y}^m(\alpha^s \hat{a}'; (1-\alpha^s)\hat{a}', \hat{k}', e) + (1-p^s)\tilde{W}^m(\hat{a}', \hat{k}'; e)\Big\},$$

where

$$\tilde{W}^g(a,k;e) = \begin{cases} \tilde{V}_3^g(a-\kappa^e; e) + \beta^K \tilde{V}_{col}^{kid}(k), & \text{if college,} \\ \tilde{V}_3^g(a; e) + \beta^K \tilde{V}_{ncol}^{kid}, & \text{if non-college,} \end{cases}$$

for $g \in \{f, m\}$ is the expected value of each spouse at the end of stage 2, just before the decision to send children to college or not is made.

Table A.13: Alimony Reforms - Time Investments - Placebo Exercises

	Dependent Variable: **Weekly Hours**			
	(1) Market Work	(2) Childcare	(3) Non-market Work	(4) Leisure
Years since placebo reform (4 years before actual)	0.38**	−0.14	−0.11	−0.16
	(0.15)	(0.14)	(0.08)	(0.15)
Years since placebo reform (5 years before actual)	0.30**	−0.11	−0.09	−0.13
	(0.14)	(0.13)	(0.07)	(0.14)
Years since placebo reform (6 years before actual)	0.23*	−0.08	−0.07	−0.10
	(0.13)	(0.12)	(0.07)	(0.12)
Years since placebo reform (7 years before actual)	0.18	−0.06	−0.06	−0.07
	(0.12)	(0.12)	(0.06)	(0.11)
Mean hours	18.14	14.20	25.34	41.42
Observations	16,711	16,711	16,711	16,711

Notes: ATUS data, 2003–2019. Time is measured in weekly hours. Sample: Women aged 25-44 with at least one child aged 0-19, who got married before the alimony reforms took place. Additional controls: college, age, age^2, number of children, age of youngest child, race, metropolitan area, year and state fixed effects. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01. We use sample weights, adjusted for the day of the week when the time-use diary was recorded.

Table A.14: Alimony Reforms - Money Investments in Children's Education - Placebo exercises

	Dependent Variable: **Annual Educational Expenditures**		
	(1) Children Age 0-17	(2) Children Age 0-11	(3) Children Age 12-17
Years since placebo reform (4 years before actual)	−20.60	−19.98	−23.83
	(13.18)	(13.81)	(20.92)
Years since placebo reform (5 years before actual)	−18.12	−17.15	−21.84
	(11.98)	(12.54)	(18.31)
Years since placebo reform (6 years before actual)	−16.57	−14.80	−21.94
	(11.08)	(11.58)	(16.38)
Years since placebo reform (7 years before actual)	−14.97	−13.18	−19.60
	(9.82)	(10.53)	(14.30)
Mean hours	439.95	384.31	548.49
Observations	10,088	6,664	3,421

Notes: CEX data, 2003–2019. The sample is restricted to couples ages 25–44 with children. The regressions include the following controls: college, age, age squared, number of children, age of youngest child, race, metropolitan area, year and state fixed effects. We apply sample weights. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01.

Middle-aged couples The value of being a middle-aged spouse with gender $g \in \{f, m\}$ is given by

$$\tilde{V}_3^g(a; e) = u(\hat{c}_g) + \beta(1 - \eta_3)\tilde{V}_3^g(\hat{a}'; e) + \beta\eta_3\tilde{V}_4^g(\hat{a}'; e).$$

Table A.15: Parental Marital Status and Child Development - Couples Only

	(College Completion)$_{\text{age } 26-32}$				
	(1)	(2)	(3)	(4)	(5)
(Mother married)$_{age13-19}$	0.16***	0.13***	0.06**	0.06*	0.03
	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
(GPA)$_{age13-19}$					0.25***
					(0.01)
(Mother college grad)$_{age13-19}$	0.24***	0.21***	0.21***	0.20***	0.14***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Nb. Relationships			x	x	x
Presence biological father				x	x
Fixed Effects	State	School	School	School	School
N	5,160	5,177	5,154	5,081	5,081
adj. R^2	0.16	0.22	0.22	0.23	0.35

Notes: Add Health Data, Waves I and IV. Standard errors in parenthesis clustered at the school level, survey weights used. 'College Compl.' is a dummy=1 if the child completed college or more by Wave IV (average age 30); 'Mother Married' is a dummy=1 if the mother was married (without previous cohabitation history) when the child was attending high school (Wave I) and 0 if cohabiting; 'Nb. Relationships' is the number of romantic relationships of the mother in the last 18 years; 'Biol. Father Present' is a dummy=1 if the father was a co-resident household member when the child was attending high school (Wave I) and 0 otherwise; 'GPA' is the grade point average in English, math, history, and science. Additional controls: gender, age, race, and household income.

The continuation value captures the possibilities of transitioning to retirement or staying in middle age.

Retired couples The value of being a retired spouse with gender $g \in \{f, m\}$ is given by

$$\tilde{V}_4^g(a; e) = u(\hat{c}_g) + \beta(1 - \eta_4)\tilde{V}_4^g(\hat{a}'; e).$$

Note that retired households die with probability η_4, in which case utility is normalized to zero.

C Calibration Appendix

C.1 Parental Wages, Retirement Benefits, and Childcare Costs

In the model, men always work one unit of time, while women split their time between market work and children. To calibrate men's earnings, $w^e_{t,m}$, and women's wages, $w^e_{t,f}$, in each stage $t \in \{1, 2, 3\}$ we use 2003–2019 CPS-ASEC data. Annual earnings are converted into 2017 USD using the PCE index and the sample is restricted to individuals who work at least ten hours per week and more than four weeks per year. For each education

Table C.1: Exogenously Set Parameters

Parameter	Description	Value	Source
A. Preferences			
β	Discount factor	0.960	
γ	Risk aversion	2.000	
θ^m	Weight on male in household utility	0.500	Equal weights assumed
θ^f	Weight on female in household utility	0.500	Equal weights assumed
B. Parental Wages			
$w_{t,m}^{ncol}$	Non-college men $t = \{1,2,3,4\}$	{0.4041,0.4956,0.5248,0.48735}	CPS ASEC 2003-2019
$w_{t,m}^{col}$	College men $t = \{1,2,3,4\}$	{0.7485, 1.0370, 1.1072, 1.0000}	CPS ASEC 2003-2019
$w_{t,f}^{ncol}$	Non-college women $t = \{1,2,3,4\}$	{0.3221,0.3950,0.4183,0.3884}	CPS ASEC 2003-2019
$w_{t,f}^{col}$	College women $t = \{1,2,3,4\}$	{0.6640,0.9199,0.9822,0.8871}	CPS ASEC 2003-2019
λ	Childcare costs	0.062	CPS CSS 2003-2018
υ_1	Extra work time college women stage 1	0.455	ATUS 2003-2019
υ_2	Extra work time college women stage 2	0.000	ATUS 2003-2019
C. Marriage versus Cohabitation			
p^s	Separation probability $s = \{M, C\}$	{0.0247,0.0688}	NFSG 2011-2019
α^s	Asset split $s = \{M, C\}$	{0.50,0.65}	CPS ASEC 2003-2019
$\iota^{s,e}$	Child support $\{ncolM, ncolC, colM, colC\}$	{0.0532,0.0451,0.0855,0.0833}	CPS CSS 2003-2019
D. Other Parameters			
k_0	Innate human capital	0.4341	PSID CDS 2002, 2007, 2014
b	Replacement rate in retirement	0.352	OECD (2015)
r	Real interest rate	0.042	$1/\beta - 1$, where $\beta = 0.960$
ζ	Returns to scale in consumption	1.753	Daley et al. (2019)
η_t	Aging probabilities stage $t = \{1,2,3,4\}$	$\{0.1, 0.1, 0.05, 0.05\}$	Stage length in years $\{10, 10, 20, 20\}$

Notes: Parameters set exogenously based on data estimates or external sources.

group, men's earnings profiles reflect the corresponding average earnings profiles in the data. Stage 1 corresponds to men aged 25–34, stage 2 corresponds to men aged 35–44, and stage 3 corresponds to men aged 45–64. For instance, earnings of college-educated men in stage 1 are set to the average earnings of college-educated men ages 25–34 in the data. To calibrate women's wages in the model, we multiply men's earnings by the average hourly wage gap between men and women in our CPS-ASEC sample. Hourly wages are constructed by taking annual earnings and dividing them by weeks worked per year times usual hours worked per week. Non-college women's average wage is 79.7 percent of non-college men's. College women's average wage is 88.7 percent of college men's.

For each education group, annual retirement benefits are a constant fraction, b, of their average annual earnings over ages 25–64, $w_{4,g}^e$. For this calculation women are assumed to work one unit of time to capture spousal benefits in a simple way. Based on OECD (2015) data, annual retirement benefits are 35.2 percent of annual earnings ($b = 0.352$). Earnings and wages are normalized by dividing them by the average earnings of college-educated men (USD 106,931). The resulting earnings and wage profiles are reported in Appendix Table C.1.

Parents have to pay for childcare when children are young and the mother is work-

Table C.2: Parameters for Children's Human Capital, College Choice, and Marriage

Parameter	Value	Description	Target	Source
A. Child Human Capital Accumulation in Stage 1				
Inner CES nest in stage 1				
$\bar{\tau}_{f,1}$	0.537	Time normalization	—	ATUS 2003–2019
$\bar{d}_1$	0.093	Money normalization	—	CEX 2003–2019
π_1^0	1.225	TFP of $x_1(\tau_f, d)$	Avg. time investment stage 1	ATUS 2003-2019, PSID CDS
π_1^1	0.850	Weight on τ_f	Avg. money investment stage 1	ATUS 2003-2019, CEX 2003-2019
π_1^2	-3.000	Elasticity b/w τ_f and d	—	Caucutt et al. (2023), Abbott (2022), Molnar (2024)
Outer CES nest in stage 1				
$\bar{k}_1$	0.761	Human capital normalization	—	PSID CDS
ψ_1^0	1.000	TFP on human capital k	—	Fuchs-Schündeln et al. (2022)
ψ_1^1	0.100	Weight on current k	Avg. HC child stage 1	PSID CDS
ψ_1^2	0.000	Elasticity b/w k and $x_1(\tau_f, d)$	—	Fuchs-Schündeln et al. (2022)
B. Child Human Capital Accumulation in Stage 2				
Inner CES nest in stage 2				
$\bar{\tau}_{f,2}$	0.176	Time normalization	—	ATUS 2003–2019
$\bar{d}_2$	0.103	Money normalization	—	CEX 2003–2019
π_2^0	1.170	TFP of $x_2(\tau_f, d)$	Avg. time investment stage 2	ATUS 2003-2019, PSID CDS
π_2^1	0.250	Weight on τ_f	Avg. money investment stage 2	ATUS 2003–2019, CEX 2003–2019
π_2^2	1.000	Elasticity b/w τ_f and d	—	Agostinelli and Sorrenti (2022)
Outer CES nest in stage 2				
$\bar{k}_2$	1.021	Avg. human capital	—	PSID CDS
ψ_2^0	1.000	TFP on human capital k	—	Fuchs-Schündeln et al. (2022)
ψ_2^1	0.750	Weight on current k	Avg. HC child stage 2	PSID CDS
ψ_2^2	0.000	Elasticity k and $x_2(\tau_f, d)$	—	Fuchs-Schündeln et al. (2022)
C. College Attendance, College Completion, and College Costs				
College Attendance				
ξ	9.750	Parental college preference	% ncol attending	PSID CDS-TAS
β^K	1.810	Altruism parameter	% col attending	PSID CDS-TAS
College Completion				
χ_0	1.910	Midpoint Logistic Function	% ncol graduating	PSID CDS-TAS
χ_1	9.050	Slope Logistic Function	% col graduating	PSID CDS-TAS
χ_2	1.000	Maximum Probability	—	Blandin and Herrington (2020)
College Cost				
κ^{ncol}	1.123	Cost paid by ncol parents	—	Marto and Wittman (2024)
κ^{col}	1.355	Cost paid by col parents	—	Marto and Wittman (2024)
D. Marriage				
σ_ω^2	3.580	Variance preference shock	Cohabitation rate	CPS ASEC 2003-2019

Notes: The table displays a combination of exogenously determined and internally calibrated parameters. Exogenous parameters include a source, but do not report a model and data moment and no target is defined. Internally calibrated parameters, in contrast, report model and data moments as well as the target chosen to identify the value of the parameter.

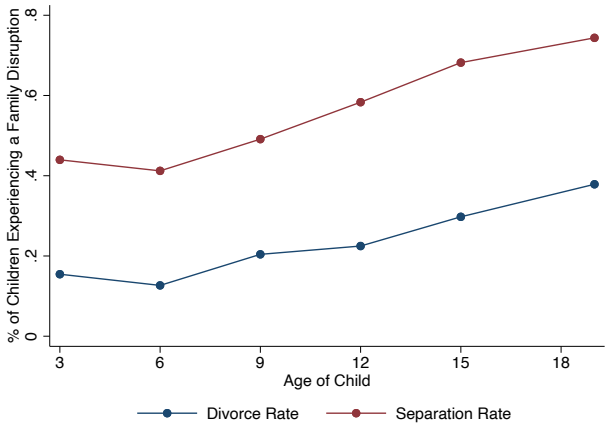
ing. We estimate annual childcare expenses from the CPS Child Support Supplement (CPS-CSS) between 2010 and 2018. We restrict the sample to households with 1 to 3 children and require the youngest child to be between 0 and 10 years of age and parents to be between 25 and 34 years of age, consistent with stage 1 in the model. We convert childcare expenses into 2017 USD and compute, separately for college- and non-college-educated women, average childcare expenses per child conditional on having non-zero childcare expenses. We assume two children in the model and normalize the resulting annual childcare expenditures by the average annual wage of a woman of each education type in stage 1 (ages 25-34). We find that childcare expenses equate to 19 percent of a woman's earnings in stage 1. Since about 40 percent of non-college-educated women use informal care as their primary form of childcare (see Guner et al. (2020)),

and young children, on average, spend 30 hours per week in center-based care (Department of Education, 2005), we adjust the childcare cost parameter to capture these data features. The resulting average childcare cost parameter, λ, is 0.0622.

C.2 Separation Probabilities

Appendix Figure C.1 shows that separation and divorce rates increase as children get older. However, the gap between separation and divorce rates remains roughly constant over children's age. Our calibration captures this difference in the divorce and separation rates conditional on child age.

Figure C.1: Divorce and Separation Rates by Age of the Child



Notes: Data from National Survey of Family Growth 2011–2019. The sample is restricted to families with children.

C.3 Time Allocation of College and Non-College Mothers

The following tables summarize data moments for different types of time uses in the ATUS data. We focus on market work and adjusted childcare in our calibration.

C.4 Money Investments in Children

C.5 Children's Human Capital

We run a Tobit regression of children's human capital scores on age and age squared, a dummy variable for parental education, a cohabitation indicator and year fixed effects. Note that human capital scores in the PSID-CDS are only observed starting at age three. We thus use the regression to predict human capital scores at age zero.

Table C.3: Time Spent on Market Work and Childcare by Married and Cohabiting Mothers in the Data

Edu (1)	Mkt Work (2)	Childcare (3)	Avg. No. Children (4)	Adj. Childcare (5)	Total Time (6)	Share Childcare (7)
A. Mothers with children age 0–9						
all	20.13	17.87	2.00	17.87	38.00	0.537†
ncol	18.46	16.02	2.17	14.79	33.25	0.445
col	23.55	21.12	2.03	24.71	48.27	0.743†
B. Mothers with children age 10–19						
all	28.25	4.87	1.68	5.79	34.03	0.176†
ncol	27.39	4.45	1.64	5.42	32.81	0.165
col	30.47	5.87	1.79	6.58	37.05	0.201†

Notes: Data source: 2003–2019 ATUS. The sample in Panel A (B) consists of currently married and cohabiting women aged 25–34 (35–44) with children aged 0–9 (10–19). The samples are restricted to women with 1 to 3 children. Columns (2) and (3) are average weekly hours spent on market work and childcare. Adjusted childcare time in column (5) is childcare time per child multiplied by 2. Time per child is calculated using the average number of children, column (4). Column (7) reports adjusted childcare time as a share of total time. †Childcare shares are calculated using the total time of non-college-educated mothers.

C.6 College Costs and Marriage Rates

We compute the normalized costs of sending two children to college in the data by using state-level tuition fees for private and public four-year colleges based on the Integrated Postsecondary Education Data System (IPEDS) from 2010–2019 that is published by the US Department of Education. We convert the per child tuition averages into 2017 USD using the PCE and then multiple them by 2. Finally, we use CPS-ASEC data to compute the average earnings of college-educated men by state and year. After converting

Table C.4: Additional Time Uses (Weekly Hours) - Model Stage 1

Marital	Edu	Mkt Work	Adj. Childcare	Non Mkt Work	Leisure	Other	Avg. Children	N
all	all	20.13	17.87	25.50	38.39	66.10	2.00	8,693
all	ncol	18.46	14.79	27.23	39.45	67.13	2.17	5,205
all	col	23.55	24.71	22.48	36.53	64.31	1.71	3,488
cohab	ncol	20.53	13.45	24.96	42.09	66.33	2.09	583
cohab	col	33.35	18.28	20.16	37.75	62.41	1.57	110
married	ncol	17.77	15.02	27.62	38.98	67.27	2.18	4,622
married	col	23.17	24.94	22.57	36.48	64.38	1.72	3,378

Notes: Data come from the ATUS 2003–2019. We restrict the sample to married and cohabiting women aged 25–34 with children aged 0–9 (corresponding to model stage 1). In addition, we restrict the sample to families with 1 to 3 children.

Table C.5: Additional Time Uses (Weekly Hours) - Model Stage 2

Marital	Edu	Mkt Work	Adj. Childcare	Non Mkt Work	Leisure	Other	Avg. Children	N
all	all	28.25	5.79	27.08	42.40	65.40	1.68	3,840
all	ncol	27.39	5.42	27.82	42.68	65.74	1.64	2,560
all	col	30.47	6.58	25.32	41.73	64.61	1.79	1,280
cohab	ncol	31.35	4.51	24.51	44.25	64.90	1.33	159
cohab	col	26.49	4.40	18.70	45.45	74.13	1.47	36
married	ncol	26.99	5.48	28.08	42.56	65.81	1.67	2,401
married	col	30.60	6.64	25.53	41.61	64.30	1.80	1,244

Notes: Data come from the ATUS 2003–2019. We restrict the sample to married and cohabiting women aged 35–44 with children aged 10–19 (corresponding to model stage 2). In addition, we restrict the sample to families with 1 to 3 children.

Table C.6: Expenditure Moments (Annualized Expenditures) - Model Stage 1

Marital	Edu	Child Goods	Childcare	Education	Housing	Food	Transport	Health
all	all	735.38	1,673.80	203.82	3,639.92	1,154.68	2,105.08	516.40
all	ncol	635.75	1,204.35	162.64	2,779.33	1,125.10	1,922.17	438.07
all	col	924.19	2,960.48	298.83	5,270.82	1,210.73	2,451.73	664.83
cohab	ncol	583.86	713.76	140.32	1,981.62	1,103.56	1,836.06	310.32
cohab	col	850.30	3,180.70	165.86	3,161.52	1,014.38	2,168.83	588.61
married	ncol	643.14	1,274.57	165.81	2,893.01	1,128.17	1,934.44	456.27
married	col	926.69	2,952.83	303.73	5,342.37	1,217.39	2,461.33	667.42

Notes: Data come from the CEX 2003–2019. We restrict the sample to married and cohabiting couples aged 25–34 with children aged 0–9 (corresponding to model stage 1). All expenditures are measured in annual values and are converted into 2017 USD using the PCE index.

earnings into 2017 USD, we use them to normalize college costs in every state-year.

Table C.7: Expenditures on Children by Married and Cohabiting Couples in the Data

Edu (1)	Child Expenditures (2)	Avg. No. Children (3)	Adj. Exps (4)	Normalized Adj. Exps (5)
A. Mothers with children age 0–9				
all	9,133.40	1.83	9,983.96	0.093
ncol	7,765.84	1.93	8,029.97	0.075
col	12,881.56	1.63	15,792.15	0.148
B. Mothers with children age 10–19				
all	9,649.59	1.75	10,999.59	0.103
ncol	8,726.53	1.77	9,848.29	0.092
col	12,895.07	1.69	15,244.05	0.143

Notes: Data source: 2003–2019 CEX. The sample in Panel A (B) consists of currently married and cohabiting women age 25–34 (35–44) with children age 0–9 (10–19). Column (2) reports total expenditures on children measured in annual values and converted into 2017 USD using the PCE index. Adjusted expenditures in column (4) are expenditures per child multiplied by 2. Expenditures per child are calculated using the average number of children, column (3). Column (5) reports adjusted expenditures as a share of the average earnings of college-educated men in 2017 (USD 106,931).

Table C.8: Expenditure Moments (Annualized Expenditures) - Model Stage 2

Marital	Edu	Child Goods	Childcare	Education	Housing	Food	Transport	Health
all	all	680.19	139.75	695.84	3,799.70	1,416.04	2,441.88	583.62
all	ncol	635.60	122.23	534.02	3,328.05	1,388.91	2,289.99	531.68
all	col	837.17	205.82	1,264.79	5,468.53	1,512.44	2,981.53	768.16
cohab	ncol	605.86	164.66	313.90	2,404.40	1,357.86	2,171.50	492.55
cohab	col	842.50	0.00	971.81	7,041.35	1,474.62	3,163.00	623.33
married	ncol	637.81	119.58	550.14	3,399.42	1,391.38	2,299.43	534.79
married	col	836.97	214.19	1,275.75	5,417.85	1,513.63	2,975.80	772.73

Notes: Data come from the CEX 2003–2019. We restrict the sample to married and cohabiting couples ages 35–44 with children age 10–19 (corresponding to model stage 2). All expenditures are measured in annual values and are converted into 2017 USD using the PCE index.

Table C.9: Tobit Regression to Predict Children's Human Capital at Age Zero

	Dependent Variable: **Human Capital Score**
Child Age	0.0684^{***}
	(5.93)
Observations	2,397

Notes: Data come from the PSID-CDS. We run a Tobit regression since the dependent variable is left-censored at zero. Control variables include children's age squared, a dummy for the education of the mother and the father, an indicator whether parents were cohabiting at birth, and year fixed effects.

Table C.10: College Costs and Marriage Rates of Non-college Couples Across US States

	Dependent Variable: **Marriage Rate of Non-college Couples**
Normalized College Costs	-0.0837^{***}
	(0.0100)
Constant	0.9480^{***}
	(0.0139)
Observations	510

Notes: Data for state-level college costs come from the Integrated Postsecondary Education Data System (IPEDS) between 2010–2019. Male college earnings used to normalize college costs as well as the marriage rates are based on CPS-ASEC data between 2010–2019. Controls incldue year fixed effects.

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