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Cohabitation, Child Development, and College Costs*

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Abstract

Why do U.S. college-educated couples with children marry at higher rates than those without a college degree? We argue that investing in children is more valuable for college-educated couples, who are more likely to send their children to college. Marriage, which entails lower separation risk and more equal asset division if separation does occur, provides insurance to the lower-earning spouse, which facilitates child investment. Using an OLG model of marriage, cohabitation, wealth accumulation, and educational investments where college completion is risky, we find that insurance through marriage is particularly important when investing in children is costly and college costs are high.

Keywords: cohabitation, marriage, child development, time and money investments, human capital accumulation, college costs

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

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1 Introduction

Over the past five decades, cohabitation rates have risen in the United States, accompanied by a decline in the proportion of life spent in marriage. However, this shift has not occurred evenly across demographic groups. While cohabitation rates among couples without children have followed a similar trend irrespective of their educational attainment, a pronounced educational gradient among couples with young children has emerged. Couples with lower educational attainment and young children are significantly more likely to cohabit compared to their college-educated counterparts. In 2015, the cohabitation rate stood at 17.2% for couples with high school education and young children, but was only 3.3% among college-educated couples with young children. Moreover, cohabitation is not a step towards marriage for most cohabiting couples with children. Data from the National Survey of Family Growth (2006–2013) shows that among couples cohabiting when their first child was born, only 23% married within five years, while 32% continued cohabiting, and 45% eventually separated (Lichter et al., 2016).

What accounts for the differences in cohabitation rates by education in the presence of young children? How does the choice to marry or cohabit impact parental investments and the long-run outcomes of children? In this paper, we provide evidence that marriage, by providing insurance to the lower-earning spouse, facilitates child investment. Thus, the value of marriage is tied to the value of parental time and money investments in a couple's children. These investments improve children's long run outcomes by increasing the likelihood that they obtain a college degree. We argue that, if the children of non-college-educated couples are less likely to attend college, then the value of parental investments may be lower for non-college-educated parents, thereby reducing the value of marriage for them. Consistent with our theory, we show that the high cost of college in the U.S. lowers college attendance rates among children of non-college-educated parents. This, in turn, reduces the value of investing in children and, consequently, the likelihood of marriage for non-college-educated couples.

We first turn to the data, to explore whether the empirical evidence is consistent with our theory. Utilizing an event study approach and leveraging information from the Panel Study of Income Dynamics (PSID), we find that cohabiting mothers experience lower childbirth penalties than married mothers, even when controlling for maternal education and race. Meanwhile, an analysis of data from the American Time Use Survey (ATUS) and the Consumer Expenditure Survey (CEX) reveals that married couples allocate more resources, both in terms of time and expenditures, towards their children.

To provide further empirical evidence that marriage, by providing insurance, induces investments in children, we also explore the impact of alimony reforms across U.S. states from 2006 to 2018. 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.

Consistent with the fact that children of married couples receive higher levels of investment, they have higher college completion rates. Leveraging the PSID Transition into Adulthood Supplement (PSID-TAS), we show that parental marital status is related to child outcomes later in life. Children of parents who were married at their birth are more likely to complete college by their mid-twenties.

Motivated by these findings, we develop an overlapping generations (OLG) model with stochastic aging in which college- and non-college-educated parents choose whether to cohabit or marry and how much to invest in their children. Parents are altruistic towards their children and care about their lifetime utility. The life cycle 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. Over the first two stages of the life cycle, parents 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 completes college depends on the human capital accumulated during the first two stages of the life cycle. During the third stage of the life cycle, parents are middle-aged and work. They are then retired during the last stage.

In the model, marriage and cohabitation are distinguished by two key aspects. First, in the event of divorce, married partners are entitled to an equal division of assets. Conversely, the partner earning less in a cohabiting couple receives a lower fraction of the couple's accumulated wealth upon separation. As is the case in most U.S. couples with children, the woman is assumed to be the lower earner. Second, the risk of separation is higher for cohabiting couples compared to those who are married. In the event of separation, both parents continue to care about the child's development. However, children stay with the mother, who makes all child investment decisions going forward, while the father transfers child support payments.

The model is calibrated to the U.S. in the year 2015 using data from the Current Population Survey (CPS), National Survey of Family Growth (NFSG), PSID, ATUS, and CEX. 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% compared to 3.3% in the data. For non-college-educated couples, the cohabitation rate is 18.3% in the model compared to 17.2% 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.

To understand the drivers of education-specific cohabitation rates within the model, we start by assessing the quantitative importance of children for marriage decisions. If we shut down the mechanism through which parental investments contribute to the skill development of children, effectively removing all incentives to invest in children from the model, we observe a notable decrease in the marriage rate of college-educated couples. With the incentives to invest in children's skill accumulation removed, college-educated couples' cohabitation rate increases from 5.3% to 31.4%. In contrast, the cohabitation rate of non-college-educated parents drops from 18.3% to 13.4%. 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.

Next, we show that the parental choice to marry or cohabit in the model is 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 show that when college costs are removed, the marriage rates of college- and non-college-educated households essentially flip. The cohabitation rate of non-college-educated parents goes from 18.3% to 4.6% and the cohabitation rate of college-educated parents goes from 5.3% to 16.0%. Among non-college-educated couples, we observe a monotonic decline in marriage rates when college costs increase. 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 U.S. 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 U.S. 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.

Lastly, 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 rules 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% to 29.9% 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% to just 5.4%. These results indicate that family structure plays a critical role in shaping educational disparities, especially for children of non-college-educated parents. They also highlight the important influence of parental marital choices on intergenerational inequality.

Related Literature Lundberg and Pollak (2014) argue that the primary gains from marriage have shifted from household production to investment in children, highlighting how marriage acts as a commitment mechanism that supports higher levels of investment. Building on these insights, we develop a macroeconomic model to study how these dynamics influence marriage and cohabitation choices and, consequently, child outcomes. Our paper thus bridges a gap between two important strands of the literature. The first examines couples' incentives to marry versus cohabit and underlines the effect of asset-splitting rules upon divorce on marriage choices. The second analyzes how parental investments in children shape future child outcomes. In integrating these perspectives, we demonstrate that the choice between marriage and cohabitation has implications for both parental investments and child development, and we quantify the impact of these choices on child outcomes.

Brien et al. (2006), Adamopoulou (2010), Gemici and Laufer (2012), and Wong (2016) were among the first to study the differences between marriage and cohabitation. More recently, Blasutto (2023) shows that roughly 15% of the cohabitation-rate gap between U.S.-college-educated and non-college-educated couples can be explained by differences across education in the gender wage gap. Blasutto and Kozlov (2020) meanwhile argue that the enactment of unilateral divorce laws that reduced the marriage gains from risk-sharing has been an important driver of rising cohabitation in the U.S. In this paper, risk sharing in marriage is key as it impacts investments in children. Parents care about the outcomes of their children and marriage ensures higher child investments, thereby leading to higher rates of college attainment for children.

Voena (2015) and Bayot and Voena (2014) provide early studies on the impact of laws governing the splitting of assets upon divorce on the decision to get married. They do not, however, explicitly model the role of children. Lafortune and Low (2023) take a first step in this direction by formalizing the notion that asset division rules influence how much spouses specialize during marriage and invest in a public good, which can be interpreted as children. They propose a static model in which spouses can specialize and invest in the public good at the cost of future earnings as long as they are married. In their setup, higher joint savings leads to more specialization in marriage by insuring the lower-earning spouse against future earnings losses. We build on this notion by modeling children as a public good into which parents can invest time and money. Importantly, in our setup, parents continue to care and invest in their children even after divorce or separation. More recently, two papers explicitly model divorce laws and children. Brown et al. (2023) develop a model of marriage, fertility, and parenting to investigate how family law influences children's cognitive attainment. In a complementary study, Calvo (2023) examines the implications of child custody laws on child outcomes for married and cohabiting couples.

Our paper also closely relates to the literature using models to study parental investments in children and the effect of the latter on child outcomes. Though, work in this area typically does not distinguish how the parental decision to marry or cohabit affects investments in children. Abbott et al. (2019), Daruich (2021), Bolt et al. (2023), and Yum (2023) propose overlapping generation frameworks to study the effects of parental investments on child development. We extend this research by explicitly modeling the difference between cohabiting and married couples. Blandin and Herrington (2022) 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. This leads to a gap in college completion rates between children from low- and high-resource families. Caucutt and Lochner (2020) emphasize the importance of financial constraints in a dynastic framework of human capital investment, while Caucutt et al. (2023) and Molnar (2024) highlight the role of dynamic complementarity between time and money investments in children. We complement these studies by documenting how the decision to marry amplifies the differences in child investments and outcomes between high- and low-educated couples, taking into account that child investments are dynamic complements. Finally, our research intersects with that of Fuchs-Schündeln et al. (2022), and more recently Krueger et al. (2024), who study the role of public investment through schooling using a human capital production function that features complementarity between child inputs.

More broadly, this study adds to the body of work exploring the career costs of children (Adda et al., 2017). In particular, Kleven et al. (2019a) and Kleven et al. (2019b) find, using an event study design, that childbirth is accompanied by large and persistent reductions in earnings for women. Kuziemko et al. (2018) show that these earnings penalties exist for both college-educated and non-college-educated women, though they are larger for the latter group. Berniell et al. (2020) extend these results to 29 European countries. We contribute to this literature by documenting that the long-run earnings penalties from childbirth in the U.S. are almost twice as large for married women as compared to cohabiting women.

Finally, we build on the literature assessing the role of family insurance (Hayashi et al., 1996; Kaplan, 2012; Matouschek and Rasul, 2008). Our macroeconomic study departs from modeling one-earner households and examines marriage, labor supply choices, and the impact of children from the perspective of a dual-earner household.[1] Our framework is an important extension as it links parental labor supply choices over the life cycle to their impacts on child investments. These investments, in turn, determine the wages, marriage, and labor supply choices of the next generation.

The paper is organized as follows. Section 2 documents the rise in cohabitation by education and shares important facts that motivate the quantitative analysis. Section 3 describes an overlapping generations model of marriage, cohabitation, and child investment. Section 4 provides details on the model calibration, while Section 5 summarizes the benchmark economy and compares it with the data. Section 6 analyzes the importance of college costs for marriage rates. Finally, Section 7 concludes.

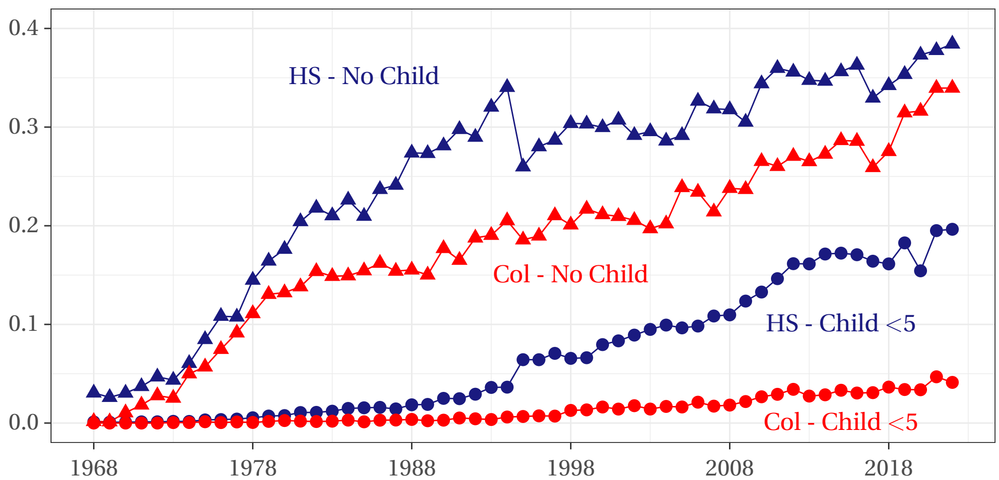
2 Stylized Facts

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 is

[1] Guner et al. (2012), Bick and Fuchs-Schündeln (2018), Alon et al. (2019), Obermeier (2019), Guner et al. (2020), and Hannusch (2024).

lacking. To address this challenge, we use data from the CPS Annual Social and Economic 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. 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. Our imputation strategy accounts 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 partner's parents. See Appendix A.1 for details.

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



Notes: Data from CPS-ASEC 1968–2022. The sample is restricted to all individuals aged 25–44 living in couples. We identify cohabiting couples in two steps (see Appendix A.1 for details). We report each couple type as a fraction of all couples living together (married or cohabiting) in a given year.

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% 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.

Figure A.1 in the Appendix shows that the same cohabitation patterns are observed when distinguishing by race. We also observe similar educational gradients in cohabitation rates across European countries among couples with small children, while education gradients for couples without children are less pronounced (see Appendix Table A.1).

2.1 Earnings Penalties in Marriage and Cohabitation

As we have seen, cohabitation rates have risen for couples without children and those without a college degree, while that of college-educated couples with children has remained relatively low. A possible explanation for this 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).[2] 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 data from the PSID between 1976 and 2018. 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.[3] 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.

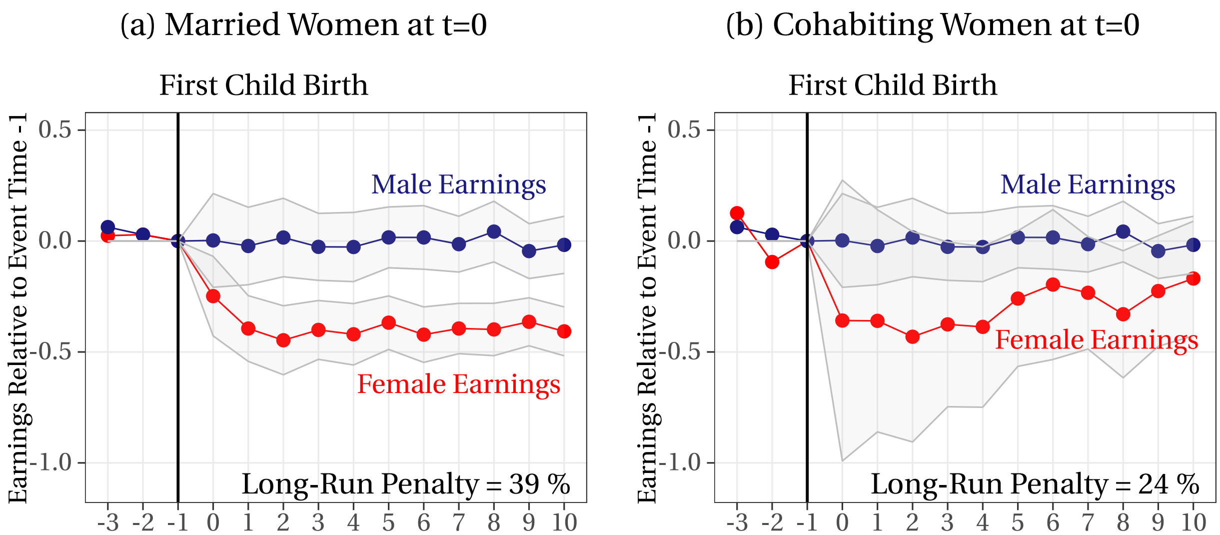
Figure 2 displays the differential impacts of childbirth on the earnings of married and cohabiting women.[4] Consistent with existing research, our analysis reveals no discernible child penalty on men's earnings. In contrast, women experience a significant decline in earnings post-childbirth, an effect that is much more pronounced for married women. Specifically, while the earnings penalties for cohabiting women are similar in initial magnitude to married women, they are both more variable and less persistent. In the long run (5 to 10 years after childbirth), earnings are still 39% below their pre-birth levels for married women compared to 24% below for cohabiting women. These findings indicate that cohabiting women may indeed specialize less and remain more attached to the labor market after childbirth. Appendix A.2 shows that these findings are robust to using a racially homogeneous sample of White women only.

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

[3]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.

[4]Due to the fact that we rarely observe highly-educated cohabiting women, we cannot further distinguish the sample by education.

Figure 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 defined as the average penalty from event time five to ten. 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. They are set to zero for non-working individuals. We split women by marital status at first child birth in panel (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.

2.2 Time and Money Investments in Children

Higher earnings penalties among married women suggest that they may allocate more time to their children. Using 2003–2019 data from the American Time Use Survey (ATUS), we confirm that marital status and time allocated to children are positively correlated. 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.[5] 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 diaries were recorded.[6]

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

[6] Time use data is not representative of a normal week since half of the 24-hour time use diaries are

Table 1: 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
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

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 diary was recorded. *p<.10; **p<.05; ***p<.01.

Table 1 shows that, even 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 2. The reduction in time spent with children by cohabiting mothers is driven by women whose youngest child is between the ages of 0 and 9 (see Appendix Table A.4).

When analyzing the data by mother's education level, the lower amount of time spent with children for cohabiting women is especially evident among college-educated

recorded during weekends. The day weights take into account the fact that weekends only represent 2/7 of total weekly time.

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,[7] 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 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. Appendix Table A.5 shows no significant differences regarding childcare time between cohabiting and married men.

The gaps in time spent with children by marital status are substantial. For instance, the average gap (1.7 hours) is 40% of the average gap in time spent with children between college- and non-college-educated mothers (4.3 hours) in our data. 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 degree or less.[8] Given that over 80% of cohabiting couples are non-college educated, differences in childcare time by parental education may, in part, reflect differences in parental marital arrangements.

A growing literature documents that time investments in children are complemented by monetary investments (see, for example, Caucutt and Lochner (2020); Agostinelli and Wiswall (2024); Fuchs-Schündeln et al. (2022)). We accordingly 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.[9] 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 Appendix A.3.1 for details).

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

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

[8]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% of the time of college-educated parents. In our sample, the time investment gradient for fathers is roughly the same, but non-college-educated mothers' time investments are about 74% of those of college-educated mothers.

[9]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 2: 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
Controls	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

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.

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 2 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% for young children and 12% for older ones compared to the respective children of married couples.

Due to the way we construct annual child expenditures, it is not possible to directly compare our estimates to the literature. However, consistent with Kornrich and Furstenberg (2013), we find that parents in recent decades spend more money on younger children than on older ones: the mean expenditure on young children in our sample is $10,500 per year versus $8,100 for older children. Note that the effect here is mostly driven by non-college-educated couples. One concern might be that cohabiting couples have lower labor income and thus spend less on housing and medical expenditures, as documented by DeLeire and Kalil (2005). If we restrict expenditures to education, we find that cohabiting couples spend on average 29% less. This is consistent with DeLeire and Kalil (2005), who report 28% lower education expenditures for cohabiting parents. Appendix Table A.6 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 not statistically significant.

2.3 Insurance Value of Marriage: Evidence from Alimony Reforms

In the previous section, we 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 explains the differences in child investment.

To address this concern, we analyze alimony reforms implemented in eight U.S. states between 2006 and 2018.[10] 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 can not 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% 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% 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

[10]Appendix Figure A.3 highlights the states in which a reform was implemented and Table A.7 describes these reforms in greater detail.

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.[11] We focus on women who were already married at the time 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 does 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.[12]

The findings in Table 3 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 1.15 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.8 shows that the reduction in childcare time in column (2) is detected for both mother's of younger (0-9) and older children (10-19).

Our results indicate that alimony reforms reduce childcare time by 17.6% after 5 years. Fernández-Kranz and Roff (2022) report a reduction in the sum of childcare time and non-market work time of 5.3% after 5 years (see their Table 4). In comparison, in our sample, the sum of childcare time and non-market work time declines by 6%, closely

[11] Fernández-Kranz and Roff (2021) study the effect of alimony reform on assortative mating whileFernández-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.

[12] 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.4).

Table 3: 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
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

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 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.10.

aligning with their result.[13] It is worth noting that we restrict the sample to women with children, while Fernández-Kranz and Roff (2022) consider a much large universe that includes all married women. In addition, we impute the year of marriage using a combination of birth year of the youngest child and total number of children. Our findings are also consistent with the effects of alimony reforms documented in 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.

[13] 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 3).

We further decompose total childcare time into passive (physical care) and active (human capital investment) time following Bastian and Lochner (2022). Table 4, Panel A shows that the decline in time allocated to children includes investment time that is crucial for children's human capital development (column 3). Thus, the reforms impact children's human capital development. In the Appendix (Table A.9), we show that fathers do not compensate for mothers' reduced childcare time; in fact, their time allocation is not affected by the reforms.

Table 4: 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
Controls	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

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. Additional controls: college, age, age^2, number of children, age of youngest child, race, weekend time diary, metropolitan area, year and state fixed effects. Sample weights are adjusted for the day of the week when the time diary was recorded. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01.

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.[14] 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 5 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).

Table 5: 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
Controls	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: CEX data, 2003–2019. The sample is restricted to couples aged 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. See Appendix Table A.11 for a set of placebo exercises that exclude the possibility that the estimated effects of alimony reforms are driven by time trends.

[14] See Section 2.2 for a detailed description on how we measure household expenditures on children.

2.4 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 parent's marital status at the child's birth. Through a series of logistic regressions, we explore the relationship between children's college completion and parent's education level, marital status, and homeownership in the year the child was born.

Table 6: 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
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

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.

The results reported in Table 6 are consistent with our theory. Children whose parents were married at the time of their birth are indeed more likely to complete college. The second column shows that the positive effect of marriage is still present when controlling for the education of the mother and the father. Unsurprisingly, parents' education itself has a strong positive effect on children's college completion. Nonetheless, the independent positive effect of marriage remains.

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 effect of marriage on children's college completion remains even after controlling for parental homeownership, consistent with our previous findings that marriage leads to 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 has a positive impact on the likelihood that children complete college because it increases children's skill accumulation. Therefore, controlling for a measure of children's skill level towards the end of high school (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 effect 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.12 replicates the analysis using data from the Add Health study—a longitudinal survey of a nationally representative sample of U.S. 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 influenced by their parents being married.[15] 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 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 sort into heterosexual couples and choose whether to marry or cohabit. Matching by education is perfectly assortative.[16] Each couple has two children: a boy and girl. Children are identical aside from gender and 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 towards their children and can increase the probability that they earn a college degree by investing in their human capital.

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

[16] In the CPS-ASEC data between 2013 and 2019, 84% of couples living together have the same education type (non-college or college).

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 reflect the fact that marriages are more stable than cohabiting relationships in the data, the probability of breaking up is higher if parents choose to cohabit instead of marrying.[17] Upon splitting, the man receives share α^s of the couple's assets, which depends on marital status s. The woman receives share $1 - \alpha^s$.

In the model, fathers always work. 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 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. (2024). 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

[17] Breakup probabilities are exogenous for tractability. Alternatively, we could make the breakup decision endogenous and assume that divorce costs are higher than the costs of separating from cohabitation.

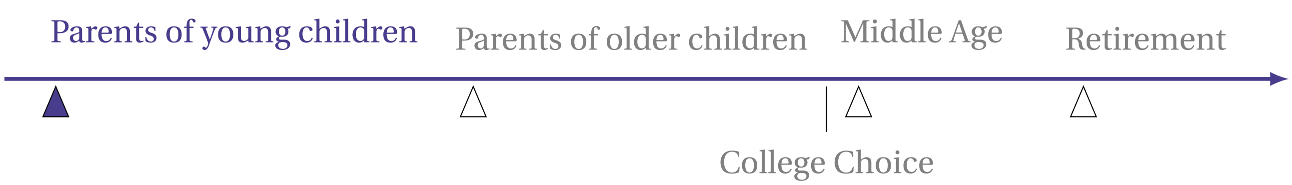
according to the outer nest,

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

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 documented 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 women'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

$$V_1^s(a,k;e) = \max_{c_m,c_f,a',\tau_f,d} \quad \theta^m u(c_m) + \theta^f u(c_f)$$
$$+ \beta(1-\eta_1)\Big\{p^s S_1^s(a',k';e) + (1-p^s)V_1^s(a',k';e)\Big\}$$
$$+ \beta\eta_1\Big\{\underbrace{p^s S_2^s(a',k';e)}_{\text{breaking up}} + \underbrace{(1-p^s)V_2^s(a',k';e)}_{\text{staying together}}\Big\},$$

subject to

$$(c_f^\zeta + c_m^\zeta)^{\frac{1}{\zeta}} + a' + d = (1+r)a + w_{1,m}^e + (w_{1,f}^e - \lambda)[1 - \tau_f + \upsilon_{1,f}\mathbb{I}(e = col)],$$

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).[18]

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. In addition, breaking up lowers consumption for both parents due to the loss of economies of scale.

We abstract from re-marriage and re-cohabitation. 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.[19] The problem of a divorced or separated woman with young children is

$$\tilde{S}_1^{s,f}(a,k;e) = \max_{c_f,a',\tau_f,d} \quad u(c_f) + \beta(1-\eta_1)\tilde{S}_1^{s,f}(a',k';e) + \beta\eta_1\tilde{S}_2^{s,f}(a',k';e),$$

subject to

$$c_f + a' + d = (1+r)a + \iota_1^{s,e} + (w_{1,f}^e - \lambda)(1 - \tau_f + \upsilon_{1,f}\mathbb{I}(e = col)).$$

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

$$\tilde{S}_1^{s,m}(a;a^f,k,e) = \max_{c_m,a'} \quad u(c_m) + \beta(1-\eta_1)\tilde{S}_1^{s,m}(a';\hat{a}^{f\prime},\hat{k}',e) + \beta\eta_1\tilde{S}_2^{s,m}(a';\hat{a}^{f\prime},\hat{k}',e),$$

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

[19] Alimony is not included in the model because it is much less common than child support. In the early 2000's, just 10 to 15% of divorces resulted in alimony awards (Fernández-Kranz and Roff, 2021). In addition, as explained in Section 2.3, reforms in eight U.S. states implemented between 2006 and 2018 reduced alimony payments and their duration. In the 2003 to 2019 CPS-ASEC data, only 2% of divorced women aged 24–44 with children under 18 received alimony payments, while 43% received child support.

subject to

$$c_m + a' + \iota_1^{s,e} = (1+r)a + w_{1,m}^e.$$

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

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

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

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

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,

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

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

$$\begin{aligned} V_2^s(a,k;e) = \max_{c_m, c_f, a', \tau_f, d} \quad & \theta^m u(c_m) + \theta^f u(c_f) \\ & + \beta(1-\eta_2)\Big\{ p^s S_2^s(a',k';e) + (1-p^s) V_2^s(a',k';e) \Big\} \\ & + \beta\eta_2 \Big\{ p^s Y^s(a',k';e) + (1-p^s) W(a',k';e) \Big\}, \end{aligned}$$

subject to

$$(c_f^\zeta + c_m^\zeta)^{\frac{1}{\zeta}} + a' + d = (1+r)a + w_{2,m}^e + w_{2,f}^e[1 - \tau_f + \upsilon_{2,f}\mathbb{I}(e = col)],$$

with $k' = F[x_2(\tau_f, d), k]$, $S_2^s(\cdot)$ 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

$$\tilde{S}_2^{s,f}(a,k;e) = \max_{c_f,a',\tau_f,d} \quad u(c_f) + \beta(1-\eta_2)\tilde{S}_2^{s,f}(a',k';e) + \beta\eta_2\tilde{Y}^f(a',k';e),$$

subject to

$$c_f + a' + d = (1+r)a + \iota_2^{s,e} + w_{2,f}^e(1-\tau_f) + \upsilon_{2,f}w_{2,f}^c\mathbb{I}(e=col),$$

and the problem of a divorced or separated man is

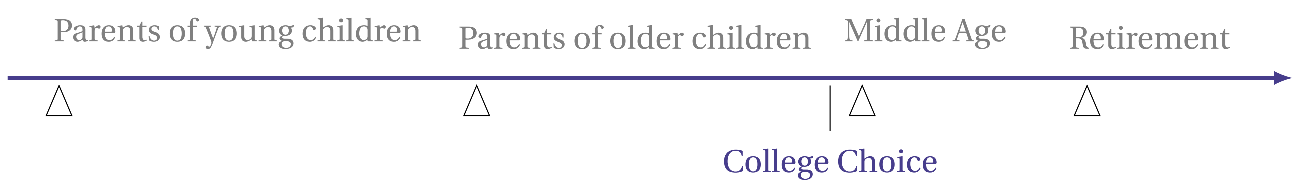
$$\tilde{S}_2^{s,m}(a;a^f,k,e) = \max_{c_m,a'} \quad u(c_m) + \beta(1-\eta_2)\tilde{S}_2^{s,m}(a';\hat{a}^{f\prime},\hat{k}',e) + \beta\eta_2\tilde{Y}^m(a';\hat{a}^{f\prime},\hat{k}',e),$$

subject to

$$c_m + a' + \iota_2^{s,e} = (1+r)a + w_{2,m}^e.$$

Like before, $\hat{a}^{f\prime}$ 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

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

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

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

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, out of current wealth. Thus, the expected lifetime utility of a couple at the beginning of stage 3 is

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

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

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

Finally, a single father takes the decsion 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 life. Middle-aged households consume and save. Couples solve

$$V_3(a;e) = \max_{c_m,c_f,a'} \theta^m u(c_m) + \theta^f u(c_f) + \beta(1-\eta_3)V_3(a';e) + \beta\eta_3 V_4(a';e),$$

subject to

$$c_m + c_f + a' = (1+r)a + w^e_{3,m} + w^e_{3,f}.$$

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

$$\tilde{S}^g_3(a;e) = \max_{c_g,a'} \quad u(c_g) + \beta(1-\eta_3)\tilde{S}^g_3(a';e) + \beta\eta_3\tilde{S}^g_4(a';e),$$

subject to

$$c_g + a' = (1+r)a + w^e_{3,g}.$$

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

$$V_4(a;e) = \max_{c_m, c_f, a'} \quad \theta^m u(c_m) + \theta^f u(c_f) + \beta(1-\eta_4)V_4(a';e),$$

subject to

$$c_m + c_f + a' = (1+r)a + bw^e_{4,m} + bw^e_{4,f}.$$

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

$$\tilde{S}^g_4(a;e) = \max_{c_g, a'} \quad u(c_g) + \beta(1-\eta_4)\tilde{S}^g_4(a';e),$$

subject to

$$c_g + a' = (1+r)a + bw^e_{4,g},$$

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

In equilibrium, couples and singles solve their maximization problems. In addition, 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 as defined in equation (4). Finally, 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.

4 Calibration

We calibrate the model to the U.S. economy in 2015 in two stages. First, we set the values of some parameters directly based on independent data estimates or existing literature. A subset of these parameters is summarized in Table 7. 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. Table 8 summarizes parameters governing children's human capital accumulation, children's college completion, and the marriage preference shock distribution. Some of these parameters are determined in the minimization and some are set directly.

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, Table 8 reports the targeted moment that identifies it. Moment values and model counterparts are reported in Table 11.

Table 7: 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.

Initial conditions Individuals begin life as an adult endowed with zero assets ($a_0 = 0$). They are matched with someone of the same education type, draw a preference shock for marriage, and have two children (a boy and a girl). All newborn children have the same innate human capital ($k_0 = 0.4341$), independent of their parents' education.

Aging Probabilities Independent adult life starts at age 25. Both stage 1 and 2 are child development stages and each have 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

Table 8: 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 $x_1(\tau_f, d)$	Ave. time investment stage 1	ATUS 2003-2019, PSID CDS
π_1^1	0.850	Weight on τ_f	Ave. 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	Ave. 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 $x_2(\tau_f, d)$	Ave. time investment stage 2	ATUS 2003-2019, PSID CDS
π_2^1	0.250	Weight on τ_f	Ave. 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	Ave. 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 (2022)
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.

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

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

Individuals are risk-averse and the coefficient of risk aversion, γ, is assumed to be 2.0. 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 11 shows, the model matches this moment well, 12.6% of couples cohabit in the model compared to 11.2% 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%. The fraction of children attending college in the model is 84.5%.

Interest Rate and Economies of Scale The annual real interest rate r is given by $r = 1/\beta - 1$. Since $\beta = 0.96$, the interest rate is set to 4.2%. While living in 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 U.S. for a family of 4 (2 parents and 2 children) constructed by Daley et al. (2019) using 2004–2012 Consumer Expenditure Survey data.

Parental Wages and Retirement Benefits 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, $w_{t,m}^e$, and women's wages, $w_{t,f}^e$ 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 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 multiple 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% of non-college men's. College women's average wage is 88.7% 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), annual retirement benefits are 35.2% 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 Table 7.

Childcare Costs Parents have to pay for childcare when children are young and the mother is working. 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 (age 25-34). We find that childcare expenses equate to 19% of a woman's earnings in stage 1. Since about 40% 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.

Separation and Divorce Probabilities We calibrate the separation probability for cohabitors (p^C) and the divorce probability for married couples (p^M) using data from the National Survey on Family Growth (NSFG) between 2011 and 2019. In the data, when children are 19 years old, 62.1% of their once married parents are still married and 25.6% of their once cohabiting parents still live together (see Appendix Figure C.1 for a breakdown by age of the child). We calibrate the annual breakup rate for each couple type to be consistent with these shares. The implied annual breakup probability is 2.47% for married couples and 6.88% for cohabiting couples.

Asset Splitting The division of assets in a U.S. divorce varies depending on the state's legal framework.[20] Generally, states either follow community property rules or equitable distribution laws. In community property states (which account for a quarter of the U.S. population), assets acquired during marriage are seen as jointly owned and are typically split 50/50. Most states follow equitable distribution, which aims for a fair—not necessarily equal—division of assets. Courts consider factors like the length of the marriage, each spouse's financial situation, contributions (both financial and non-financial), and future needs to determine what is equitable. 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 50/50 distribution unless the court rules this division to be inequitable based on a specific set of criteria. We abstract from the legal differences in divorce regimes across U.S. states and, for simplicity, assume assets are always split equally in divorce, i.e., α^M, the share of assets that go to the man, is 0.5.

To date, no state legislature has established a formal system to define the economic rights of cohabitants who are not legally married. In the absence of specific statutes, courts rely on case law to determine how assets should be divided, leading to varied outcomes. Generally, each person retains the assets they owned before the relationship, while items acquired during cohabitation belong to the individual who purchased them or holds their title. As a result, the wealthier and/or higher-earning partner usually receives a larger share of the couple's assets upon separation (see Atwood and Cahn (2022) for details). To capture this fact in a simple way, we set the asset shares upon separation from cohabitation equal to the average earnings shares of cohabiting partners in the

[20] See Freed and Foster Jr (1981) for an overview of U.S. divorce laws.

CPS-ASEC. This yields a value of 0.65 for α^C, implying that, upon separation, 65% of the assets go to the man.

Child Support We estimate annual child support payments by education and marital status from the CPS-CSS between 2003 and 2019. In the model, spouses receive child support only during stages 1 and 2, i.e., when children are present in the household. As this corresponds to parents being between the ages of 25–44, we restrict our sample to this age group. We further require children in the household to be younger than 18 years of age and limit the sample to households with 1–4 children. We again convert child support into 2017 USD. We normalize the annual child support payments by stage-4 wages of college-educated men. Table 7 summarizes the results. We distinguish child support by education and by whether parents are divorced or separated, implying that they were previously married or cohabiting. The results show that, on average, child support is lower for non-college- compared to college-educated parents. In addition, marital status does not significantly affect child support payments for college-educated parents. We do, however, observe a large gap between separated and divorced non-college-educated parents, which is accounted for in the calibration.

Time Investments in Children In the model, women allocate time to market work and childcare. We compute time spent on each by education and marital status using 2003–2019 ATUS data for mothers with children ages 0–9 (corresponding to women in model stage 1) and mothers with children ages 10–19 (corresponding to women in model stage 2). The average number of children varies with a couple's education and marital status in the data. In contrast, each couple raises two children in the model. To account for this difference, we divide childcare time by the number of children and multiply the result by two. Column (5) of Table 9 summarizes the resulting adjusted childcare time.

Column (6) of Table 9 reports the average weekly hours spent, in total, on market work and adjusted childcare time. When children are young (Panel A.), the combined time spent on both activities varies substantially between college- and non-college-educated women. While the former spend more than 48 hours per week on market work and childcare, the latter dedicate just over 33 hours per week.[21] Since the model does not capture any time use beyond market work and childcare, we provide all women in the model with a discretionary time budget of 33.25 hours and assume that college-educated women spend 15 additional hours on market work ($v_1 = 0.455$). Assuming a total of 33.25 hours of discretionary time, non-college-educated women allocate 44.5% of it to childcare, while college-educated women allocate 74.3%. The average share of time allocated to childcare when children are young is 53.7%. We set the normalization parameter for time investments in stage 1, $\bar{\tau}_1$, to 0.537.

We repeat the procedure to estimate the average time that women spend on childcare in stage 2. Assuming that total discretionary time is 32.81, we find that non-college-educated women allocate 16.5% of it to childcare, college-educated women allocate

[21]Instead, non-college-educated women allocate more time to non-market work, leisure, and other activities (see Appendix Table C.1).

Table 9: 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.

20.1%, and the average share of time allocated to childcare is 17.6%. Since the differences in total time allocated to childcare and market work by mother's education are much less pronounced when children are older, we do not give college-educated women additional market time in stage 2 and, instead, set $v_2 = 0$.

Money Investments in Children Using the CEX 2003–2019, we compute a measure of money investments in children. The CEX collects information on expenditures specifically for children (clothing, childcare, and school expenses), while other budgetary components such as housing, food, transportation, and health care are only reported at the household level. To obtain a reasonable measure of money investments in children, we follow Lino et al. (2017) and use their proposed children's budget shares to allocate a share of overall household expenditures on housing, food, transportation, and health care to children. Detailed expenditures for each category are shown in Appendix Table C.3. Since the average number of children across couples (by education and marital status) varies in the data, but the model assumes two children for every couple, we compute the average expenditures per child in each education-marital group and multiply the result by two. All expenditures are converted into 2017 USD using the PCE index, and then into model units using the average earnings of college-educated men from the CPS data (USD 106,931).

Table 10 summarizes the resulting child expenditures for all couples and by couples' education status. Panel A. reports expenditures when children are young. While non-college-educated couples spend 7.5% of the annual average earnings of college-educated men on young children, college-educated couples spend almost double, close to 15%. On average, investment in young children is 9.3%. We thus set the value of the normalization parameter for money investments in stage 1, $\bar{d}_1$, to 0.093. Panel B. reports expenditures when children are old. The table shows that college-educated parents spend about the same on younger and older children, while non-college-educated children spend more on older children. Consequently, at 10.3% of the earnings of a college-educated man, parents invest only slightly more in older children on average. However, as can be seen in Appendix Table C.4, childcare expenditures become much less important and education expenditures more than triple for older children. We set $\bar{d}_2$, to 0.103.

Table 10: 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).

Children's Human Capital Accumulation To obtain a measure for children's human capital, we follow the literature and use Letter-Word test scores from the 2002, 2007, and 2014 PSID CDS waves. The test comprises 57 questions that vary in difficulty. Each correctly answered question earns one point. As in Lee and Seshadri (2019), we adjust the test scores such that more difficult questions receive a higher weight in the overall test score. Note that there are no test scores available for children below the age of three. To infer a value of human capital at age zero, we thus run a Tobit regression of test scores on children's age at the time of the assessment and several control variables interacted with children's age.[22] Specifically, we include age squared and the interactions between parental education and marital status at birth with child age, using the estimated coefficients to predict the marginal effect of children's age on test scores between 0 and 17. Children's initial human capital is set to the predicted test score at age zero, $k_0 = 0.4341$.

[22]The dependent variable of children's test scores is left-censored at zero. See Appendix C.4 for details.

Next, we predict test scores for ages 0 to 9 and compute the average test score across the age group. This yields the normalization parameter $\bar{k}_1 = 0.7260$. Similarly, for predicted scores between the ages of 10 and 17, the average score is $\bar{k}_2 = 1.1768$, which normalizes children's human capital in stage 2.

The human capital production functions in both stages consist of two nested CES functions. The outer production functions, combining current human capital k with the investment aggregator $x_t(\tau_f, d)$, where $t = 1, 2$, are assumed to be Cobb-Douglas ($\psi_1^2, \psi_2^2 = 0$). In addition, the TFP parameter in the outer CES nest is normalized to one in each stage ($\psi_1^0, \psi_2^0 = 1$). We pin down the weight on current period's human capital k by matching the human capital levels in stage 1 and 2 in the data. Table 11 shows that the growth rate of children's human capital during stage 1 is too high resulting in an average level of human capital in stage 1 in the model of 1.209 compared to 0.726 in the data. However, the model matches the ratio of children's human capital between stages 1 and 2 well leading to a human capital level of 1.463 in stage 2 in the model compared to 1.177 in the data.

The inner CES nests differ between stage 1 and 2. In stage 1, we set the elasticity of substitution between time and money investments to $\pi_1^2 = -3.0$, which implies a strong complementarity between time and money investments when children are young. This is consistent with recent literature that estimates the elasticity to be between -1.85 and -3.00 (Abbott, 2022; Caucutt et al., 2023; Molnar, 2024). Following Agostinelli and Sorrenti (2022), we relax this assumption in stage 2 and allow for more substitutability between time and money investments when children are older ($\pi_2^2 = 1.0$). Note that both the human capital production function for young children and that for older children exhibit dynamic complementarity: as the human capital of a child increases, so does the marginal product of either time or good investments in the child.

The TFP parameters on the inner CES production functions, π_1^0 and π_2^0 are set such that the model generates average levels of time investment in stage 1 and 2 that are consistent with the data. Recall that the average share of time allocated to childcare when children are young is 53.7% and the average share of time allocated when children are older is 17.6%. At 51.1% and 9.0%, the model slightly understates the average time investments in stages 1 and 2. The weights on time investments relative to good investments in each stage are set such that the model matches average money investments in young and older children in the data. Recall that the average money investment in young children is 0.093 and the average money investment in older children is 0.103 as a share of the average earnings of college-educated men. In the model, average money investments are 0.072 and 0.352 in stages 1 and 2, respectively. The model significantly overstates money investments in stage 2. This may be due to the fact that older children receive additional investments through mandatory public schooling at older ages which the model abstracts from.

College Costs To calculate college costs, we use data from the Integrated Postsecondary Education Data System (IPEDS) on college tuition fees and room and board, published by the U.S. Department of Education. We construct an enrollment-weighted average of tuition fees, as well as costs for room and board, at 4-year public and private

Table 11: 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.

colleges. After adjusting these fees to 2017 USD, the average combined annual cost of attending a 4-year college between 2003 and 2019 is USD 45,750 for a private college, and USD 20,330 for a public one. However, most families do not pay the full sticker price of college thanks to financial aid, which is particularly substantial for families with lower incomes. We consequently calculate net tuition by applying income-specific subsidy rates based on the net tuition fees by income quintile reported in Marto and Wittman (2024). These rates are 0.44 for families with non-college-educated parents and 0.33 for those with college-educated parents. We then multiply the resulting net attendance costs by eight to estimate the total cost of sending two children to college for 4 years and normalize these costs by the average earnings of college-educated men (USD 106,931). This calculation implies college attendance costs of 1.12 for families with non-college-educated parents and 1.35 for those with college-educated parents.

College Attendance and Completion The probability that a child completes college is given by a logistic function as in Blandin and Herrington (2022),

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

where χ_2 is the maximum probability of college completion. We set $\chi_2 = 1$. Next, we calibrate χ_0 and χ_1 such that the average rates of college completion of children with non-college- and college-educated parents match their data counterparts (unconditional on attendance). In the PSID-TAS data, the gap in college completion rates by parental education is striking: 22.0% of children from non-college-educated households graduate from a 4-year college, while the completion rate is 69.2% for children from college-educated households. As Table 11 shows, the model matches this gap well with 25.6% of children with non-college-educated parents completing college and 67.7% of children with college-educated parents.

The educational gradient in college attendance is instead much less steep. In our sample, the college attendance rate is 98.9% for children from college-educated couples, meaning that virtually every child attends college. For children from non-college-educated couples, the attendance rate amounts to 79.0%, a surprising contrast to their low completion probability which illustrates that paying for college is risky for parents—many children who attend college never obtain a college degree. Recall, that the weight on children, β^K, is pinned down by the fraction of all children attending a 4-year college in the data. Children with non-college-educated parents have, on average, lower human capital at the end of stage 2 and consequently, a lower probability of college completion, than children with college-educated parents. For this reason, non-college-educated parents' decision to send their children to college is more sensitive to the warm glow utility parents get when their children attend college, ξ. We therefore use the differential in children's attendance rates by their parents' education to pin down this parameter. The model matches the differential well. 72.8% of children with non-college-educated parents and 99.6% of children with college-educated parents attend college in the model.

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. Table 12 shows that the model accurately predicts higher cohabitation rates and lower marriage rates among couples without college degrees compared to their college-educated counterparts. Specifically, the cohabitation rate for non-college-educated couples is 13.9 percentage points higher in the data and a comparable 13.0 percentage points higher in the model.

The model also generates a similar pattern of time and money investments by parental education and marital status as observed in the data. The time and money investments in Table 12 are average annual investments, averaging over model stages 1 and 2, and for

Table 12: 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
Ave. 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
Ave. 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.

currently married and cohabiting couples only.[23] While the model matches the pattern of investments in the data, the extent of variation in investment across marital and education groups in the model does not always align with that in the data. For instance, the model tends to generate too much variation in time and money investments between married and cohabiting non-college-educated couples. At the same time, the model generates too little variation by marital status for college-educated couples.

The large differences in child investments by marital status for non-college-educated

[23] We do not include divorced and separated couples here because we cannot identify mothers who are from separated couples in the data.

Table 13: 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).

couples in the model, illustrate that, for these couples, marriage clearly facilitates investment in children. What about college-educated couples? There is little difference in time investments between married and cohabiting college-educated couples, and money investments actually increase in cohabitation. Cohabiting college-educated couples invest more money in children than married couples to help offset the higher risk they face of splitting up. Table 13 presents average time and money investments in the baseline economy by parental education and marital status including divorced and separated couples. Upon divorce or separation, the cost of investing in children increases, and both time and money investments fall significantly.[24] In the model, college- and non-college-educated cohabiting parents respond differently to their relatively higher risk of breaking up. Because they are less affluent, non-college-educated parents reduce child investments and the probability they send their children to college. In contrast, college-educated couples try to offset the risk by investing more while still cohabiting, and send their children to college at similar rates to married couples.

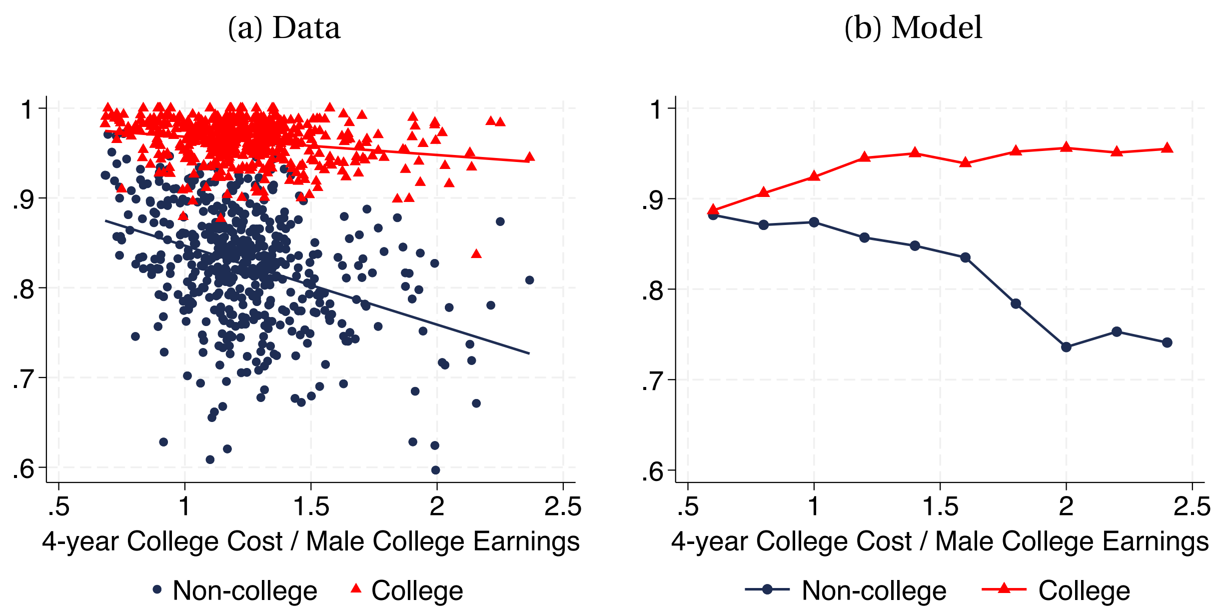
As a result, in the model, as in the data, cohabitation primarily affects the college attendance rates of children with non-college-educated parents. The college attendance rates of children with college-educated parents are less than a percentage point lower with cohabitation as compared to marriage in both the model and the data. In contrast, the college attendance rates of children with non-college-educated parents decline from 77.5% to 52.2% in the model if the parents cohabited. Albeit, the decline in the model is larger than its data counterpart. In the data the college attendance rate of children with non-college-educated parents declines from 81.9% to 68.6%.

Lower levels of child investment and college attendance rates results in lower college completion rates for children with cohabiting non-college-educated parents. Their completion rate is only 6.9% compared to 29.8% for children with married parents of the same education level. Similar completion rates are observed in the data for these two groups. Even though the children of college-educated cohabiting parents attend

[24]This feature of the model is in line with Kearney (2023), who shows that children growing up in single-parent versus two-parent households face much lower educational outcomes.

college at similar rates to those of college-educated married parents, they also have relatively lower college completion rates. College-educated cohabiting parents only partially offset the impacts of their higher likelihood of splitting up on their children's human capital. Still, at 65.9%, their children's college completion rate is high relative to the rate in the data (42.9%). The even lower college dropout rates for children with cohabiting parents in the data may be due in part to differences in the degree of reliance on financial aid (Vardishvili (2020)) which our model abstracts from. Note, also, that these households are less than 3% of all couples in both the model and the data.

Figure 3: 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.

We next assess the model by comparing its predictions regarding the relationship between the costs of sending two children to college and marriage rates to empirical counterparts. To this end, we compile a dataset of state-level college costs and marriage rates for both college- and non-college-educated couples in the U.S. We calculate state-level tuition fees, including room and board, by constructing an enrollment-weighted average of tuition fees from both private and public four-year colleges.[25] The per child cost is multiplied by two, converted to 2017 USD, and normalized by the annual earnings of college-educated males aged 25–44. Earnings as well as state-level marriage rates

[25]The U.S. Department of Education publishes state-level tuition fees for private and public four-year colleges based on the Integrated Postsecondary Education Data System (IPEDS). See the calibration section on college costs for further details on how we construct college costs.

for college and non-college educated parents are calculated from the CPS-ASEC.

Figure 3 shows that the model generates marriage patterns by parental education and college costs that are similar to those in the data. In the data the marriage rate among college-educated couples is relatively stable for the observed range of college costs. Likewise, the model only predicts small changes in marriage rates as college costs rise. Along the same lines, for non-college-educated couples, the model replicates the observed empirical decline in marriage rates as college costs increase. When regressing the marriage rate of non-college-educated couples on the costs of sending two children to a 4-year college (normalized by male college earnings), we find that the marriage rate of non-college-educated couples declines by 9.4 percentage points when college costs double from their baseline model value of 1.12.[26] In the model, we observe a drop in the marriage rate for non-college-educated couples of 10.6 percentage points when college costs double. The magnitude of the decline is very close to the data.

5.1 Cohabitation and the Importance of Children

In our theory, children are a key motive for couples to marry. We use the model to investigate whether couples in particular 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 shutting down one model ingredient related to the presence of children. In each experiment, we solve for parents' optimal choices including over marriage versus cohabitation keeping their education distribution fixed at the baseline level.

Table 14: 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 14 reports parents' cohabitation rates in the decomposition exercises. In Experiment (1), we shut down all aspects of children that affect the parental decision problem. This includes the endogenous accumulation of skills, childcare costs, child sup-

[26] See Appendix Table C.6 for details.

port, and the warm glow utility that parents receive if their children attend college. In the economy without children, mothers work full-time since any investment in children (time and money) becomes unproductive. Therefore, the expected lifetime utility of children is constant and no longer varies between college- and non-college-educated parents. In addition, parents spend all their resources on consumption. The absence of children has a large impact on marriage and cohabitation rates. The cohabitation rate of non-college-educated couples drops slightly from 18.3% to 13.4%, while that of college-educated couples increases by a factor of six from 5.3% to 31.4%. Absent children, the value of marriage as a facilitator of child investment declines putting downward pressure on marriage rates. However, parents still benefit from the economies of scale in consumption when living in a couple. Since all resources are spent on consumption, the economies of scale become more important for low-income parents, who choose to increase the couple's stability through marriage. As a result, college-educated couples now cohabit at higher rates than non-college-educated couples.

Next, we assess how the individual model components related to children affect the cohabitation rates of parents. In Experiment (2), we only shut down the endogenous skill accumulation of children, which implies that parents work full-time and no longer invest in children. This experiment closely replicates the results of Experiment (1) and also implies a gap in cohabitation rates by parental education that is counterfactual to the data.[27] In Experiments (3) and (4), we eliminate childcare costs and child support, respectively. Both experiments minimally impact the cohabitation rates of college- and non-college-educated couples relative to the baseline. Removing warm glow utility from college attendance in Experiment (5) yields larger changes in cohabitation rates: they increase for both college- and non-college-educated parents. However, the former still marry at higher rates and the education gap in cohabitation rates does not change signs. In sum, the endogenous skill accumulation of children 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 offers more insurance to women since assets are divided equally upon divorce, while a larger share of assets stay with the man in separation. Third, child support payments are more generous in divorce than in separation from cohabitation. As we have shown in Section 5.1, the impact of child support payments on cohabitation rates is small. 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.

We first implement equal asset splits for both married and cohabiting couples in Experiment (1), and introduce an unequal asset split, as in cohabitation in the baseline, for

[27]Cohabitation rates in Experiment (2) are slightly lower than in Experiment (1) since parents still receive warm glow utility from children's college attendance. This implies that some prefer to stay in a couple in order to be able to pay the college costs at the end of stage 2.

Table 15: 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.

both couple types in Experiment (2). Table 15 shows that when the share of assets allocated to each partner is independent of whether the couple is married or cohabiting, cohabitation rates go up. This is true whether the asset split is 50-50 in both marriage and cohabitation, or 65-35. Requiring the same asset-splitting rule in both marriage and cohabitation removes part of the insurance value from marriage for women, making marriage less attractive. When all couples are subject to a 65-35 asset-splitting rule, child investment declines and college completion rates fall slightly. Subjecting all couples to a 50-50 asset-splitting rule has two effects on couples that work in opposite directions. Holding marriage rates fixed, it increases incentives to invest in children. However, it also induces more cohabitation which lowers child investment. The net effect is little change in child college completion rates.

In Experiments (3) and (4), we equalize the annual separation probabilities between married and cohabiting couples to the baseline probability in marriage (2.47%) and the baseline probability in cohabitation (6.88%), respectively. In both experiments, cohabitation rates increase substantially. Yet, the college completion rates of children with college-educated parents remain remarkably stable. Even when marriage is as unstable as cohabitation, the college completion rate of children with college-educated parents remains high at 66.1% compared to 67.7% in the baseline. Faced with a higher separation risk, regardless of marital status, college-educated parents behave like cohabiting college-educated couples in the baseline economy. Recall from the beginning of Section 5 that these more affluent cohabiting couples invest more money in their children than their married counterparts to help offset the higher risk they face of splitting up and its negative impacts on their children's human capital. Consequently, cohabitation has only a small impact on their children's college completion rates. In contrast, cohabiting non-college-educated parents in the baseline model invest relatively less in their children, send their children to college at lower rates, and have children with significantly lower rates of college completion than their married counterparts. In Experiment (4), when marriage is as unstable as cohabitation, all non-college-educated parents behave in this way and their children's college completion rates plummet to 4.7% compared to 25.6% in the baseline.

Experiments (1)–(4) reveal that both equal asset-splitting in divorce and the lower probability of splitting up increase the attractiveness of marriage relative to cohabitation in the model. Both features of marriage, but especially its relatively higher stability, facilitate child investment. College-educated parents are better able to compensate for the loss of either of these features. Consequently, making marriage more like cohabitation has little impact on their children's college completion rates. This is not the case for non-college-educated parents. Thus, marriage is particularly important for the college completion rates of children who's parents do not have a college degree. We return to this point in Section 6.2.

6 Cohabitation and Child Outcomes

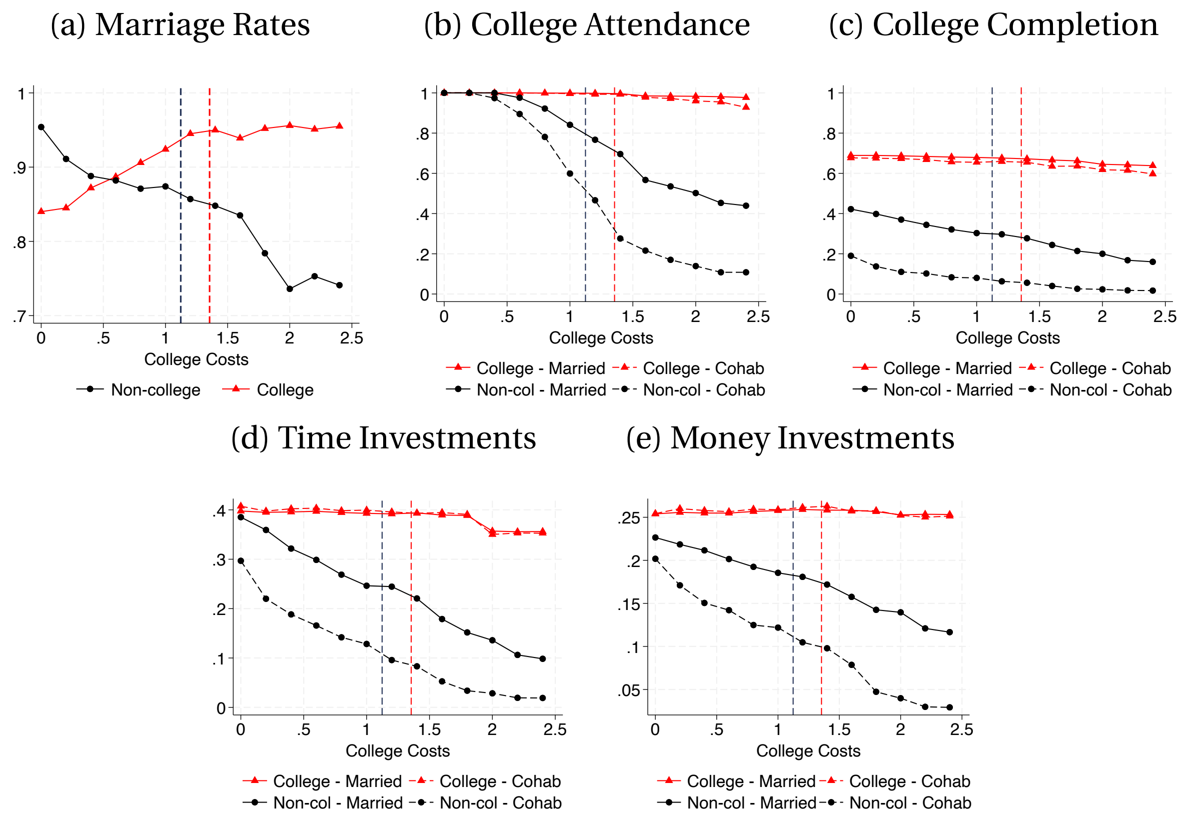
6.1 How College Costs Shape Cohabitation Rates

We explore, through the lens of the model, how college costs shape parents' decision to marry. To this end, we vary college attendance costs in the model, κ^e, from zero to the maximum observed in the U.S. data.[28] Figure 4 shows how marriage rates, children's college attendance and completion rates, and average time and money investments change as college costs vary. College attendance and completion rates are reported by parent's education and marital status at birth. For instance, the solid blue line in panel (b) shows how the college attendance rate of children with non-college-educated parents who married at birth changes as college costs rise. Average time and money investments are the averages over period 1 and 2 of annual time and money investments, and are reported by education and marital status for currently married and cohabiting couples. Divorced and separated couples are not included. The vertical lines in each panel are provided for reference and show the baseline levels of college costs for non-college-educated (blue) and college-educated (red) parents.

The first point in each line in Figure 4 shows the impact of setting college costs to zero in the model. Notice that, compared to their baseline levels, when college is free, the marriage rates of college- and non-college-educated parents essentially flip. With college free, non-college-educated parents no longer face uncertainty about whether or not they will be able to afford it, and college attendance rates increase to 100% for both education groups. Because non-college-educated parents are now certain that they will be able to send their children to college, the value of investing both time and money in them goes up. As a result, as Figure 4 shows, they invest more of both and the differences in time and money investments by parental education decrease relative to those in the baseline. To achieve these higher rates of time and money investments, more non-college-educated couples marry and their marriage rate increases from about 82%

[28] In the baseline, the cost of college differs by parent's education. In these experiments everyone pays the same college cost.

Figure 4: 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.

in the baseline to over 95%. Marrying facilitates child investment by increasing the expected duration of time the couple will stay together and women's resources should the couple split up.

In contrast to non-college-educated couples, college-educated parents are able to afford college in the baseline. Thus, making college free has little impact on their children's college attendance rates. For college-educated parents, free college works like a positive wealth effect. Now that college is free, they do not need to save for college costs and can 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.[29] This lowers the value of stability through marriage. The value of economies of scale in consumption when living in a couple also declines further lowering the value of marriage. As a result, the marriage rate of college-educated couples falls from about 95% in the baseline to 83% with zero college costs.

Panel (a) of Figure 4 shows that as college costs increase there are opposite effects on the marriage rates of non-college- and college-educated couples. As college becomes more costly, college-educated couples value of marriage rises. Part of this rise is due to increasing returns from economies of scale in consumption, and part of it is due to the effect of college costs on child investments in the event that the couple splits up. Rising college costs has little effect on child investments conditional on being currently married as shown in panels (d) and (e). But, by marrying, college 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 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 resources for consumption. Both reduce the value of marriage. Consequently, more and more non-college-educated couples opt for cohabitation. 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 the 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 ($p^C = 0.0247$), such that cohabitation and marriage are equally stable. Second, we require assets to be split equally 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 is the opposite: marriage is as unstable as cohabitation ($p^M = 0.0688$), assets are split unequally ($\alpha^M = 0.65$), and child support is as low as in cohabitation.

We distinguish two types of equilibrium in this exercise: short run and long run. In the short-run equilibrium, couples re-optimize but the parental education distribution remains fixed at its baseline value. In the long-run equilibrium, we let parents' edu-

[29] Table 13 shows this gap in the baseline economy.

Table 16: 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.

cation distribution converge to its new steady state. Table 16 summarizes the results. Note that, aside from the preference shock, parents are indifferent between cohabitation and marriage in both experiments, resulting in a cohabitation rate of 50% for both college-educated and non-college-educated parents.

In Table 16, we observe that, making cohabitation equivalent to marriage (Experiment I) reduces inequality in educational outcomes while, at the same time, increasing college completion rates. Comparing columns (1) and (2), reveals that there is little impact on the college attendance and completion rates of children with college-educated parents. This is not surprising given that nearly 95% of college-educated parents are married in the baseline. In contrast, there is a notable increase of about 4 percentage points in college attendance and completion rates for children from non-college-educated families. This adjustment leads to an increase in the fraction of children who complete college which rises from 44.2% to 46.7%, and a decline in the gap in college completion between children with college-educated and non-college-educated parents which falls from 42.1 percentage points to 38 percentage points. In the long run, the college completion rates rises to 48.2%.

In Experiment II marriage is, instead, made equivalent to cohabitation. Since most couples are married in the baseline, the impacts of this change are likely to be more pronounced, and this is indeed the case for children with non-college-educated parents. For children with college-educated parents, the impacts are small. College-educated parents have higher wages and college-educated mothers get larger child support transfers if the couple splits up. For both these reasons, 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% to 51.2%, and completion rates drop significantly from 25.6% to 5.4%, widening both the college attendance and completion gap by around 20 percentage points. The overall college completion rate drops from 44.2% to 32.0% in the short run, and 13.5% in the long run.

The experiments reveal that the choice of parents to marry versus cohabit matters for children's educational outcomes. The college completion rates for children of non-college-educated parents, in particular, are lower when their parent's cohabit. Consequently, rising rates of cohabitation among non-college-educated couples may be contributing to rising inequality in children's educational outcomes.

7 Conclusion

Cohabitation rates are higher among non-college-educated couples with young children as compared to college-educated couples. We provide empirical evidence that marriage, by providing insurance to the lower-earning spouse, facilitates investment in children. Then, we build an overlapping generations model where couples choose whether to cohabit or marry, in addition to 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 interact with the cost of education for children. Calibrating the model to the U.S. 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 U.S. We also show that, in the context of high college costs, college-educated parents' decision to marry amplifies the gap in college completion rates between their children and those of non-college-educated parents. The parental choice to marry or cohabit thus heightens inequality in the next generation.

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A Data Appendix

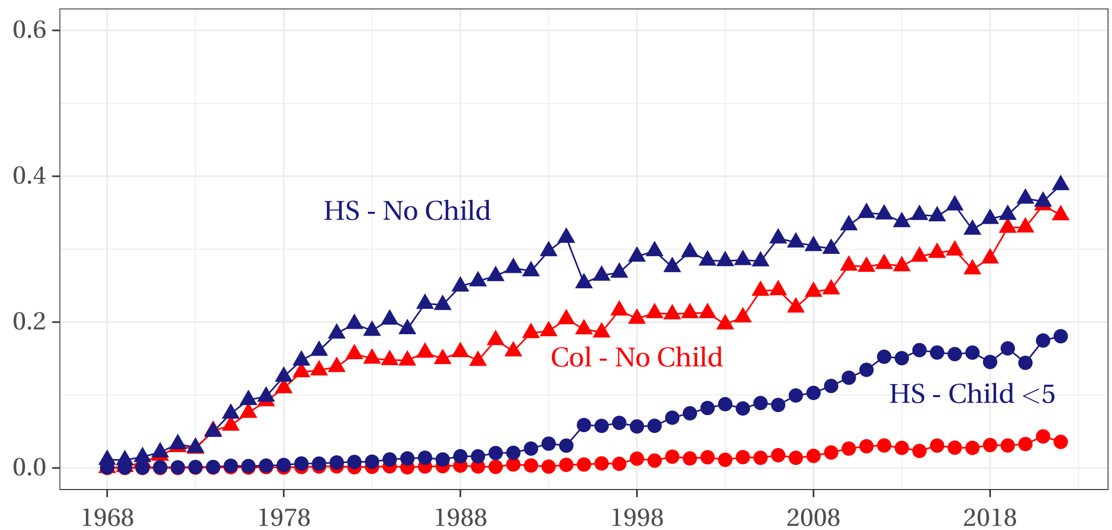
A.1 Cohabitation Rates

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% of all cohabiting couples.[30] 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 to 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.

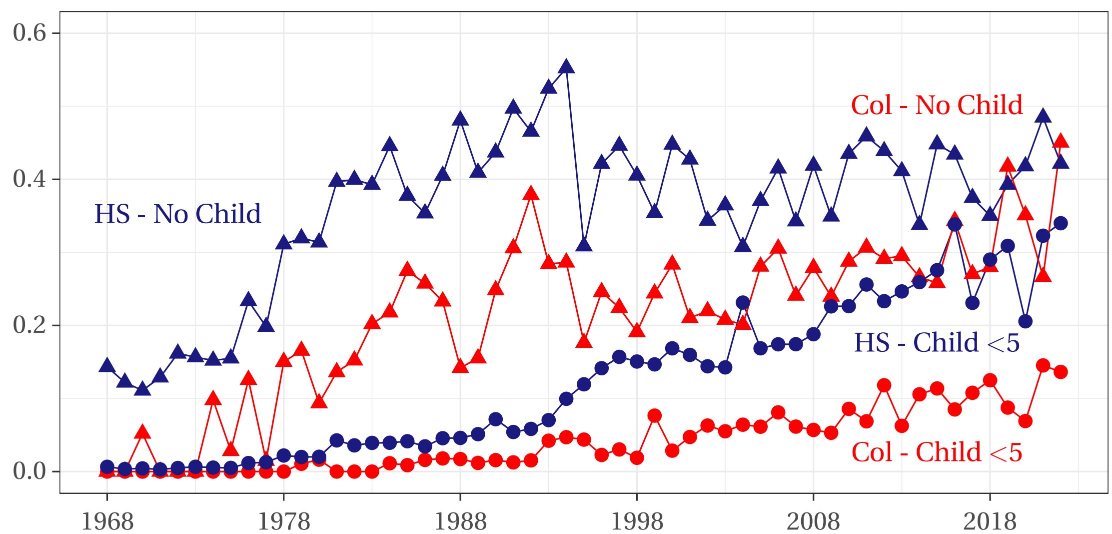
[30] Between 1995 and 2007, we validate our findings using the 'relate' variable to ensure all cohabiting couples, where one member is the household head, are accurately identified.

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). Author's calculations.

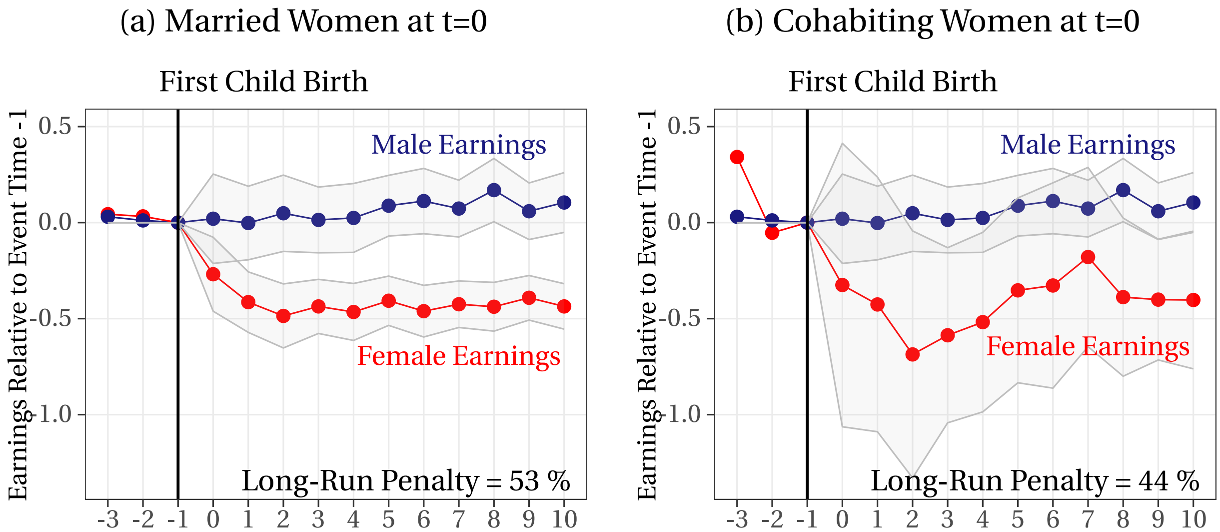
Table A.1: Marriage Rates across Countries

	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. Author's calculations.

A.2 Earnings Penalties

Figure A.2: Child Penalties - Robustness excluding Blacks



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 panel (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.

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.2 in Appendix A reports the child penalties in this restricted sample. We observe that child penalties increase both for married and cohabiting women but a substantial difference remains between the two groups. In particular, child penalties amount to 53% among married women while among cohabiting they reach 44% 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.

A.3 Time and Money Investments

A.3.1 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.3: CEX 2003-19 UCC codes

Expenditure Type	**Universal Classification Codes (UCCs)**
1. Children's Goods	
infants' furniture; infants' equipment; infant clothes; children's clothes; diapers; accessories, hosiery, and footwear; bicycles; toys, games, hobbies, tricycles, and battery powered riders; playground equipment; musical instruments and accessories; rental and repair of musical instruments; computers for non-business use	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	
Babysitting and childcare; School books, supplies, and equipment for day care center, nursery school, and other schools; School books, supplies, and equipment for day care centers and nursery schools Other expenses for day care centers and nursery schools, including tuition; School meals for preschool and school age children	340210 340211 340212 660900 660901 670310 790430
3. Education of school-age Children	
Food or board, at school and rooming/boarding houses; Housing for someone at school; Private school bus; School books, supplies, and equipment for elementary and high school; Encyclopedia and other sets of reference books; School books, supplies, and equipment for elementary, high, vocational or technical school; Rentals of books and equipment, and other school-related expenses; Test preparation, tutoring services; School meals for preschool and school age children	190901 210310 530902 660210 660310 660410 660902 670210 670410 670902 670903 790430

4. Housing	
Rent of dwelling; Ground rent; Fire and extended coverage insurance; Homeowners insurance; Property taxes; Mortgage interest; Parking at owned home management fees; Tenant's insurance; Rent received as pay; Built-in dishwasher, garbage disposal, or range hood; Fuel oil; Gas, bottled or tank; Coal; Wood, kerosene, and other fuels; Electricity; Natural or utility gas; Water and sewerage maintenance; Trash and garbage collection; Septic tank cleaning; Lines, curtains, drapes and pillows; Furniture; refrigerator or home freezer; clothes washer; clothes dryer; cooking stove, range or oven, excl. microwave; portable dishwasher; Window air conditioner; Room-size rugs and other non-permanent floor coverings; Carpet squares for owned and rented homes; Venetian blinds, window shades and other window coverings; Clocks; Lamps, lighting fixtures, ceiling fans; Dinnerware, flatware, serving pieces; Non-electric cookware; Power tools; Electric floor cleaning equipment; Sewing machines; Small electrical kitchen appliances; Portable heating and cooling equipment; Non-power tools; Fresh flowers or potted plants; Closet storage items; Housekeeping service, incl. management fees for maid service in condos; Water softening service; Moving, storage, and freight express; Non-clothing household laundry or dry cleaning; Repair of household appliances; Furniture repair, refinishing, or reupholstering; Rental or repair of equipment and other yard machinery, power and non-power tools; Miscellaneous home services and small repair jobs not already specified; Rental of furniture Rental; Rental of office equipment for non-business use; Sewing materials for making clothes; Material and supplies for sewing, needlework, quilting; Sewing notions, patterns; Repairs of household items; Clothing storage; Calculators; Typewriters and other office machines for non-business use; Total purchases at grocery stores; Food and nonalcoholic beverage purchases at convenience or specialty stores; and others	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	
Food and nonalcoholic beverage expenses	220313 220314

6. Transportation	
Gasoline; Diesel fuel; Motor; Coolant/antifreeze, brake & transmission fluids, additives, and radiator/cooling system protectant; Electric vehicle charging; Tires; Vehicle products and services; Vehicle parts, equipment, and accessories audio equipment; Vehicle cleaning services including car wash; Repair and replacement of vehicle parts; Auto repair service policy; Vehicle insurance; State and local vehicle registration; State vehicle registration; Local vehicle registration; Driver's license; Vehicle inspection ; Auto, truck or van rental; Parking fees at garages, meters, and lots; Tolls; Towing charges; Global positioning services; Motorcycle, motor scooter, or moped rental; Airline fares; Intercity and Intracity transit fares; Taxi fares; Intercity train fares; Ship fares; Membership fees for automobile service clubs; Automobile service clubs and GPS services; Rental of motorized camper; Vehicle finance charges; New vehicles; Cash downpayment for new or used vehicles; Principal paid on new or used vehicles; Vehicle personal property taxes; Vehicle lease payments, extra fees, and termination fee	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	
Prescription drugs and medicines; Purchase of eye glasses or contact lenses, incl. kits and equipment, fittings, warranty expenses, and insurance; Purchase of general medical or surgical equipment; Purchase of supportive or convalescent medical equipment; Physicians' services; Dental care; Eye exams, treatment or surgery; Lab tests and X-rays; Services by medical professionals other than physicians, nursing services, and therapeutic treatments; Non physician services; Hospital room and meals; ICU, Xrays, lab tests, medicine, injections, therapy, examinations, transfusions, nursing services, oxygen, and anesthetics; Other medical care service, such as blood donation, ambulance, emergency room, or outpatient hospital services; Health insurance and other insurance fees; Medicare payment, supplement and premiums; Tricare/military premiums; Children's Health Insurance Program (CHIP) premiums; Adult diapers	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.3.2 Additional Regression Results

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
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

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 diary was recorded.

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
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

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 diary was recorded.

Table A.6: Monetary Education Investments in Children

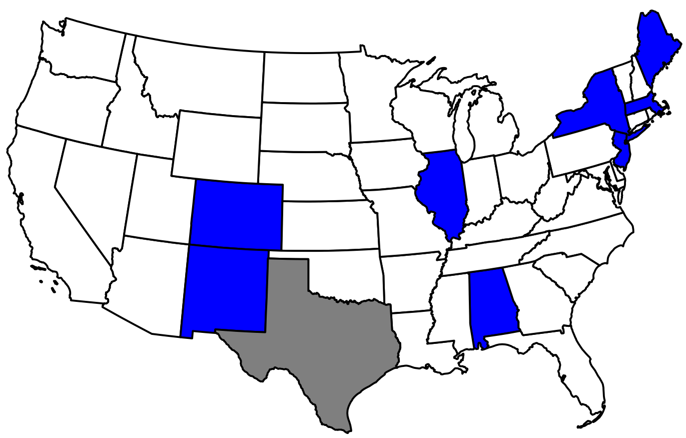
	Dependent Variable: **Annual Education Expenditures**		
	(1) Children Aged 0-17	(2) Children Aged 0-11	(3) Children Aged 12-17
	A. All Families		
Cohabiting (rel. to Married)	-121.64^{*}	-98.81	-154.92
	(68.00)	(86.78)	(109.75)
Mean expenditures	420.12	365.77	523.12
Observations	11,431	7,483	3,948
	B. 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
Controls	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

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 corresponds to the development stages in our model.

A.4 Alimony Reforms

We consider alimony reforms in eight states (see Figure A.3) 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 its duration. Table A.7 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.

Figure A.3: Map of Alimony Reform States



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

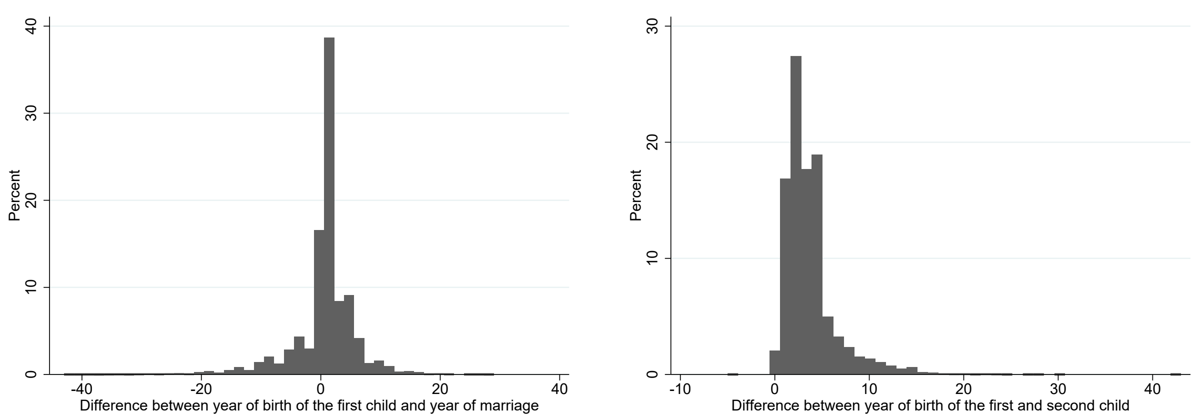


Figure A.4: Intervals between year of marriage, year of birth of first child and year of birth of second child

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

Table A.7: Overview of Alimony Reforms

Year of Reform	State	Legal Change
2006	New Mexico	released new guidelines on alimony payments
2012	Massachusetts	limits 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	limits length of time during which alimony can be awarded
2015	Illinois	capped maximum amount of alimony paid
2016	New York	limits length of time and capped maximum alimony that can be awarded
2018	Alabama	limits length of time during which alimony can be awarded
2011	Texas	expanded previous caps on alimony amount and duration

Table A.8: Alimony Reforms - Mother's 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
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

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 diary, metropolitan area, year and state fixed effects. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01.

Table A.9: Alimony Reforms - Father's 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
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

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 diary, metropolitan area, year and state fixed effects. Sample weights are adjusted for the day when the time diary was recorded. Standard errors are clustered at the state level. *p<.10; **p<.05; ***p<.01.

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 than the actual ones and re-estimate the effects on mothers' time spent with children. Tables A.10 and A.11 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.10: 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** (0.15)	−0.14 (0.14)	−0.11 (0.08)	−0.16 (0.15)
Years since placebo reform (5 years before actual)	0.30** (0.14)	−0.11 (0.13)	−0.09 (0.07)	−0.13 (0.14)
Years since placebo reform (6 years before actual)	0.23* (0.13)	−0.08 (0.12)	−0.07 (0.07)	−0.10 (0.12)
Years since placebo reform (7 years before actual)	0.18 (0.12)	−0.06 (0.12)	−0.06 (0.06)	−0.07 (0.11)
Mean hours	18.14	14.20	25.34	41.42
Observations	16,711	16,711	16,711	16,711
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: ATUS data, 2003–2019. Time is measure 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.11: 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 (13.18)	−19.98 (13.81)	−23.83 (20.92)
Years since placebo reform (5 years before actual)	−18.12 (11.98)	−17.15 (12.54)	−21.84 (18.31)
Years since placebo reform (6 years before actual)	−16.57 (11.08)	−14.80 (11.58)	−21.94 (16.38)
Years since placebo reform (7 years before actual)	−14.97 (9.82)	−13.18 (10.53)	−19.60 (14.30)
Mean hours	439.95	384.31	548.49
Observations	10,088	6,664	3,421
Controls	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

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.

A.5 College Completion Probabilities

Although Add Health contains no information on parental wealth, it does provide rich information about schools.[31] 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 at 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, also a parent, who in the vast majority was the mother, filled-in a detailed questionaire. 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 instability, which is known to hinder child outcomes (Aiyagari et al., 2000; Tartari, 2015). Similarly 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 6.[32] 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 regression (gender, age, race and household income) and include state fixed effects. Table A.12, column 1 in the Appendix 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 AddHealth data and conduct some robustness checks. In Table A.12, 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 addi-

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

[32] 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.

tional regressor.[33] 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 on their children while at school leading to 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 child outcomes.

Table A.12: Parental Marital Status and Child Development - Couples Only

	$(\text{College Completion})_{\text{age } 26-32}$				
	(1)	(2)	(3)	(4)	(5)
$(\text{Mother married})_{age13-19}$	0.16***	0.13***	0.06**	0.06*	0.03
	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
$(\text{GPA})_{age13-19}$					0.25***
					(0.01)
$(\text{Mother college grad})_{age13-19}$	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; 'Family instability' 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 in column 1; gender, age, race, and household income.

[33] GPA is reported in Wave I and is the Grade Point Average in English, Math, History and Science.

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

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

and the value of being a father is given by

$$\begin{aligned}\tilde{V}_2^{s,m}(a,k;e) &= u(\hat{c}_m) \\ &\quad + \beta(1-\eta_2)\Big\{p^s \tilde{S}_2^{s,m}(\alpha^s \hat{a}'; (1-\alpha^s)\hat{a}', \hat{k}', e) + (1-p^s)\tilde{V}_2^{s,m}(\hat{a}', \hat{k}'; e)\Big\} \\ &\quad + \beta\eta_2\Big\{p^s \tilde{Y}^m(\alpha^s \hat{a}'; (1-\alpha^s)\hat{a}', \hat{k}', e) + (1-p^s)\tilde{W}^m(\hat{a}', \hat{k}'; e)\Big\},\end{aligned} \tag{B.2}$$

where

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

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

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

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

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

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

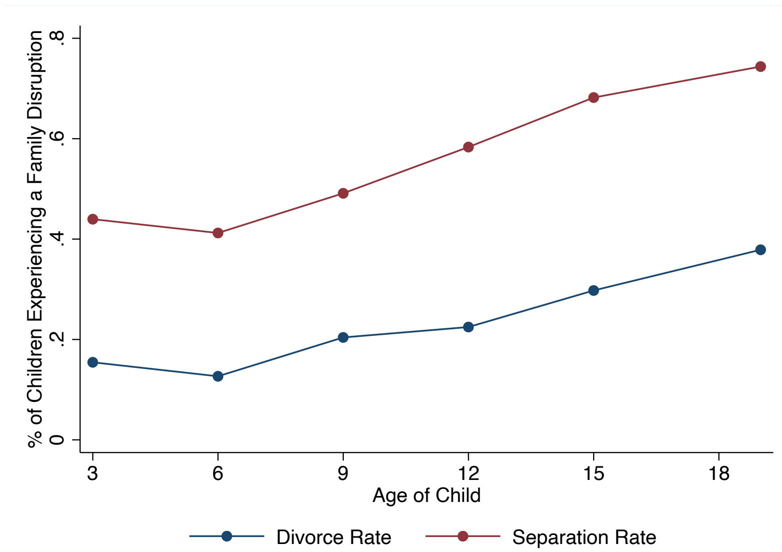
Note that retired households die with probability η_4, in which case utility is normalized to zero.

C Calibration Appendix

C.1 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.2 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.

Table C.1: 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.2: 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.

C.3 Money Investments in Children

Table C.3: 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 are converted into 2017 USD using the PCE index.

Table C.4: 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 are converted into 2017 USD using the PCE index.

C.4 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.5: 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
Controls	Yes
Year FE	Yes

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.

C.5 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 U.S. 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 a college-educated men by state and year. After converting earnings into 2017 USD, we use them to normalize college costs in every state for every year.

Table C.6: College Costs and Marriage Rates of Non-college Couples Across U.S. States

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

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.