Marital Unions and Human Capital Formation

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Table of contents

List of tables

List of figures

Introduction

Marriage is one of the most private and critical decisions a person makes in their life. This has far reaching effects on an individual, their average quality of life and most importantly on the lives of their children. The development of young children, in terms of emotional, physical, social and learning skills, has a direct effect on their overall development and on the adults they will become. Comprehending the role played by marital unions and the elements that potentially shape childrens human capital formation is intriguing and important, to acquire knowledge on where new initiatives are needed and how to design the optimal policies.

This thesis consists of three enclosed chapters that all empirically investigate issues related to how families function in different environments, in order to understand the nature, causes and consequences of disparities in children's human capital. The first chapter focuses on India, while the second and third chapters are centred on the United States. Although different environments, different histories, varied cultures and different backgrounds, yet the one common theme of this thesis is the way in which families are rational players within households.

The first chapter, *"The Effect of Arranged Marriages on Child Development"*, is motivated by the findings in Heckman (2000), which argues that role of the family is crucial to the formation of learning skills in children. This paper used the India Human Development Survey (IHDS), a new dataset, with the first wave starting in 2004—05. India is a country where marriages are still arranged by members of the bride and groom's family, gradually it is leading to marriages where the bride and groom choose each other with little or no parental involvement. Marital relations between spouses

considerably affect their quality of life and development of their children and contribute to the intergenerational transmission of human capital. This paper sheds light on an ever present yet neglected aspect of women's lives in India. My work is a novel effort to explain whether consent within marriage has a causal impact on responses of women to violence and if there are any effects on cognitive test scores of children. To identify causal effect of consent in marriage within households, I exploit variations in sex ratios across districts in India using an instrumental variable approach. I find that women in marriages without their consent report higher incidences of violence and their children perform worse in cognitive tests than those women in partial or fully consensual marriages. The effect is strong and persistent for children from low-income households, rural and lower caste categories.

"Assortative Mating, Marital Dissolution and the Role of Business Cycles" is the second chapter in this thesis. It uses the Panel Study of Income Dynamics (PSID) data from the US, to test the association between assortative mating and marital dissolution of couples in the context of business cycles. Assortative mating is along the dimensions of age at marriage, educational attainment, ethnicity and religiosity (Kalmijn, 1998). Research has long speculated the effect of economic changes on social conditions. Children are the most vulnerable and greatly affected members of the society when marriages breakdown. It was noted by Willcox early in 1893 that divorce rate is influenced by business conditions. For example, low divorce rates observed in 1873–79 and 1884–86 were periods of depression in trade for the United States. However, there is little empirical evidence on whether such a link exists for assortatively mated couples. Using a duration model strategy, this work contributes to an existing strand of literature which has not been studied in depth. Findings suggest that higher education of the wife at marriage and mixed ethnicity greatly increases the couples hazard of ending their marriages. Furthermore, race and religiousness have a very stabilising effect on the hazard of dissolution.

The third chapter, *"Parental Education and Child Development: Long and Short term Outcomes"* using the PSID dataset, examines the relationship between educational homogamy of spouses on child's outcomes which is measured by college enrollments and college graduation for children between 18-28 years of age. There has been growing evidence of educational attainment of spouses on marriage, dissolution and fertility patterns, economic well-being, family investments in children as well as parenting practises and standards. Although, countries spend a large share of their investment in the education sector and on building their labour force, there is almost no evidence of how educational similarity of parents can impact on college outcomes of young adults. Using variation in the timing of implementation of joint child custody and unilateral divorce laws across the United States as instruments, the findings from this analysis indicate that if the spouses are similar in their educational attainment levels, the propensity of their children enrolling in college increases. Thus, suggesting that spouses with similar educational levels are perhaps less likely to face frictions in terms of household management and therefore more likely to strategically invest in their children's future.

Chapter 1

The Effect of Arranged Marriages on Child Development: Evidence from India

1.1 Introduction

Children of today are the future of tomorrow. Almost three decades ago it was widely acknowledged that a low human capital base is the most serious developmental constraint in developing countries (*World Development Report, 1980*). Several studies have emerged since then which demonstrated the importance of investment in human capital formation of children in the context of developing countries.[1]

The families that these children come from has vital implications for their health, behavioural and labour market outcomes. Families are formed by marital unions. Historically, the elder members of a family or community played an important role in arranging marriages, however, over time the role of the bride and the groom has increased. In the West, romantic love is a primary basis for marriages where mate selection is autonomous. However, arranged marriages characterized by strong parental control over mate choice continue to be an accepted mode of mate selection in South

[1]See among others Frankenberg et al. (2005); Haddad, L. and Bouis (1991); Paxson and Schady (2005); Psacharopoulos and Arriagada (1989); Rogers (2010); Strauss (1986); Thomas and Strauss (1997)

and East Asia, Turkey, Middle East and several parts of Africa (Hamon and Ingoldsby, 2003). There is plentiful sociological evidence in this context and in economics, Edlund and Lagerlöf (2006) discuss the role of consent in marriage for intra-household allocation of resources and growth.

This paper, for the first time, examines the effect of the type of marriage, in particular non-consensual marriage on cognitive achievement of children in India, thereby contributes to the growing early child development literature. It has atleast two original data features. First, it relies on data from the India Human Development Survey of 2004-2005, which is a relatively new, large-scale national survey that includes specific questions on marital history for eligible women. Second, the paper tests the association between non-consensual marriage and cognitive achievement of children and empirically examines whether this association represents a causal mechanism, by exploiting the variation in the type of marriage through the variation in sex ratio at the time of marriage of women. A higher sex ratio (more males than females) at the time of marriage, is indicative of a son preference attitude and lower female autonomy in the natal household. This may expose her to an increased risk of having a non-consensual marriage. The instrumental variable estimates suggests, that the probability of the mother being in a non-consensual marriage, decreases the probability of the children obtaining higher test scores. Moreover, this study also shows that women in non-consensual marriages are more likely to answer "yes" to questions on potential situations that may result in wife beating at the community level (see section 1.3 for more). These questions are not reported incidences of wife beating, but they provide an assessment of gender-role attitudes among women.

The remainder of this chapter is organized as follows: Section 2 provides the literature on early human capital formation and a background on arranged marriages in India. Section 3 describes the data and section 4 presents the estimation strategy. Section 5 reports the results and section 6 concludes.

1.2 Literature Review

Human capital is a general notion of the knowledge and skills embodied in human beings, which plays an important role in determining their labour productivity and their ability to absorb new knowledge and master new technologies (Becker, 1962; Schultz, 1961, 1975). At the core of acquisition of knowledge and skills, education plays a vital role, while human health determines labour productivity (Strauss and Thomas, 1995). Health capital measures physical development and conditions in children such as height, weight and health status (Cunha et al., 2006). Human capital formation takes time and takes different forms, starting before childbirth when parents' decisions and behaviour determine birth outcomes, then passes through various stages with the human life cycle. Family environments during early years are major determinants of human development since they shape the foundation for lifetime skill development formed before children enter formal schooling (Francesconi and Heckman, 2016). Child growth affects outcomes during schooling which subsequently influence labour market outcomes (Alderman et al., 2000).

Cognitive ability and human capital formation

Emerging developmental literature demonstrates the importance of early environmental conditions on the evolution of adolescent and adult cognitive and non-cognitive skills (Cunha and Heckman 2007;Knudsen et al. 2006). Cognitive as well as non-cognitive skills affect the evolution of health capital through choices made by parents and children. Heckman et al. (2006) and Ryff and Singer. (2005) have shown the importance of personality and cognition in directly affecting educational choices and their role in affecting health and healthy behaviours.[2] Non-cognitive skills (such as motivation, perseverance, time preference, risk aversion, self-esteem, self-control and preference for leisure) have direct effect on wages, schooling, teenage pregnancy, smoking, crime, social life, performance in tests and health choices.[3]These are the

[2]See Heckman et al. (2006), Murnane et al. (1995), Auld and Sidhu (2005)
[3]See Borghans et al. (2007), Bowles et al. (2001), Heckman et al. (2006), Grossman (2000)

important determinants of success and can be improved more successfully at later stages in life than basic cognitive skills (Heckman, 2000).

An extensive multidisciplinary literature studies the determinants of cognitive achievements in children and this is divided into two branches: The early childhood development (ECD) branch and the education production function (EPF). The ECD branch seeks to understand the role of parental characteristics and early home environments in producing cognitive skills. The EPF branch examines the productivity relationship between schooling inputs and test score outcomes for school-age children. This paper focuses mainly in contributing to the ECD branch. There is evidence which shows early test scores are predictive of future labour market success. Robertson and Symons (1990) and Currie and Thomas (2012) based on data from the British National Child Development Survey have found that test scores at age 7 predict occupational choices and are correlated with education and earnings.

Research in psychology demonstrates the vital importance of the early pre-school years for skill formation, when human ability and motivation are shaped by families and non-institutional environments. Although formal education is only one important aspect of the learning process, it is not necessarily the most important one (Heckman, 2000). Coleman et al. (1966) has shown that families and environments play the crucial role in motivating and producing educational success as measured by test scores. Families are formed by marital unions and the quality of relationship between the husband and the wife affects the parenting behaviour of both parents (Lamb, 2002). By investing in their children parents are able to shape the preferences that govern the choices of children in a spectrum of health, labour market and behavioural outcomes (Heckman, 2007). Moreover, recent studies have shown the importance of parental time inputs on child cognitive and emotional skill development (Del Bono et al. 2012, Fiorini and Keane 2014, Boca et al. 2014). These studies lend support to my research hypothesis, that non consensual marriages is likely to affect quality of life

and child's cognitive ability.

In analysing cognitive achievement it would be ideal to have access to data on all past and present family and school inputs as well as information about children's heritable endowment. This is because theoretically, child development is a cumulative process that depends on the history of family and school inputs as well as inherited endowments. However, existing datasets lack information in one or more of these areas and therefore researchers in this field have to face the problems of missing or imprecisely measured variables (Todd and Wolpin, 2007).

Background on Arranged Marriages

Historically, matrimonial alliances were arranged by parents and elders in the family. Around the 8th century, individual consent marriages were introduced in Europe at the instigation of the Catholic Church (Goody, 1983). Although the family still played an important role in the marriage and mate choice, the involvement of the bride and groom increased.

In India the institution of arranged marriages is accepted as the legitimate way of finding a mate, and continues to survive to this day. Over the years, this institution has become accomodating in nature such that, there is considerable variation in the extent of parental involvement. Traditionally, arranged marriages relied exclusively on parental judgment in the selection of a spouse and premarital interaction and courtship was limited; in some cases the couple met on the wedding day. The modern version of the arranged marriage is characterized by greater collaboration between the parents and the children. Parents search and shortlist prospective candidates, children are encouraged to meet them, interact and veto shortlisted candidates. Gradually it is giving way to love marriages, especially among the middle and upper class in urban India in which mates select each other with little or no parental involvement, and

decide to get married usually after a period of courtship or dating. [4]

Arranged marriages reflect the importance of the family and co-dependence between the parents and the children, wherein the family' s needs, goals and interests supersede those of the individual. The joint or extended family remains an important institution in India. It is common to find three generations living together in the same household or multiple brothers forming a joint household with their wives and children. Family owned business is often a single source of household income, although income may also be pooled within the household and then reallocated by the head of the household, typically the eldest brother, father or grandfather (Nanda, 1995). Strong family ties imply greater reliance on family as an economic unit and less on the market or the government (Alesina and Giuliano, 2007b).

One of the ways in which the type of marriage could affect child development is through the equality of autonomy between sexes which implies equal decision-making in the household. Marital relations are associated with the type of marriage, and self-arranged marriages are more egalitarian than parent-arranged ones. In the latter, because family members play an important role in spouse selection process, the husband-wife relationship is de-emphasized. Instead, as Blood (1967) suggests, greater emphasis is placed on the "individual's vertical linkage with and responsibility to antecedent kinsmen and his progeny". On the contrary, self-arranged marriages are based on personal qualities and the quality of inter-personal relationships. Therefore, it is likely that such marriages emphasize a "horizontal bond" between marital partners (Fox, 1975). Household gender relations are related to fertility levels and intra-household resource allocation. Several authors such as Dyson and Moore (1983), Miles-Doan and Bisharat (1990) and Basu (1992) have found that egalitarian relations within a household are associated with low fertility levels and equal resource allocation. In marriages with egalitarian relations between spouses, investments in children are likely to be high since mothers have greater bargaining power in the household. This has been empirically demonstrated by Attanasio and Lechene (2002); Bobonis (2009);

[4]See Xiaohe and Whyte (1990), Mullatti (1995), Nanda (1995), Medora (2003), Jana (2000)

Lundberg et al. (1997); Thomas (1990).

Lack of female autonomy in marriage, could lead to low education and age at female marriage; restrictions on the ability of women to control their fertility, arising due to the need to produce a male heir; restricted freedom of movement characterised by low labour force participation of women (Dyson and Moore, 1983). In many instances, the husband's family may resort to domestic violence which clearly reduces women's welfare and affects children born to her through various mechanisms (Nasir and Hyder 2003; Campbell et al. 1999).

1.3 Data

Data used in this paper is publicly available from the India Human Development Survey (IHDS) conducted in 2004-2005, by the National Council of Applied Economic Research, New Delhi, India, in collaboration with the University of Maryland. The survey is micro unit recorded, nationally representative, based on a multistage sampling procedure. It is spread over 41,554 households across 33 states in India. Of the total 612 districts in India in 2001, 382 are included in the sample. The sample is spread across 1503 villages and 971 urban blocks. The districts were selected using a stratified random sampling to represent a range of socio-economic conditions. Villages, urban centres and households were selected using a cluster sampling technique.

The survey was carried out in face-to-face interviews with the questions organized into two separate questionnaires, household and women. Two one-hour interviews in each household covered health, education, employment, economic status, marriage, fertility, gender relations and social capital. The household questionnaires were administered to the individual most knowledgeable about income and expenditure, frequently the male head of the household. The questionnaire on health and education was administered to an married woman in the household aged 15-49, often the spouse of the household head. Data presented in this paper are drawn from a sub sample of

8, 880 married women aged 18-49 at the time of the interview and their children aged 8-11 years who took the test.

Cognitive Skills: Test Scores Children aged 8-11 completed short reading, writing and arithmetic tests. The objective was to measure basic skills using standardised tests that can be administered relatively easily and causing low anxiety levels on the part of children. Also, it was administered at the children's homes in order not to miss those who were absent from school. These tests were simple, intuitive and were translated into 13 languages in addition to English, and the children were asked to take the test in whichever language they were most comfortable. The focus was on children aged 8 to 11 years because "all of these children should have acquired the basic skills" (Desai et al., 2010). The three outcome variables for children in this analysis are: scores of children in reading, mathematics and writing tests. In the survey, scores on reading skills are divided into the following five categories:

- 0: Child cannot read at all (9%)
- 1: Can identify letters (13%)
- 2: Can identify words (20%)
- 3: Can read paragraphs (22%)
- 4: Can read stories (35%)

Mathematics skills is the second outcome variable and the scores are categorised as follows:

- 0: No recognition of written numbers (17%)
- 1: Can identify numbers (32%)
- 2: Can subtract a two-digit number from another (28%)

- 3: Can divide a three digit number with a one digit number (23%)

Writing scores are dichotomous in nature, where 1 indicates whether the child is able to write a simple sentence with two or less mistakes (69%) and 0, if the child cannot write (30%). For estimation, I construct binary indicators for reading and mathematics scores. Therefore, reading score, takes the value 0 if the score is either 0, 1, 2 and it takes the value 1, if the reading score is 3 or 4. Similarly, another binary indicator for maths scores is generated, which takes the value 0, if the maths score is either 0, 1 and it takes the value 1, if the score is 2 or 3. In all cases, higher scores indicate higher levels of achievement.

Marriage Type and Other Covariates Central to the analysis in this paper, the survey asks married women in the age group 15-49 years questions on the mate selection process. Married women were asked the following question: "Who chose your husband?" Their responses are divided into four categories:

1. Arranged by respondent herself
2. Arranged by respondent and parents together
3. Arranged by parents
4. Arranged by others i.e extended family members played a role in choosing a spouse

Women with responses (3) and (4) were further asked: "Did you have any say in choosing him?" to which they responded either Yes or No. Based on these responses, I categorize marriage type as a dichotomous variable where 1 represents a non-consensual marriage and 0 indicates a consensual one. The sample shows 41% of women in a non-consensual marriage.

Drawing from the literature on determinants of cognitive outcomes among children, I allow for a number of controls. These controls are divided as Household

Table 1.1 Percentage of women who reported experiences related to marriage planning

Measure	
Marriage Planning and choice:	
Woman herself chose husband	4.48
Woman and parents together	35.57
Parents alone: with woman's approval	18.91
Parents alone: without woman's approval	41.03
N=8813	

characteristics: total household income in logarithms (Rs/month), whether piped water, whether own dwelling, number of children; Home environment: household members read/watch/listen to radio,television or newspaper, if parents discuss work/farm/politics; Marital history: includes responses to questions such as, whether husband is from the same village, same caste, whether first marriage, if husband was related to the respondent, economic status of the natal family at the time of marriage; Child characteristics: such as age and gender of children; Parental education: measured by years of schooling. Also included are dummy variables for region, religion and caste. The Constitution of India officially recognizes the Scheduled Caste (SC) and the Scheduled Tribes (ST) as two groups of historically disadvantaged people. In addition, the Central Government of India has grouped many other castes and communities as Other Backward Classes (OBC) and describes them as "the socially and educationally backward classes". Thus, four caste categories are included: SC, ST, OBC and Others where Others includes all other caste groups and the general caste. To control for geographical variation, Indian states and union territories are classified into the following five regions: North (Jammu and Kashmir; Himachal Pradesh; Punjab; Chandigarh; Uttaranchal; Haryana; Delhi; Rajasthan), Central (Uttar Pradesh; Chhatishgarh; Madhya Pradesh), East (Bihar; Sikkim; Arunachal Pradesh; Nagaland; Manipur; Mizoram; Tripura; Meghalaya; Assam; West Bengal; Jharkhand; Orissa), West (Gujarat; Daman & Diu; Dadra and Nagar Haveli; Maharashtra; Goa) and South (Andhra Pradesh; Karnataka; Kerala; Tamil Nadu; Pondicherry). Furthermore, there are five religious categories: Hindu, Muslim, Sikh, Christians and Others where Others includes all other religions and those who identify themselves without a religion, which constitutes an extremely small

proportion.

Descriptive Statistics

Data presented in this paper are drawn from a sub sample of 8880 married women aged 18-49 at the time of the interview and their children aged 8-11 years who took the test. Table 1.2 presents descriptive statistics for this sample. The average age of a female respondent in the sample is 34 years and the average age at marriage is 17 years. 47% of them are literate and have low educational attainment. 52% report having no education while 16% attained primary education, 26% and 7% attained secondary and higher education. Among the male cohort, 71% are literate and have on average completed six years of schooling. 19% attained primary schooling while 40% and 15% have obtained secondary and high education and 28% have no education. About 69% of individuals reside in rural areas, roughly 79% are Hindus and 14% Muslims, 23% belong to a scheduled caste while 8% belong to scheduled tribe and 39% into other backward classes. Among the children in the age group 8-11 years, roughly 47% are girls and 93% are literate. 98% of the girls and 99% of the boys report attending school at the time of the survey. 2.68% have atleast one child, 22.05% have two children, 29.79% have three children, while 45.38% have four or more children.

To measure women's involvement in partner choice I examine their responses to questions on marriage choice and whether the respondent's parents (including extended family members) had sought her opinion about whom to marry. Respondent's who chose their spouses themselves, jointly decided or had answered yes to parents choice of spouse are classified as being in a consensual marriage. In the sample, 4% of the respondents had themselves chosen their spouses, 35% sought their spouses together with their parents, 19% had given their consent to marry a person chosen by their parents and 41% had no consent while choosing their spouses.

Table 1.2 Summary Statistics of Selected Sample, IHDS

Year of survey	2004 - 2005		No obs. 8880		
Characteristic	*Mean*	*St.dev.*	*Min.*	*Max.*	*N*
Child: 8-11 years					
Read(0-1)	0.572	0.495	0	1	8866
Maths(0-1)	0.508	0.5	0	1	8827
Write(0-1)	0.694	0.461	0	1	8787
Age	9.467	1.061	8	11	8880
Female	0.471	0.499	0	1	8880
Mother:					
Non-Consentual marriage	0.41	0.492	0	1	8813
Age at first birth	24.438	5.093	9	41	8876
Age at marriage	16.86	3.57	1	40	8866
Mother's age	33.905	5.156	18	49	8876
Literate	0.47	0.499	0	1	8869
Yrs of educ	3.531	4.394	0	15	8847
No education	0.526	0.499	0	1	8712
Prim education	0.165	0.371	0	1	8712
Sec education	0.263	0.441	0	1	7913
High education	0.07	0.255	0	1	8712
Father:					
Age	38.98	5.918	23	70	8463
Yrs of educ	5.938	4.797	0	15	8440
Literate	0.717	0.451	0	1	8456
No education	0.284	0.451	0	1	8440
Prim education	0.193	0.395	0	1	8440
Sec education	0.403	0.49	0	1	7714
High education	0.154	0.361	0	1	8440
Mother's outcomes:					
Beat leave	0.387	0.487	0	1	8840
Beat cash/jewelry	0.274	0.446	0	1	8842
Beat badcook	0.287	0.452	0	1	8849
Beat neglect home	0.335	0.472	0	1	8849
Beat xtrmarr	0.864	0.342	0	1	8831
Beat all 5	0.166	0.372	0	1	8845
Beat any 5	0.882	0.322	0	1	8840
Instruments:					
Sex ratio 91	892.648	59.313	388	1141	8701
Fem. pols 91	0.869	1.107	0	9	6989
Household:					
No. of children	3.64	1.576	0	13	8874
Discuss any	0.92	0.271	0	1	8774
Income (Logs/Rs.)	10.256	0.934	3.912	14.075	8757
Own home	0.896	0.305	0	1	8880
Piped Water	0.41	0.492	0	1	8880
Rural	0.689	0.463	0	1	8880

I examine broad aspects of the female respondent's marital relationship. Spousal communication on general matters examines whether the woman and her husband usually discussed issues related to work or farm, expenditure and community related issues such as elections or politics. This includes a question on whether the respondent and her husband go out to eat, visit fairs or the cinema. Questions related to women's participation in decision making reveal if she has the most say in what to cook; whether to buy expensive items such as TV/fridge; how many children to have; what to do if the child falls sick and to whom children should marry. I consider affirmative answers to the following questions, which were asked to assess the respondent's gender-role attitudes. A summary of these is shown in Table 1.3. In the survey women were asked: "In your community, is it usual for husbands to beat their wives in the following situations:

- If she goes without telling him
- If her natal family does not give expected money, jewellery or other items
- If she neglects the house or the children
- If she does not cook food properly
- If he suspects her of having relations with other men. "

Table 1.3 Summary of women who reported experiences after marriage

Measure	All married women	Consent	No consent	Difference
Marital relationship:				
Spousal communication on general matters				
Usually discuss things happened at work/farm	0.809	0.821	0.791	0.03
Usually discuss what to spend money on	0.900	0.909	0.888	0.021
Usually discuss community issues , elections/politics	0.867	0.882	0.845	0.037
Usually discuss all three topics	0.920	0.926	0.911	0.015
Go out to eat, watch movies, fairs/ festivals	0.490	0.589	0.349	0.24
Decision making:				
What to cook daily?	0.807	0.813	0.798	0.015
Whether to buy expensive items- fridge/TV?	0.099	0.111	0.082	0.029
Number of children to have	0.181	0.182	0.179	0.003
What to do if child falls sick?	0.302	0.321	0.276	0.045
Whom children should marry?	0.084	0.099	0.063	0.036
Spousal violence:				
Usual to beat if woman goes without telling husband	0.386	0.347	0.442	-0.095
Usual to beat if natal family does not give expected money/ jewelry/other items	0.274	0.251	0.307	-0.056
Usual to beat if she neglects house or children	0.333	0.316	0.358	-0.042
Usual to beat if food not properly cooked	0.284	0.262	0.317	-0.055
Usual to beat if he suspects her of having extra-marital affairs	0.864	0.821	0.926	-0.105
Usual to beat if all five	0.164	0.150	0.184	-0.034
Usual to beat if any five	0.882	0.844	0.936	-0.092

In Table 1.3, prevalence of each outcome is compared for women who are in consensual and those in non-consensual marriages. Overall, the share of women in non-consensual marriages reporting on the likelihood of spousal violence is higher compared to those in a consensual one. Although, it is lower on issues relating to communication and decision making. Separate multivariate regression analyses are conducted to ascertain the relationship between the type of marriage and each of the indicators for violence after adjustment for factors such as woman's age at marriage, years of schooling, if husband is from the same village, age of husband at the time of survey, his years of schooling, total income of the household, residence, caste and religion. These are shown in Table 1.4.

1.4 Empirical Strategy

1.4.1 Identification

The key empirical issue being addressed in this paper is that, women in non-consensual marriages would have a higher probability to respond affirmatively to questions on domestic violence because factors such as home environment, inegalitarian gender relations, family structure and individual traits or personality factors such as level of confidence, and events that occur within a person's lifetime could shape an individual's responses to situations. These are likely to affect their responses to questions assessing gender relations. The prevalence of domestic violence in the context of India has been documented in the sociological literature by Jejeebhoy (1998), Martin et al. (1999), Ouattara et al. (1998) and Koenig et al. (2006) among others. Gender-based violence including wife-beating, rape, sexual abuse and dowry-related murder are prevalent in India. Amongst these, wife-beating and intimidation are the most endemic and widespread forms of violence, although most of these are unreported or under-reported.

The very same unobservable factors (as just mentioned above) together with children's heritable endowments, mother's nurturing skills, early life conditions also affect

test scores of children, as demonstrated in the literature on cognitive achievement. In the study of cognitive achievement it is ideal to have access to all past, present family and school inputs about the child because child development is a cumulative process that depends on the history of family and school inputs as well as on inherited endowments. However, since most datasets including this one are not so comprehensive, I face the problem of endogeneity which may render OLS estimates biased.

Therefore, in this study, endogeneity may arise due to the following: First, omitted variable bias, caused due to missing information on child's cognitive achievement and on responses to gender-role questions. Second, measurement error which may arise from under-reporting of violence among women and the possibility of withholding information while assessing attitudes on gender. To correct for this, I use instrumental variable strategy for the endogenous variable marriage type, which is a binary variable and takes the value 1 if the mother is in a non-consensual marriage and 0 if it is consensual. Sex ratios and number of female politicians are the two instruments considered in this paper and in what follows, I provide arguments for their relevance and validity.

Sex ratios: is the relative number of men and women, which can affect marriage prospects, labour force participation and other social and economic variables (Angrist, 2002). It can be determined by biological as well as economic and cultural factors. In parts of Asia where male sex-bias is prevalent, biological factors are likely to play a minor role in determining sex ratios.

Chiappori et al. (2002) show that sex ratios and divorce laws favourable to women have a sizeable impact on labour supply behaviour and decision processes. Grossbard-Shechtman and Neideffer (1997) found that an increase in sex ratio (more males than females) reduces the labour force participation of married women and their hours worked. Similarly, Angrist (2002) using data on immigrants to the United States found that higher sex ratios had a large positive effect on the likelihood of female marriage

and a large negative effect on female labour force participation. Edlund (1999) models endogenous sex choice and shows that unbalanced sex ratios are one of the possible consequences of a preference for sons which is widespread in many Asian countries such as India, China and South Korea. Using annual province-level data from China Edlund et al. (2013) show that higher sex ratios imply fewer married men and thus, is associated with rise in crime rates.

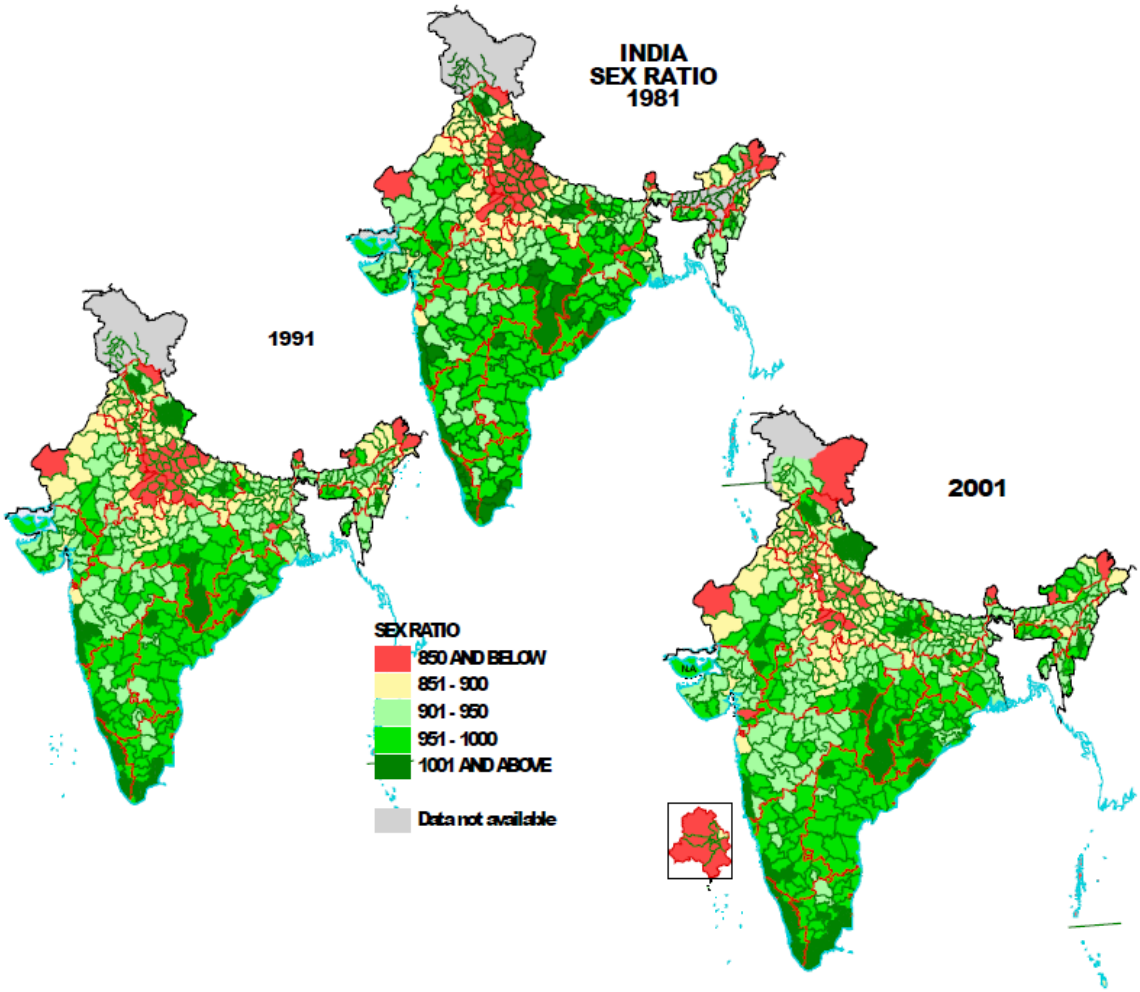
In the context of India, Visaria (1961), one of the earliest studies into India's demography, revealed that there was a persistent rise in sex ratios between 1901 and 1961, in the northern states, and lower in the south (Dyson and Moore, 1983). Chakraborty and Sukkoo (2008) have argued that kinship systems played an important role in determining sex ratios in India. They also observe that sex ratio is lowest (less females than males) in the North, where kinship system provided the least autonomy of women, intermediate in the East and highest in the South where women's autonomy was believed to have been the strongest.

From a regional perspective, Karve (1990), Dyson and Moore (1983) have argued that distinct differences in kinship organization, that is, patrilineal or patrilocal system in the northern states and matrilineal or matrilocal system in the southern states, which have led to women in the north having significantly lower autonomy than those in the south.[5] Female autonomy, sexual freedom, land ownership rights are closely related with kinship and inheritance systems where women's rights were stronger, as found by Agarwal (1994). Several studies have shown that the upper social strata mainly indulge in son preference.[6] Discrimination of girls has been found to increase with prosperity and education level of mothers in India. Extremely male biased sex ratios at birth have been largely a phenomenon confined to high-caste groups in the north-west of India and female infanticide is known to be a high-caste phenomenon.

[5]These differences, arising due to village female exogamy, male household cooperation, male-only property inheritance, marriage based on inter-group alliance and low parental benefit from daughters, all contributed towards poor treatment of girls and women

[6]Tambiah and Goody (1973); Dreze and Sen (1995); Bhalotra and Cochrane (2010)

Fig. 1.1 India Sex ratios, Source: Census of India



Angrist (2002) has argued that lower sex ratio, or more males for every female may increase female bargaining power in the marriage market and this would shift resources and family structures so as to favour women. However, this has not been the case in India (Amaral and Bhalotra, 2016). Either men take much younger women as wives, therefore the spousal age gap is higher Anukriti et al. (2015). Another less well known phenomenon is women trafficking across India to make up for the resulting shortages.[7] On the contrary, a vast literature documents the various ways in which Indian (and, in particular, Hindu) families exercise their preference for sons, for instance, through differential fertility stopping (Bhalotra and van Soest, 2008), female foeticide (Jha et al. 2006, Bhalotra and Cochrane 2010), and gender-differentiated

[7]See also: http://www.economist.com/news/asia/21648715-distorted-sex-ratios-birth-generation-ago-are-changing-marriage-and-damaging-societies-asias
http://www.bbc.co.uk/news/magazine-20938125

parental investments in antenatal care, breastfeeding, nutrition and immunization (Bharadwaj and Lakdawala 2013; Jayachandran and Kuziemko 2011; Chakravarty 2010; Oster 2009).

More recently, Bhalotra et al. (2016) have provided evidence that son preference behaviours of Indian parents respond to changes in the cost of dowry and have shown that pre-ultrasound, gold price variation is reflected in differences in postnatal mortality, while, post-ultrasound, it is reflected in the sex ratio at birth. This is consistent with Anukriti et al. (2015) who show that after the introduction of prenatal sex detection technologies in the mid-1980s in India, postnatal excess girl mortality declined sharply, which suggests that parents have been substituting postnatal neglect with female foeticide, which is a more deliberate choice than the former. Moreover, the availability of ultrasound has granted access to cheap, often unsafe abortion clinics which has lowered the financial and psychic costs.

Throughout this paper, sex ratio is defined as the number of females per thousand males as outlined by the Census of India. In my knowledge, this is the first paper that uses sex ratio as an instrument. I obtained district-wise data on sex ratio from the 1981, 1991 and 2001 Census of India for the whole population and this is shown in Figure 1.1. Figure 1.2 shows the distribution of sex ratio from 1901 to 2011. In 1991, the number of females per thousand males was the lowest at 927, following which, it is shown to be rising steadily.

Arranging a marriage requires many decisions, such as when to begin the proceedings, suggestions of who might be eligible, enlisting others who might be helpful in finding a partner, characteristics of the potential spouse that might be important and evaluations of the potential spouses that may arise. In this sample, the age at marriage for the female respondent is 17 years and the mean age at the time of survey is 34 years. Men and women enter the marriage market at different time periods and vary in age. Since the survey takes place in 2004-2005, presumably these women

Fig. 1.2 Sex ratios 1901-2011, Source: Census of India

entered the marriage market around the year 1987. For this reason, sex ratios of the population above age 7 and/or around age 15, in the years close to 1987, would be a good representative of the prevalent gender-bias against girls and take into account, the existing son preference phenomena in various parts across the country. From the Census of India, I was able to obtain district-data on sex ratios at birth for the years 1981, 1991 and 2001. The relevant variation in sex ratio occurs soon after birth, therefore I use sex ratios for 1981 and 1991, with approximately a twenty year lag as these would be the closest possible match. A potential drawback of using sex ratio at birth is that, it does not account for infant child mortality which could be a consequence of gender discrimination of the girl child, among other reasons such as, post-natal health of the mother and child. Thus, in this analysis, I make use of sex ratio at birth in 1981 and 1991 as potential candidates for instruments, because the sex ratios for these years would capture the marriage market situation for the women in the sample used in this study.

Number of female politicians: Another possible instrumental variable is the number of female representatives in politics. Existing literature on women's representation in politics has shown that women support liberal policies, child care spending and

use their income towards spending on education, health, nutrition in the household and other expenditures benefiting women.[8] Thomas (1990) and Duflo (2003) have also shown that increase in women's incomes improve girl's well-being in the family. According to Banerjee and Somanathan (2001) female policy makers also affect the participation of other women in the political process, encouraging women to raise issues and express their concerns. Bhalotra and Clots-Figueras (2014) identify significant causal impacts of women's political representation on neonatal survival, indicators of prenatal and early postnatal care and the village level public health infrastructure. Women's political representation leads to reduction in neonatal mortality, they are more likely to build public health facilities and encourage antenatal care, institutional delivery and immunization.

Clots-Figueras (2012) using political data from India shows that female politicians have a larger effect than male politicians on the education received by individuals living in urban areas, but not on the education of those living in rural areas. This difference between rural and urban areas is possibly due to female politicians investing more in education in areas where women can gain benefit more from it or by educational investments being more visible to voters in urban areas. Female politicians also have an effect on the number of primary schools per village at the district level, especially more in urban areas. Moreover, they are likely to be more sensitive to women's needs and women may be more likely to express their needs and interests if their legislator in the constituency is a woman.

These findings imply that the presence of female politicians could therefore lead to policies which are more favourable for the well-being of women and children. This is because the number of female politicians in the district would encourage women to express their concerns, participate in the political process, increase women's education and well-being. As a result, it would lower the probability of women having a marriage without their consent by giving them confidence to raise issues affecting them in their

[8]See among others Lott and Kenny (1999), Edlund and Pande (2001), Edlund, Lena, Laila Haider and Pande (2005), Lundberg et al. (1997)

natal households and also increase children's well-being in terms of education, health facilities and early childhood care.

Data for female politicians is obtained from different volumes of the Statistical Reports on General (Lok Sabha) Elections from the website of the Election Commission of India. I obtained constituency data for the years 1980, 1991 and 2004. For aggregation of the constituency data to the district level, I use the *State Elections in India*, a publication of the Election Commission which lists the constituencies included in each district in each year. Some districts have been newly created and others have disappeared during the period of 1980-2004. I use the 2001 census district definition and match the districts with those as in the sample. I include all districts that were present in 2001 as intact or even divided. The districts not included are those of Andaman and Nicobar islands because these are not in the surveyed sample. As instruments, I use the presence of female politicians in the year 1980 and 1991, in accordance with an approximate twenty year lag from the survey year of 2004-05.

1.4.2 Regression Specifications

Women in consensual marriages, on average tend to report in a positive way on experiences related to decision making such as number of children to have or whether to buy expensive items for the house. Moreover, their responses are positive on various aspects of marital relationship such as discussion about everday affairs as well family outings to the cinema, fairs or festivals. On the contrary, women in non-consensual marriages are more likely to respond affirmatively to questions about the likelihood of violence in their community, on average, while their responses to aspects of marital relationship and decision making are lower compared to their consensual counterparts (see also Table 1.4). Furthermore, OLS estimates show that there are strong negative associations between non-consensual marriage and cognitive achievement in children. These are very interesting correlations in themselves, but can these associations be

given a causal interpretation?

The strong positive association between non-consensual marriage and responses to questions on violence (Table 1.15) as well as the strong negative effects on childrens cognitive achievement (Table 1.6, 1.16) suggests that they can, because such an association would be absent if there were no forces to drive the different types of marriages and their effects on mothers and children.

Mother's outcomes

I investigate if non-consensual marriage has a causal impact on women's attitude to gender-role questions about domestic violence. Different versions of equation (1.1) are estimated depending upon the questions asked to the respondent and I call these Mother's outcomes.

$$Y_j = \beta_0 + \beta_1 M_j + \beta_2 X + \zeta_j \tag{1.1}$$

where Y_j is the share of women in the community who respond 'yes' to questions on incidences of domestic violence. M_j is a binary variable which takes the value of one if the respondent was in a non-consensual marriage and zero otherwise. Vector X includes extensive information about marital history of the mother such as age at marriage, if husband is from the same village, same caste, if husband is related and economic status of the natal family at the time of marriage whether same, better or worse. It also includes age at the time of survey of both partners, their educational attainment, number of children, total household income (in logs) and dummies for residence in rural area, religion (Hindu, Muslim, Christian, Sikh, Others is reference category), caste (SC, ST, OBC, General is reference category) and region(North, South, East, West, Central is reference category). The idiosyncratic error term, ζ_j includes unobserved characteristics such as genetic traits or personality of the mother, family structure that determine the type of marriage of the mother. Parameter β_1 measures the effect of being in a non-consensual marriage on the posi-

tive response to the incidence of violence by the share of women at the community level.

Estimation of equation (1.1) may be biased because women in non-consensual marriages are likely to have different unobserved characteristics compared to those women in consensual marriages, which would result in the variable M_j and the error term ζ_j being correlated. Women who had no say in the choice of their spouse were probably raised in a more patriarchal family or environment where inequality in gender relations affects their responses to questions on incidence of violence. To address the potential endogeneity of M_j, I use district-wise sex ratio in 1991 as instrument. The first stage equation concerning mother's marriage choice is represented as:

$$M_j = \alpha_0 + \alpha_1 Z_d + \alpha_2 X + \omega_j \tag{1.2}$$

where the set of instruments Z is aggregated at district level d. Vector X is the same as in equation (1.1) and ω_j is the error term.

Child's outcomes

Next, I examine whether non-consensual marriage of the mother has an impact on the cognitive skills of her child. Cognitive achievement of a child is measured by test scores on reading, writing and mathematics. Three versions of equation (1.3) are estimated which I call Child outcomes:

$$T_i = \gamma_0 + \gamma_1 M_j + \gamma_2 X + \epsilon_i \tag{1.3}$$

where T_i is the test score of child i, M_j is a binary variable which takes the value of 1, if the respondent was in a non-consensual marriage and 0 otherwise. The vector X includes observed child-specific factors: child's age and gender; marital history of the mother: age at marriage, whether it was first marriage, if husband is from the same village, same caste, if husband is related and economic status of the natal family at the time of marriage whether same, better or worse with same being the

reference category. I control for whether mother reads newspaper and if parents discuss work, expenditure or politics to capture home environment. Also included are parental-specific factors: their age at the time of survey, highest education attained, number of children, total household income (in logs), if house is owned and has piped water facility and demographic variables such as residence in rural area, religion, caste and region dummies. The error term, ϵ_i includes time-invariant unobserved child and maternal factors that can affect a child's test score. These can include home environment, familial structure, genetic traits or personality, nurturing skills of the mother and children's heritable endowments, in addition to other factors.

Since these unobservable characteristics impact test scores of children (T_i) and could be correlated with M_j, equation (1.3) is estimated using set of instrumental variables, Z_d where marriage type is instrumented by district-wise sex ratio at birth in 1991. The first stage equation concerning mother's marriage choice is similar to equation (1.2).

$$M_j = \alpha_0 + \alpha_1 Z_d + \alpha_2 X + \omega_j \tag{1.4}$$

where vector X is the same as in equation (1.3) and ω_j is the error term which also includes unobserved time-invariant maternal or child factors such as genetic traits or personality of the mother and family structure that determine the type of marriage of the mother. In all equations I use robust standard errors clustered at household level.

In equations (1.1) and (1.3), β_1 and γ_1 represent the causal effect of M_j on Y_j and of M_j on T_i respectively. The key assumptions that are required to identify β_1 and γ_1 are the following:

1. $Cov(Z_d, \zeta_j)$=0 and $Cov(Z_d, \epsilon_i)$=0. The instrument Z_d is uncorrelated with the disturbances ζ_j from equation (1.1) and ϵ_i from equation (1.3).

2. The covariance between endogenous variable M_j and instrument Z_d must be different from zero, that is, $Cov(M_j, Z_d) \neq 0$. This requires that α_1 statistically differs from 0.

If Z_d satisfies these assumptions, then it is considered an instrumental variable in this model. First stage regressions presented in Table 1.5 indicate that the instruments being used are relevant.

1.4.3 Estimation

First, I estimate equations (1.1) and (1.3) using Ordinary Least Squares to establish baseline estimates, as this is the standard procedure in most studies using instrumental variable regressions. These are presented in Table 1.4 for Mothers outcomes and in Table 1.7 for Child outcomes. Using instrumental variables I estimate (1.1) and (1.3), I present estimates using *IV 2SLS* as popularized by Angrist and Imbens (1994). The following is the estimated first stage equation:

$$\widehat{M_j} = \widehat{\alpha_0} + \widehat{\alpha_1}\, Z_d + \widehat{\alpha_2}\, X + \omega_j \tag{1.5}$$

In the second step, estimates of β_1 and γ_1 are obtained by adding the predicted values from the first stage to the existing set of regressors given in equation (1.1) and (1.3). However, there are a number of problems with the above approach, which is the Linear Probability Model (LPM), estimated in the usual way using OLS (Wooldridge, 2002). I avoid these problems by following a two-stage instrumental variable approach illustrated by Windmeijer and Santos Silva (1997). I follow Wooldridge (2002, p. 623), where in the first stage I estimate a non-linear Probit model of M_j over X and the set of instruments Z_d. The fitted probabilities are defined as:

$$\widehat{M_j} = \Phi\left[\,\widehat{\alpha_0} + \widehat{\alpha_1}\, Z_d + \widehat{\alpha_2}\, X\,\right] \tag{1.6}$$

where $\widehat{\alpha_0}$, $\widehat{\alpha_1}$, $\widehat{\alpha_2}$, are the Probit estimates from equation (1.2) and $\Phi[.]$ is the cumulative distribution of the standardized normal.

Next, I estimate equation (1.1) and (1.3) by the two-step efficient generalised method of moments estimator (GMM). This is more efficient than 2SLS and robust

to heteroskedasticity of unknown form, as well as to arbitrary intra-cluster correlation (Wooldridge, 2002, p. 193). I use X and fitted value, $\widehat{M_j}$ as instruments to identify the causal effects of non-consensual marriage on responses to violence and cognitive outcomes of children. The important advantage of this approach is that the predicted values from the first-stage Probit model provides a better approximation to M_j than the linear model, therefore the resulting IV estimates are more efficient than those that use a linear first stage model (Newey, 1990). This method uses non-linearities in the first stage as a source of identifying information. Moreover, as illustrated by Windmeijer and Santos Silva (1997) the consistency of this non-linear IV estimator does not depend on the correct specification of the Probit model in the first stage and IV standard errors do not need to be corrected (Wooldridge, 2002).[9].

Validity of the exclusion restriction

The identification strategy relies on the prevalence of gender discrimination towards women in India. Son preference bias continues to widely exist in various parts of the country and regional patterns can be observed. The average female-to-male sex ratio by region, in Table 1.24, for the years 1981, 1991 and 2001 shows that states in the northern and central regions experience greater shortage of women, in other words, greater son preference, compared to the southern states. Thus, the variation in sex ratio reflects the patrilineal culture that is prevalent in various parts across India. Low female-to-male sex ratios at birth and during childhood are rooted in a patriarchal culture that extols the economic and familial contributions of boys and men over the contributions of girls and women (Das Gupta 1987; Malhotra et al. 1995).

Since the introduction of prenatal sex detection technology, it has become easier for Indian couples to manipulate the sex ratio of surviving children. Families that conceive because they want a son but not a daughter can now detect the sex of the foetus and conduct sex-selective abortion. Street advertisements in India encourage

[9] An early application of this estimator within a count data model is by Windmeijer and Santos Silva (1997). For recent applications see O.Attanasio (2013)

families to seek sex-selective abortion to avoid dowry costs. For instance, Desai (1994) reports that abortion clinics in Mumbai had posters with slogans such as "Better pay Rs 500 now than Rs 50,000 later". The Rs 500 is the cost of abortion and the Rs 50,000 refers to the future cost of dowry.

The sex ratios in India, simply reflects the fact that, there might be a departure from a natural course of events as a result of human choices or actions. Indeed, if there was no variation in sex ratio or the variation was just random, then one would observe a sex ratio that favours girls, as much as boys. However, since people are making choices about the gender of children (through pre-diagnostic tools and sex-selective abortion), one can observe variation in sex ratios, in other words a manipulated sex ratio, which reflects expectations, customs and financial constraints among other factors. If there is a specific environment in which boys and girls grow up, then the custom of arranging marriages is very likely to be affected and it is this environment that the women must have grown up witnessing when they were in the marriage market. This is precisely the reason why this paper uses sex ratio as an instrument, to capture these prevailing cultural norms, historical and institutional beliefs about gender roles, as a way to proxy for the type of marriage that a marriage-eligible woman had. Historical evidence also sugegsts that women in the south enjoy greater autonomy and freedom of movement as well inherit property rights, in contrast with women in the north where this is restricted (Dyson and Moore, 1983). In this sample (Table 1.23), I find evidence of the same occurrence: women in the northern and central parts of India are more likely to be in non-consensual marriages, compared to women in the east, west and south, with the southern region experiencing far less women in non-consensual marriages.

There is no reason to believe that those indulging in sex-selective behaviour are more farsighted than the rest of the Indian populace. Even though they may believe that boys contribute more than girls to the family, yet, they may not fully take into account or foresee that the imbalance in sex ratio caused by their actions, will

ultimately affect their sons marital chances. If sons are preferred over girls and everyone has sons then clearly, at a future time, these sons will face a shortage of marriageable daughters, but, parents are not necessarily thinking about the future consequences of their actions when they choose to opt for abortions and sex-selective methods. Thus, this paper believes that the historical and deeply rooted culture and traditions about gender norms and patriarchy, supersedes, leading parents into falsely believe that boys will always stand better chances than girls in all aspects of life.

1.5 Results

The OLS estimates presented in Table 1.4 for Mothers outcomes show a highly significant and positive effect of non-consensual marriage type on the likelihood of women responding "yes" to instances of wife-beating. These questions were asked to assess gender-role attitudes among women. Two groups of estimates are presented. The first, group A estimates are excluding any predetermined variables such as household income or number of children. While group B estimates are conditional on these factors. These effects are positive and sizeable, the magnitude of estimates from the two groups are similar. The likelihood of violence ranges from 9.3% points, if the wife leaves home without permission from her husband; 7.9% points for not receiving cash or jewellery from wife's natal family to 6.1% points if the wife responds affirmatively to violence in all the possible cases. Table 1.17 in appendix A.1., presents estimates conditioning on state-year and district fixed effects. These estimates show that non-consensual marriage is positively correlated with responses to violence and the incidences of violence would increase by 8.2% points if the wife leave, 6% points if cash/jewellry is not received, 4% points if she neglects the home or does not cook properly and 4.6% if the husband is supicious of his wife. These effect sizes are smaller than those shown in Table 1.4.

In Table 1.8, I present OLS estimates and Probit marginal effects for the Child outcomes, which show that the probability of being in a non-consensual marriage

decreases the likelihood of achieving higher scores in cognitive tests of reading and mathematics by 2.5 and 2.9% points (OLS) and by 3.3 and 3.5% points (Probit), respectively. Then, I estimate these equations after conditioning on state-year and district fixed effects among other controls and these results are shown in Table 1.18, appendix A.1. for child outcomes. These estimates are similar in sign and the magnitude of these effects is slightly higher in comparison to the estimates in 1.8, obtained without conditioning on state-year and district fixed effects. Results in Table 1.18 show that mother's non-consensual marriage negatively affects the child's probability to perform better on all three dimensions of cognitive skills by 2.7, 3.5 and 2.8% points (OLS)in rea.

First Stage Estimation

Table 1.5 shows the results of OLS and Probit regressions of *NCM* over the set of instruments Z_d and the set of covariates, X, estimated over the sample of married women. As instruments, I include the average of *Sexratio*.1981 and *Sexratio*.1991, female politicians in 1991 and 1980, *Sexratio*.1981 and its squared term, (to capture the non-linearity in the sex ratio observed in Figure 1.2). The average *Sexratio*.1981-1991 is significant at the 10% level. An increase in the average sex ratio leads to 0.1% point decline in the probability of non-consensual marriage. This would seem plausible since the increase in the number of girls (per thousand boys) would imply lower son preference bias and may lead to decline in non-consensual marriage for women.

Female politicians.1991 is statistically significant at the 10% level as shown in Table 1.5, columns (1b)-(2b). An increase in the number of female politicians decreases the probability of non-consensual marriages of women. The F-test of joint significance in columns (1b)-(2b) is 1.34 and 1.18 which is below the critical values reported in Stock et al. (2002) which may be a cause of concern due to the loss of precision in IV estimates. However, studies by Hahn and Hausman (2003), Cruz and Moreira (2005) and Angrist and Pischke (2008, p. 215) have acknowledged that the use of first stage F-statistic to assess the quality of the instruments has important limitations. The

size and power of the test are sensitive to the explanatory power of the instruments and also to the degree of endogeneity of the explanatory variable (Hall et al., 1996). The critical values obtained in Stock et al. (2002) are for a continuous endogenous variable using two-stage least squares estimation. While in my case, I have a binary endogenous variable and the non-linear two stage IV approach (explained earlier) is the favoured approach. For this case, the predicted value, $\widehat{M_j}$ is used as an instrument and it is statistically significant at 5%, 10% and 1% and the first stage F-statistic is 10.47.

Mother's Outcomes

The sample used in this analysis is restricted to women in the age group 18-49. Mother's outcomes are womens responses to questions on violence, asked to assess gender roles in the community. These questions are at the community level, where the female respondent is asked whether it is usual for husbands to beat their wives in the following situations: (i) if she goes without telling him; (ii) if her natal family does not give expected money, jewellery or other items; (iii) if she neglects the house or the children; (iv) if she does not cook food properly; (v) if he suspects her of having relations with other men. Two aggregated indicators for beating are: (vi) if any of the five incidences of violence occurs and (vii) if it is usual for all five incidences to occur. In all regressions, I control for individual covariates such as age at marriage, whether first marriage, if husband is from the same village, same caste, whether husband is related, education and age of the respondent and her husband, number of children, total income, residence and demographic controls such as caste, religion and region. Standard errors are clustered at the household level for all equations.

In Table 1.6, IV-2SLS and non linear IV-GMM estimates for Mother's outcomes are reported. The optimal Generalised Method of Moments (GMM) is applied with a weighting matrix that is optimal when the error term is heteroskedastic. Effects are presented in terms of coefficient estimates and their standard errors. The primary

variable of interest is non-consensual marriage denoted *NCM*, and IV-GMM estimates differ substantially from 2SLS in terms of coefficients as well as standard errors. 2SLS exhibits very large standard errors, almost more than twice those of IV-GMM which shows that IV-GMM has gains in precision. These two sets of estimates will not be similar since the IV-GMM estimates are obtained from a slightly different procedure which involves a non-linear first stage, whereas the 2SLS estimates are from the standard IV procedure with a linear first stage.

I find significant effects of non-consensual marriage on women's responses for all incidences of violence, including the aggregated indicators based on the non-linear IV-GMM estimates. The probability of the respondent being in a non-consensual marriage raises her probability of answering 'yes' to questions on incidences of violence at the community level. This increase in probability of an affirmative response is particularly higher for the question which asks if it is usual to beat in case of not receiving cash or jewellery from her natal family. This is indicative of a lower bargaining position of the women, through not receiving any unearned income from her natal family. The effect on whether it is usual to beat if the wife leaves is 24% points (pp), 58.6% points if she does not receive cash or jewellery from her natal family, 23.4% points if the husband suspects her of having relations with other men. Aggregated responses indicate that the probability of a woman to experience violence from her husband, increases by almost 22.6% points if women are in a non-consensual marriage. The standard 2SLS estimates show that being in a non-consensual marriage raises the probability of violence by a 91% point if the cash or jewellery is not received from the wife's natal family and by 65% point if the husband suspects her of having any extra-marital affair. However, these estimates show that the probability of violence if the wife does not cook food properly decreases which is very different in terms of sign, from OLS and non-linear IV-GMM estimates. Overall the IV estimates are very large with large standard errors which may reflect limited variation in the instrumental variables.

Reduced form estimates in Table 1.7 show a negative effect of sex ratio on the responses to violence by 0.1% points. On comparison of the IV with OLS (Table 1.4), the baseline OLS estimates are statistically significant throughout and much lower than the IV estimates. OLS estimates show a positive bias, that women in a non-consensual marriage are prone to violence for reasons other than non-consensual marriage.

Child Outcomes

Table 1.9 presents IV estimates for non-consensual marriage which is instrumented using the average sex ratio for 1981 and 1991. The dependent variables are child outcomes in reading, maths and writing. In the surveyed sample, reading, maths and writing tests were administered to children in the age group 8-11 years. The test score outcomes (except writing score) have been divided into two categories where 0 indicates a low score and 1 indicates a high score.

The IV-2SLS results show that the probability of a mother being in a non-consensual marital union has no significant impact on the probability of her child achieving a high score in reading, maths or even writing tests. Certainly these are very different from the nonlinear IV-GMM estimates since they are obtained by different procedures. Columns (4-6) of Table 1.9 shows that mothers being in a non-consensual marriage decreases the probability of securing a high score in reading by almost 21% points, maths by 35% points and writing by 17% points. Same as before, the non-linear IV-GMM estimates are lower and gives more compact standard errors.

In comparison, the baseline OLS results in Table 1.8 indicate a significantly negative impact of the probability of being in a non-consensual marriage on the propensity to achieve a high score in maths and reading for children. The IV estimates are larger than the OLS ones both in terms of coefficients and standard errors and this finding

is consistent with the literature on instrumental variable regressions.

There will be families which will always be heavily biased towards sons and therefore will not be affected by declining trends in sex ratios (caused by female foeticide or neglect of girls) or even the number of female politicians in their constituency. These could be families with highly patriarchal mindsets. On the other hand, there are families which are open to having girls, irrespective of trends in sex ratios or number of female politicians. Thus, the changes in sex ratios would only affect a part of the population whose attitudes towards females is positively influenced by the increase in sex ratios (more women than men) or by the presence of female politicians in their constituency, but would otherwise favour males. Therefore, these are the set of compliers, that is, the families where girls and women in general are perhaps given an almost equal say as men, and the female gender is not discriminated against. Using an instrumental variable strategy has allowed for the identification of a local average treatment effects relating to the set of female respondents affected by the instrument which are the "compliers". The IV estimates reveal that those respondents in a non-consensual marriage are the ones who presumably grew up experiencing gender bias or discrimination in their households, the same attitudes that must have led to manipulation of sex ratio. A lower sex ratio (more males than females) implies greater preference for the male child and this could reflect in the orientation towards women in the household, manifesting itself through the responses to questions on violence.

IV estimates for Child Outcomes reveals that children of mothers in non-consensual marriages face a lower probability to achieve higher score in mathematics. Thus, a marriage without consent on the choice of spouse for the female respondents (i.e mothers) represents a vital input into their child's cognitive development, particularly from this analysis, it affects their ability to perform well in tests, especially maths and reading. Further comparison, with estimates for the effect of fully-consensual marriages (Tables 1.19, 1.20) and partial consensual marriages (Tables 1.21, 1.22) on

mothers and child outcomes reveal a contrasting evidence. Women in fully consensual marriages (FCM) and partial-consensual marriages (PCM) are less likely to answer affirmatively to questions on gender-violence. Moreover, their children from mothers in these marriages have a higher probability to obtain higher scores in cognitive tests of reading, maths and writing.

Robustness Exercises

Stability of results: I examine stability of the results by using other potential instruments and report results in Table 1.11. In Panel A, non-consensual marriage is instrumented using the set of instruments for 1991, which are sex ratio at birth in 1991 and the number of female politicians in 1991. Panel B presents estimates using sex ratio at birth in 1981 and number of female politicians in 1980. Both sets of results demonstrate a positive effect of non-consensual marriage on affirmative reponses to instances of wife-beating. Furthermore, in Table 1.12 columns (1-3) and columns (4-6) show estimates using the set of instruments for 1991 and 1981, respectively. These results show a negative effect of non-consensual marriage on cognitive outcomes of children particularly in mathematics by almost 30% points, while there are no effects observed in reading or writing. This confirms the main results and provides support to the widely held phenomenon of son preference bias that is reflected in the manipulated sex ratios at birth across India.

In another related exercise, I control for state fixed effects and present estimates in Tables 1.13 and 1.14, repectively. The probability of being in a non-consensual marriage increases the likelihood of wife-beating, if cash or jewellery are not received from the natal home. This supports the earlier findings, however, no effects are observed on cognitive achievement of children.

Falsification Test: A paper by Pizer (2015) recommends using a falsification test to check if it is likely that the exclusion restriction holds. By using a predetermined

variable such as the womens age at menarche, this test can be performed which is shown in Table 1.15. Menarche, is perceived as the marker of a girl's readiness for marriage and motherhood. A higher sex ratio at the time of marriage may induce families to give their daughters in marriage earlier, especially if the girl had already experienced menarche. I test the relationship and find no association between sex ratio and age at menarche (Table 1.15). This lends some support to the hypothesis that the exclusion restriction holds in this case.

Heterogenous Effects

I investigate whether the effect on non-consensual marriage on cognitive outcomes of children, varies depending upon child's gender, caste, place of residence, whether rural or urban, and socio-economic status of the household. Table 1.16 presents instrumental variable results for these aforementioned sub-samples.

Child's gender: Panel A shows the results for girls and boys separately. Estimates are obtained by executing the IV equation1.3 for Child outcomes separately for both genders. Girls have a greater likelihood of performing poorly on the overall cognitive tests. The magnitude of these effects is large. Mother being in a non-consensual marriage reduces their probability of obtaining higher scores in reading, maths and writing, by 30% points, 38% points and 24% points, respectively. In contrast, boys have a lower likelihood of performing well in mathematics, and there are no effects on reading or writing scores. Also, the decrease in probability of achieving high scores in maths for girls is much higher than that for boys (23.3% points). This suggests that girls are particularly vulnerable to the negative effects of non-consensual marriage.

Caste: The caste system in India exists across societies all over India. Panel B shows results by four caste groups where the lower most caste groups are those of scheduled castes (SC), scheduled tribes (ST) and other backward classes (OBC), while the general category includes the high caste groups and all the other caste categories.

Children from lower caste groups, especially SC and OBC have a lower propensity to perform well in maths. This decrease is of almost 40% points for those from SC and 27% points for those from OBC. Reading scores are also negatively affected, by 20% points for those belonging to OBC. However, there are no effects observed for those classified in the general caste category.

Residence: There are considerable differences between rural and urban areas within India. Children from households located in rural areas have a lower tendency to achieve higher scores in mathematics by almost 35% points. There are no significant effects for children from urban areas. This could be because children from urban areas have access to better learning resources and this could have weakened the negative effect of non-consensual marriages on these children.

Socio-economic status (SES): The IHDS provides information on population by income quintiles, ranked from 0 (negative income); 1 (poorest) to 5 (affluent). I classify the bottom two quintiles as low-SES, the third and fourth quintiles as medium-SES and two highest quintiles as high-SES. 45.2% of those in non-consensual marriage belong to low-SES and 45.6% are in medium-SES households, while 33% are from high-SES homes. Children from families in low and medium SES households have lower propensity to perform well in maths, with the decrease in low-SES families (61.3% points) observed to be much higher and stronger as compared to medium-SES households (23.2% points), but there are no effects for those from high-SES families. This provides support to the earlier finding on rural households, which taken together may be driven by children in high-SES and urban families having access to available assets that children living in rural and low, medium-SES households cannot afford.

1.6 Conclusion

This paper offers a novel investigation of the effects of arranged marriages on marital life and child development. In India, the practise of arranged marriages is a legitimate way of finding a mate. Nevertheless, over time there has been a considerable variation in the extent of parental involvement. The paper delivers estimates on the effects of non-consensual marital union of women on children's cognitive development, and the effect on womens responses to questions on domestic violence. In doing so, it exploits the variation in sex ratio as a way to proxy for the type of marriage. Male biased sex ratios are a cause of concern in India, due to the son preference behaviours of parents, mainly arising from the costs of dowry[10], which have led to the manipulation of sex ratio. By capturing the gender-role attitudes, sex ratios are informative of whether a society is patrilocal or not, and this would certainly affect the type of marriage arrangements.

Using the India Human Development Survey (IHDS) dataset for 2004-2005, I find supportive evidence of non-consensual marriage on positive responses to possible incidences of wife-beating among women. In particular, the estimated impact on violence associated with not receiving cash or jewellery from the wife's natal family is higher, relative to other cases (fully consensual or partially consensual marriages). Effects on cognitive development of children mainly indicate the decreasing likelihood of them achieving a high score in reading, mathematics and writing if their mothers are in a non-consensual marital union. The effects on children are observed to be stronger for daughters rather than sons, families belonging to low caste groups, living in rural areas and from low and medium socioeconomic households. On the other hand, results differ for women who are in a fully consensual marriage or in a partially consensual marriage. Women in partially consensual marriage or fully consensual marriages show a positive effect on childrens likelihood to perform better at tests, while a negative effect is observed on their responses to violence.

[10] as shown by Bhalotra et al. (2016)

Although this study is one of the first attempts to estimate the effects of arranged marriages on child development for India, there are a few valuable extensions that rely on data improvements. First, this study disregards the role played by fathers, this is due to data unavailability, as the IHDS does not collect marital history data for men. Knowing the involvement of fathers would further the understanding on early child development. Second, the current study uses cross-section information from the first wave of the IHDS, one of the desirable extensions would be to include the recent wave, as well as examine the impact of child outcomes beyong age 11. Third, an individual's height has been linked to life expectancy, cognitive performance and socioeconomic status (Thomas and Strauss, 1997) as well as health and survival of children (Bhalotra and Rawlings, 2011). Future work would like to examine the impact of type of marriage on stature.

Table 1.4 Baseline Results: Mother's Outcomes, OLS estimates

	A							*B*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Variables	Leave	Cash/jwry	Neglect home	Badcook	Extra-marr	Any 5	All 5	Leave	Cash/jwry	Neglect home	Badcook	Extra-marr	Any 5	All 5
NCM	0.097***	0.081***	0.086***	0.081***	0.094***	0.090***	0.061***	0.093***	0.079***	0.081***	0.078***	0.089***	0.086***	0.061***
	(0.016)	(0.014)	(0.015)	(0.015)	(0.011)	(0.010)	(0.012)	(0.016)	(0.015)	(0.015)	(0.015)	(0.011)	(0.010)	(0.013)
Marriage age	-0.001	-0.005**	0.001	-0.004**	-0.006***	-0.005***	-0.004***	0.000	-0.004*	0.001	-0.004*	-0.005***	-0.003***	-0.003**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
First marriage	-0.006	0.005	-0.037	-0.112*	0.012	0.032	-0.013	-0.010	0.001	-0.042	-0.115*	0.012	0.034	-0.016
	(0.066)	(0.055)	(0.062)	(0.065)	(0.042)	(0.042)	(0.047)	(0.067)	(0.056)	(0.062)	(0.065)	(0.042)	(0.042)	(0.047)
Mother 18-25 yrs	0.124**	0.053	0.110**	0.092*	-0.046	-0.053	0.096**	0.127**	0.077	0.123**	0.094*	-0.020	-0.027	0.096**
	(0.052)	(0.050)	(0.052)	(0.050)	(0.037)	(0.035)	(0.043)	(0.053)	(0.051)	(0.053)	(0.051)	(0.038)	(0.037)	(0.044)
Mother 26-33 yrs	0.072**	0.031	0.105***	0.045	-0.010	-0.015	0.079***	0.071**	0.050	0.115***	0.048	0.011	0.003	0.081***
	(0.033)	(0.030)	(0.032)	(0.030)	(0.023)	(0.022)	(0.024)	(0.034)	(0.032)	(0.033)	(0.031)	(0.024)	(0.023)	(0.025)
Mother 34-41 yrs	0.070**	0.043	0.100***	0.071***	0.004	0.004	0.089***	0.069**	0.053*	0.107***	0.074***	0.016	0.015	0.090***
	(0.029)	(0.027)	(0.028)	(0.026)	(0.020)	(0.020)	(0.021)	(0.030)	(0.027)	(0.028)	(0.027)	(0.021)	(0.020)	(0.021)
Prim.Educ mother	0.011	0.024	0.024	-0.001	-0.019	-0.029*	0.035	0.011	0.025	0.026	0.000	-0.016	-0.027	0.035
	(0.027)	(0.026)	(0.027)	(0.026)	(0.018)	(0.017)	(0.023)	(0.027)	(0.026)	(0.027)	(0.026)	(0.018)	(0.017)	(0.023)
Sec.Educ mother	-0.091***	-0.047***	-0.048**	-0.046**	-0.027**	-0.039***	-0.024	-0.084***	-0.038**	-0.037*	-0.039**	-0.015	-0.029**	-0.019
	(0.020)	(0.018)	(0.019)	(0.018)	(0.013)	(0.012)	(0.015)	(0.020)	(0.018)	(0.020)	(0.019)	(0.013)	(0.012)	(0.015)
High.Educ mother	-0.166***	-0.090***	-0.064**	-0.042	-0.062**	-0.079***	-0.043**	-0.146***	-0.073***	-0.044	-0.032	-0.040*	-0.059**	-0.034
	(0.029)	(0.027)	(0.030)	(0.028)	(0.024)	(0.023)	(0.021)	(0.030)	(0.028)	(0.030)	(0.029)	(0.024)	(0.023)	(0.022)
Same village	-0.050**	-0.057***	-0.025	-0.019	-0.045***	-0.035**	-0.029*	-0.047**	-0.054***	-0.023	-0.017	-0.046***	-0.035**	-0.027*
	(0.020)	(0.018)	(0.020)	(0.019)	(0.015)	(0.014)	(0.015)	(0.020)	(0.018)	(0.020)	(0.019)	(0.015)	(0.014)	(0.016)
Same caste	-0.065**	-0.014	-0.104***	-0.027	0.042*	0.045**	-0.045*	-0.075**	-0.019	-0.113***	-0.034	0.035	0.037*	-0.049*
	(0.032)	(0.028)	(0.033)	(0.030)	(0.023)	(0.022)	(0.025)	(0.032)	(0.028)	(0.033)	(0.030)	(0.023)	(0.022)	(0.025)
Husband-related	-0.004	0.014	-0.023	-0.026	0.095***	0.069***	-0.022	0.000	0.016	-0.019	-0.022	0.097***	0.072***	-0.019
	(0.020)	(0.019)	(0.020)	(0.019)	(0.015)	(0.013)	(0.016)	(0.020)	(0.019)	(0.020)	(0.019)	(0.015)	(0.013)	(0.016)
Econ. status better	0.059***	0.034**	0.044***	0.036**	0.044***	0.044***	0.028**	0.054***	0.029*	0.041**	0.034**	0.042***	0.043***	0.024*
	(0.017)	(0.016)	(0.017)	(0.016)	(0.012)	(0.011)	(0.014)	(0.017)	(0.016)	(0.017)	(0.016)	(0.012)	(0.011)	(0.014)
Econ. status worse	0.069***	0.087***	0.045*	0.051**	0.067***	0.055***	0.057***	0.070***	0.089***	0.050*	0.054**	0.069***	0.057***	0.055**
	(0.026)	(0.025)	(0.026)	(0.025)	(0.015)	(0.014)	(0.022)	(0.027)	(0.025)	(0.026)	(0.025)	(0.015)	(0.015)	(0.022)
Father 23-33 yrs	0.012	-0.031	0.038	0.119	-0.005	0.018	0.060	0.024	-0.026	0.049	0.125*	0.006	0.027	0.061
	(0.093)	(0.085)	(0.086)	(0.076)	(0.060)	(0.059)	(0.050)	(0.092)	(0.084)	(0.085)	(0.075)	(0.060)	(0.059)	(0.050)
Father 34-44 yrs	-0.003	-0.047	0.010	0.091	-0.039	-0.019	0.044	0.012	-0.038	0.021	0.099	-0.033	-0.011	0.049
	(0.091)	(0.083)	(0.084)	(0.074)	(0.059)	(0.058)	(0.047)	(0.090)	(0.082)	(0.083)	(0.073)	(0.059)	(0.058)	(0.048)
Father 45-55 yrs	0.021	-0.036	0.047	0.089	-0.053	-0.044	0.066	0.033	-0.033	0.058	0.097	-0.047	-0.037	0.069
	(0.090)	(0.082)	(0.083)	(0.072)	(0.058)	(0.057)	(0.046)	(0.089)	(0.082)	(0.082)	(0.072)	(0.058)	(0.057)	(0.047)
Prim.Educ father	-0.050**	-0.031	-0.004	-0.021	0.006	0.008	-0.030	-0.052**	-0.032	-0.008	-0.026	0.008	0.011	-0.031
	(0.024)	(0.023)	(0.023)	(0.023)	(0.015)	(0.014)	(0.020)	(0.024)	(0.023)	(0.024)	(0.023)	(0.015)	(0.014)	(0.020)
Sec.Educ father	-0.025	-0.049***	-0.036**	-0.052***	-0.002	0.003	-0.054***	-0.017	-0.047***	-0.030	-0.046**	0.004	0.009	-0.052***
	(0.019)	(0.017)	(0.018)	(0.018)	(0.011)	(0.010)	(0.015)	(0.019)	(0.018)	(0.019)	(0.018)	(0.011)	(0.010)	(0.015)
High.Educ father	-0.028	-0.018	-0.043*	-0.054**	0.013	0.012	-0.046**	0.001	-0.008	-0.021	-0.033	0.026	0.028*	-0.035*
	(0.026)	(0.024)	(0.025)	(0.024)	(0.017)	(0.016)	(0.020)	(0.026)	(0.024)	(0.026)	(0.025)	(0.017)	(0.016)	(0.020)
Rural	0.053***	0.022	0.046***	0.051***	0.012	0.008	0.035***	0.033**	0.017	0.030*	0.036**	0.002	-0.004	0.027**
	(0.016)	(0.015)	(0.015)	(0.015)	(0.011)	(0.010)	(0.012)	(0.016)	(0.015)	(0.016)	(0.015)	(0.011)	(0.011)	(0.012)
Total Income(Logs)								-0.042***	-0.014*	-0.035***	-0.031***	-0.018***	-0.021***	-0.018***
								(0.009)	(0.008)	(0.009)	(0.008)	(0.005)	(0.005)	(0.007)
No.of children								0.006	0.012**	0.008	0.003	0.015***	0.014***	0.002
								(0.006)	(0.005)	(0.006)	(0.005)	(0.004)	(0.003)	(0.004)
Observations	6,441	6,439	6,445	6,445	6,432	6,441	6,441	6,363	6,361	6,367	6,367	6,354	6,363	6,363

*** p<0.01, ** p<0.05, * p<0.1
Group A estimates without predetermined variables such as number of children, income. Group B estimates with the inclusion of these variables. Standard errors clustered at household level in parentheses. Other controls include dummies for region-north, south, east, west and central(central as the reference category) ; religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-General, SC, ST, OBC and Others (General as the reference category).

Table 1.5 First Stage Regressions, Dependent variable: No Consent Marriage

	OLS		***Probit***	
Variables	(1a)	(2a)	(1b)	(2b)
Sex ratio 81_91	-0.001*	-0.001*	-0.001*	-0.001*
	(0.000)	(0.001)	(0.000)	(0.000)
Female Pols. 1991	-0.011	-0.011	-0.011*	-0.011*
	(0.007)	(0.007)	(0.006)	(0.006)
Sex ratio.1981	0.000	-0.000	0.000	0.000
	(0.000)	(0.001)	(0.000)	(0.001)
Sex ratio.1981^2		0.000		-0.000
		(0.000)		(0.000)
Female Pols. 1980	0.005	0.004	0.004	0.004
	(0.012)	(0.012)	(0.012)	(0.012)
Marriage age	-0.015***	-0.015***	-0.018***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.002)
First marriage	0.001	0.000	-0.005	-0.005
	(0.070)	(0.070)	(0.066)	(0.066)
Mother 18-25 yrs	-0.053	-0.054	-0.045	-0.045
	(0.059)	(0.059)	(0.058)	(0.058)
Mother 26-33 yrs	-0.026	-0.028	-0.023	-0.023
	(0.037)	(0.037)	(0.036)	(0.036)
Mother 34-41 yrs	-0.006	-0.007	-0.006	-0.006
	(0.032)	(0.032)	(0.032)	(0.032)
No.of children	0.025***	0.025***	0.020***	0.020***
	(0.006)	(0.006)	(0.006)	(0.006)
Prim.Educ mother	-0.023	-0.024	-0.013	-0.013
	(0.029)	(0.029)	(0.027)	(0.027)
Sec.Educ mother	-0.088***	-0.089***	-0.084***	-0.084***
	(0.022)	(0.022)	(0.021)	(0.021)
High.Educ mother	-0.099***	-0.100***	-0.111***	-0.111***
	(0.033)	(0.033)	(0.037)	(0.037)
Same village	-0.080***	-0.081***	-0.083***	-0.083***
	(0.021)	(0.021)	(0.022)	(0.022)
Same caste	0.015	0.014	0.007	0.007
	(0.040)	(0.040)	(0.041)	(0.041)
Husband-related	0.084***	0.085***	0.121***	0.121***
	(0.018)	(0.018)	(0.022)	(0.022)
Econ. status better	-0.056***	-0.056***	-0.054***	-0.054***
	(0.018)	(0.018)	(0.018)	(0.018)
Econ. status worse	-0.094***	-0.095***	-0.081***	-0.080***
	(0.030)	(0.030)	(0.028)	(0.028)
Father 23-33 yrs	0.147	0.147	0.123	0.123
	(0.103)	(0.103)	(0.096)	(0.096)
Father 34-44 yrs	0.141	0.141	0.119	0.119
	(0.101)	(0.101)	(0.094)	(0.094)
Father 45-55 yrs	0.163	0.161	0.142	0.142
	(0.101)	(0.101)	(0.093)	(0.093)
Prim.Educ father	-0.027	-0.027	-0.019	-0.019
	(0.025)	(0.025)	(0.023)	(0.023)
Sec.Educ father	0.007	0.007	0.002	0.002
	(0.020)	(0.020)	(0.019)	(0.019)
High.Educ father	0.002	0.002	0.009	0.009
	(0.028)	(0.028)	(0.027)	(0.027)
Total Income(Logs)	-0.038***	-0.038***	-0.040***	-0.040***
	(0.009)	(0.009)	(0.009)	(0.009)
Rural	0.019	0.017	0.017	0.018
	(0.018)	(0.018)	(0.017)	(0.017)
Other controls	y	y	y	y
Observations	4,974	4,974	4,974	4,974
F-stat	1.34	1.18		10.47
Log likelihood	-2808	-2808	-2643	-2618

*** p<0.01, ** p<0.05, * p<0.1

Standard errors clustered at household level in parentheses. Probit estimates are marginal effects and their standard errors. The F-stat figures in columns 1b and 2b are for the predicted $\widehat{M_j}$. Other controls include dummies for region-north, south, east, west and central (central as the reference category); religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-SC, ST, OBC, General and Others (general as the reference category).

Table 1.6 IV Estimates: Mother's Outcomes

			2 SLS							***GMM***				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Variables	Leave	Cash/jwry	Neglect home	Badcook	Extra-marr	Any 5	All 5	Leave	Cash/jwry	Neglect home	Badcook	Extra-marr	Any 5	All 5
Non-Consensual Marriage	0.568	0.919*	-0.514	-1.187*	0.654**	0.607**	-0.073	0.238*	0.586***	0.111	-0.036	0.234**	0.226**	0.026
	(0.457)	(0.555)	(0.508)	(0.714)	(0.321)	(0.302)	(0.380)	(0.125)	(0.126)	(0.119)	(0.114)	(0.099)	(0.091)	(0.094)
Marriage age	0.010	0.011	-0.005	-0.020*	0.004	0.006	-0.004	0.005*	0.006**	0.005*	-0.003	-0.002	-0.000	-0.002
	(0.007)	(0.009)	(0.008)	(0.011)	(0.005)	(0.005)	(0.006)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
First marriage	0.074	0.033	0.007	-0.043	0.004	0.030	0.018	0.074	0.034	0.006	-0.045	0.004	0.030	0.018
	(0.077)	(0.076)	(0.082)	(0.124)	(0.055)	(0.053)	(0.053)	(0.072)	(0.067)	(0.069)	(0.076)	(0.041)	(0.041)	(0.052)
Mother 18-25 yrs	0.192***	0.145*	0.114	0.078	0.064	0.044	0.139**	0.176***	0.127*	0.145**	0.136**	0.041	0.024	0.144***
	(0.072)	(0.082)	(0.076)	(0.104)	(0.057)	(0.054)	(0.057)	(0.063)	(0.067)	(0.063)	(0.061)	(0.045)	(0.044)	(0.053)
Mother 26-33 yrs	0.105**	0.116**	0.126***	0.048	0.061*	0.055*	0.101***	0.097**	0.108**	0.141***	0.077**	0.051*	0.045*	0.103***
	(0.047)	(0.051)	(0.046)	(0.061)	(0.035)	(0.033)	(0.032)	(0.041)	(0.042)	(0.039)	(0.037)	(0.028)	(0.027)	(0.031)
Mother 34-41 yrs	0.081**	0.079*	0.104***	0.079	0.041	0.043	0.093***	0.080**	0.078**	0.106***	0.083***	0.039*	0.041*	0.093***
	(0.040)	(0.043)	(0.038)	(0.050)	(0.029)	(0.028)	(0.026)	(0.036)	(0.037)	(0.034)	(0.032)	(0.024)	(0.023)	(0.026)
No.of children	-0.005	-0.005	0.031**	0.042**	0.002	0.002	0.008	0.004	0.003	0.015**	0.012*	0.013***	0.012***	0.006
	(0.014)	(0.016)	(0.015)	(0.021)	(0.010)	(0.009)	(0.011)	(0.008)	(0.008)	(0.007)	(0.007)	(0.005)	(0.004)	(0.006)
Prim.Educ mother	0.062*	0.078*	0.035	-0.016	0.021	0.011	0.053*	0.053*	0.070**	0.050	0.013	0.010	0.001	0.055**
	(0.036)	(0.041)	(0.037)	(0.051)	(0.026)	(0.024)	(0.030)	(0.031)	(0.034)	(0.031)	(0.030)	(0.019)	(0.018)	(0.028)
Sec.Educ mother	-0.011	0.054	-0.069	-0.137*	0.040	0.025	-0.024	-0.040	0.024	-0.013	-0.035	0.003	-0.008	-0.015
	(0.048)	(0.058)	(0.052)	(0.072)	(0.035)	(0.033)	(0.039)	(0.027)	(0.027)	(0.026)	(0.025)	(0.018)	(0.017)	(0.021)
High.Educ mother	-0.098*	-0.002	-0.100	-0.163*	0.015	-0.010	-0.055	-0.132***	-0.035	-0.037	-0.047	-0.026	-0.048*	-0.045
	(0.059)	(0.069)	(0.065)	(0.089)	(0.046)	(0.043)	(0.047)	(0.037)	(0.038)	(0.037)	(0.036)	(0.030)	(0.028)	(0.028)
Same village	-0.016	-0.000	-0.068	-0.121*	0.005	0.011	-0.041	-0.042*	-0.027	-0.019	-0.031	-0.029	-0.020	-0.033*
	(0.043)	(0.050)	(0.047)	(0.066)	(0.034)	(0.032)	(0.035)	(0.025)	(0.025)	(0.024)	(0.024)	(0.020)	(0.019)	(0.019)
Same caste	-0.010	-0.011	-0.018	0.040	0.030	0.043	-0.027	-0.005	-0.006	-0.027	0.023	0.036	0.048	-0.029
	(0.052)	(0.054)	(0.050)	(0.066)	(0.044)	(0.043)	(0.041)	(0.047)	(0.047)	(0.047)	(0.044)	(0.034)	(0.034)	(0.040)
Husband-related	-0.061	-0.056	0.025	0.081	0.055	0.034	-0.011	-0.033	-0.027	-0.028	-0.018	0.092***	0.067***	-0.019
	(0.046)	(0.055)	(0.050)	(0.070)	(0.034)	(0.032)	(0.038)	(0.025)	(0.025)	(0.024)	(0.024)	(0.020)	(0.018)	(0.020)
Econ. status better	0.061*	0.058	-0.007	-0.053	0.064***	0.060***	0.004	0.043**	0.039*	0.027	0.010	0.041***	0.040***	0.009
	(0.034)	(0.039)	(0.036)	(0.048)	(0.024)	(0.022)	(0.027)	(0.021)	(0.022)	(0.020)	(0.019)	(0.014)	(0.013)	(0.017)
Econ. status worse	0.121**	0.193***	-0.020	-0.095	0.130***	0.110***	0.053	0.090***	0.162***	0.038	0.013	0.090***	0.075***	0.063**
	(0.054)	(0.067)	(0.058)	(0.081)	(0.039)	(0.037)	(0.043)	(0.033)	(0.036)	(0.031)	(0.030)	(0.020)	(0.019)	(0.027)
Father 23-33 yrs	-0.092	-0.182	0.073	0.230	-0.121	-0.098	0.049	-0.043	-0.132	-0.021	0.058	-0.058	-0.040	0.035
	(0.148)	(0.165)	(0.143)	(0.188)	(0.095)	(0.089)	(0.085)	(0.121)	(0.124)	(0.110)	(0.101)	(0.055)	(0.053)	(0.065)
Father 34-44 yrs	-0.091	-0.179	0.049	0.213	-0.155*	-0.130	0.058	-0.044	-0.131	-0.040	0.048	-0.095*	-0.075	0.044
	(0.144)	(0.160)	(0.139)	(0.182)	(0.092)	(0.086)	(0.082)	(0.119)	(0.122)	(0.108)	(0.098)	(0.052)	(0.050)	(0.062)
Father 45-55 yrs	-0.074	-0.169	0.104	0.245	-0.161*	-0.148*	0.092	-0.020	-0.115	0.002	0.056	-0.093*	-0.086*	0.076
	(0.149)	(0.166)	(0.144)	(0.190)	(0.095)	(0.089)	(0.087)	(0.119)	(0.122)	(0.107)	(0.098)	(0.051)	(0.049)	(0.062)
Prim.Educ father	-0.037	-0.000	-0.031	-0.055	0.039*	0.033	-0.035	-0.048*	-0.011	-0.011	-0.019	0.026	0.021	-0.032
	(0.033)	(0.038)	(0.035)	(0.047)	(0.023)	(0.022)	(0.026)	(0.027)	(0.029)	(0.027)	(0.027)	(0.017)	(0.015)	(0.023)
Sec.Educ father	-0.026	-0.055**	-0.042*	-0.050	0.014	0.017	-0.056***	-0.025	-0.053**	-0.045**	-0.055***	0.017	0.019	-0.056***
	(0.024)	(0.027)	(0.024)	(0.032)	(0.018)	(0.016)	(0.018)	(0.022)	(0.023)	(0.021)	(0.021)	(0.013)	(0.012)	(0.018)
High.Educ father	-0.006	-0.029	-0.036	-0.050	0.029	0.027	-0.043*	-0.005	-0.028	-0.037	-0.052*	0.030	0.028	-0.043*
	(0.033)	(0.036)	(0.034)	(0.046)	(0.025)	(0.023)	(0.024)	(0.030)	(0.031)	(0.029)	(0.029)	(0.020)	(0.018)	(0.024)
Total Income(Logs)	-0.021	0.028	-0.052**	-0.066**	0.007	0.003	-0.017	-0.034***	0.015	-0.028**	-0.022**	-0.010	-0.012*	-0.013
	(0.021)	(0.024)	(0.022)	(0.031)	(0.015)	(0.014)	(0.016)	(0.011)	(0.011)	(0.011)	(0.011)	(0.007)	(0.007)	(0.008)
Rural	0.017	-0.008	0.029	0.052*	0.012	0.007	0.015	0.023	-0.002	0.018	0.032*	0.020	0.014	0.014
	(0.023)	(0.025)	(0.022)	(0.030)	(0.018)	(0.016)	(0.016)	(0.020)	(0.020)	(0.019)	(0.018)	(0.013)	(0.012)	(0.015)
Observations	4,962	4,961	4,966	4,966	4,954	4,962	4,963	4,962	4,961	4,966	4,966	4,954	4,962	4,963

*** p<0.01, ** p<0.05, * p<0.1
Columns 1-7 show estimates for standard 2SLS estimates and columns 8-14 for estimates from Nonlinear IV-GMM procedure. Standard errors clustered at household level in parentheses. Other controls include dummies for region-north, south, east, west and central (central as the reference category); religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-General, SC, ST, OBC and Others (General as the reference category).

Table 1.7 Reduced form: Mother's Outcomes, OLS estimates

Variables	(1) Leave	(2) Cash/jwry	(3) Neglect home	(4) Badcook	(5) Extra-Marital	(6) All 5	(7) Any 5
Sex Ratio 81_91	-0.001***	-0.001***	0.000	0.001	-0.001***	-0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female Pols. 1991	0.008	0.007	0.017**	0.028***	-0.003	-0.001	0.016***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.005)	(0.006)
Sex Ratio 1981	-0.001	-0.002*	-0.002**	-0.003***	0.004***	0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Sex Ratio 1981^2	0.000	0.000**	0.000**	0.000*	-0.000***	-0.000***	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female Pols. 1980	-0.001	0.042***	-0.012	0.007	0.014	0.012	-0.003
	(0.013)	(0.013)	(0.013)	(0.013)	(0.008)	(0.008)	(0.011)
Observations	4,988	4,987	4,992	4,992	4,980	4,988	4,989
All other controls	y	y	y	y	y	y	y

*** p<0.01, ** p<0.05, * p<0.1

Standard errors clustered at household level in parentheses. All controls included such as marital history of mother, couple-specific factors and other demographic controls. Marital history of the mother includes- age at marriage, if first marriage, whether husband is from the same village, same caste, if husband is related and economic status of the natal family at the time of marriage whether same, better or worse with same as the reference category. Demographic controls include residence-whether rural or urban, dummies for region-north, south, east, west and central (central as the reference category); religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-SC, ST, OBC and Others (Others as the reference category).

Table 1.8 Baseline Results: Child Outcomes

	OLS			***Probit***		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Reading	Math	Writing	Reading	Math	Writing
NCM	-0.025*	-0.029**	-0.007	-0.033**	-0.035**	-0.006
	(0.013)	(0.014)	(0.013)	(0.016)	(0.017)	(0.014)
Age 9	0.151***	0.128***	0.111***	0.184***	0.160***	0.126***
	(0.016)	(0.016)	(0.016)	(0.019)	(0.020)	(0.018)
Age 10	0.232***	0.204***	0.168***	0.277***	0.254***	0.187***
	(0.015)	(0.014)	(0.014)	(0.017)	(0.017)	(0.016)
Age 11	0.311***	0.275***	0.203***	0.369***	0.339***	0.225***
	(0.017)	(0.017)	(0.016)	(0.019)	(0.020)	(0.018)
Female	-0.019*	-0.041***	-0.028***	-0.024*	-0.054***	-0.033***
	(0.011)	(0.011)	(0.011)	(0.014)	(0.014)	(0.012)
Marriage age	0.004*	0.004**	0.004**	0.004*	0.005**	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
1^{st} marriage	0.044	0.104*	0.073	0.059	0.143*	0.080
	(0.058)	(0.057)	(0.062)	(0.067)	(0.075)	(0.058)
Mother 18-25 yrs	-0.004	-0.022	0.027	0.001	-0.026	0.024
	(0.051)	(0.052)	(0.050)	(0.059)	(0.063)	(0.051)
Mother 26-33 yrs	0.017	-0.009	0.022	0.017	-0.021	0.020
	(0.030)	(0.030)	(0.029)	(0.037)	(0.038)	(0.032)
Mother 34-41 yrs	0.014	0.016	0.014	0.015	0.013	0.014
	(0.026)	(0.026)	(0.026)	(0.032)	(0.034)	(0.028)
No.of children	-0.032***	-0.036***	-0.021***	-0.038***	-0.046***	-0.022***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)
Prim.Educ mother	0.092***	0.045*	0.061***	0.100***	0.049*	0.060**
	(0.025)	(0.024)	(0.023)	(0.027)	(0.027)	(0.024)
Sec.Educ mother	0.160***	0.141***	0.111***	0.187***	0.159***	0.130***
	(0.018)	(0.018)	(0.016)	(0.021)	(0.021)	(0.019)
High.Educ mother	0.196***	0.173***	0.139***	0.273***	0.231***	0.226***
	(0.025)	(0.027)	(0.023)	(0.039)	(0.039)	(0.040)
Same village	-0.061***	-0.030*	-0.020	-0.074***	-0.036	-0.023
	(0.018)	(0.018)	(0.017)	(0.021)	(0.022)	(0.019)
Same caste	0.037	-0.052**	-0.018	0.044	-0.065**	-0.021
	(0.027)	(0.026)	(0.024)	(0.033)	(0.033)	(0.028)
Husband-related	-0.014	-0.008	-0.035**	-0.020	-0.010	-0.045**
	(0.017)	(0.017)	(0.016)	(0.021)	(0.021)	(0.018)
Econ. status better	-0.018	-0.006	-0.001	-0.023	-0.006	-0.002
	(0.015)	(0.015)	(0.014)	(0.018)	(0.019)	(0.016)
Econ. status worse	0.005	-0.021	-0.015	0.002	-0.026	-0.015
	(0.023)	(0.022)	(0.022)	(0.027)	(0.027)	(0.023)
Father 23-33 yrs	0.026	0.046	-0.044	0.053	0.067	-0.047
	(0.083)	(0.085)	(0.077)	(0.100)	(0.108)	(0.080)
Father 34-44 yrs	0.046	0.060	-0.039	0.075	0.083	-0.041
	(0.081)	(0.084)	(0.075)	(0.098)	(0.106)	(0.078)
Father 45-55 yrs	0.094	0.101	-0.001	0.138	0.137	0.003
	(0.080)	(0.083)	(0.074)	(0.097)	(0.105)	(0.077)
Prim.Educ father	0.049**	0.022	0.046**	0.050**	0.026	0.037*
	(0.021)	(0.021)	(0.022)	(0.023)	(0.025)	(0.021)
Sec.Educ father	0.098***	0.090***	0.092***	0.103***	0.099***	0.083***
	(0.017)	(0.017)	(0.017)	(0.019)	(0.020)	(0.016)
High.Educ father	0.133***	0.145***	0.147***	0.156***	0.181***	0.166***
	(0.022)	(0.023)	(0.021)	(0.028)	(0.029)	(0.026)
Total Income(Logs)	0.018**	0.030***	0.006	0.024**	0.038***	0.010
	(0.008)	(0.008)	(0.007)	(0.010)	(0.010)	(0.008)
Discuss work/expd/pols	0.055**	0.029	0.013	0.064**	0.033	0.013
	(0.025)	(0.024)	(0.024)	(0.029)	(0.029)	(0.025)
Newspp.	0.103***	0.089***	0.103***	0.114***	0.103***	0.092***
	(0.016)	(0.015)	(0.016)	(0.018)	(0.019)	(0.015)
Piped water	0.013	-0.006	-0.003	0.017	-0.005	-0.004
	(0.014)	(0.015)	(0.014)	(0.018)	(0.018)	(0.016)
Own home	-0.027	-0.021	-0.020	-0.028	-0.025	-0.020
	(0.020)	(0.020)	(0.019)	(0.026)	(0.026)	(0.025)
Rural	-0.021	-0.043***	-0.002	-0.029	-0.056***	-0.005
	(0.016)	(0.016)	(0.015)	(0.019)	(0.020)	(0.017)
Other controls	y	y	y	y	y	y
Observations	6,250	6,216	6,192	6,250	6,216	6,192

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. Probit estimates are marginal effects and their standard errors. Other controls include dummies for region-north, south, east, west and central(central as the reference category) ; religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-SC, ST, OBC and Others (Others as the reference category).

Table 1.9 IV estimates: Child Outcomes

	2SLS			*GMM*		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Reading	Math	Writing	Reading	Math	Writing
NCM	-0.887	-0.747	-0.771	-0.208*	-0.351***	-0.169*
	(0.563)	(0.471)	(0.600)	(0.113)	(0.111)	(0.095)
Age 9	0.146***	0.126***	0.112***	0.146***	0.127***	0.112***
	(0.024)	(0.022)	(0.023)	(0.019)	(0.019)	(0.019)
Age 10	0.240***	0.206***	0.179***	0.237***	0.205***	0.178***
	(0.021)	(0.019)	(0.019)	(0.017)	(0.017)	(0.016)
Age 11	0.317***	0.281***	0.217***	0.315***	0.280***	0.216***
	(0.024)	(0.023)	(0.023)	(0.019)	(0.020)	(0.018)
Female	-0.033*	-0.051***	-0.035**	-0.028**	-0.048***	-0.030**
	(0.017)	(0.016)	(0.017)	(0.013)	(0.013)	(0.013)
No.of children	-0.005	-0.016	0.004	-0.023***	-0.026***	-0.012*
	(0.016)	(0.014)	(0.017)	(0.006)	(0.006)	(0.006)
Marriage age	-0.009	-0.006	-0.007	0.001	-0.000	0.002
	(0.009)	(0.007)	(0.009)	(0.003)	(0.003)	(0.002)
First marriage	0.060	0.105	0.069	0.061	0.105	0.068
	(0.085)	(0.083)	(0.083)	(0.064)	(0.069)	(0.071)
Mother 18-25 yrs	-0.066	-0.066	0.015	-0.032	-0.047	0.046
	(0.080)	(0.077)	(0.085)	(0.060)	(0.064)	(0.060)
Mother 26-33 yrs	-0.001	-0.020	0.016	0.017	-0.008	0.035
	(0.051)	(0.046)	(0.050)	(0.036)	(0.037)	(0.035)
Mother 34-41 yrs	0.009	0.008	0.007	0.013	0.012	0.013
	(0.043)	(0.039)	(0.041)	(0.031)	(0.032)	(0.031)
Prim.Educ mother	0.056	0.016	0.021	0.075***	0.027	0.036
	(0.041)	(0.035)	(0.036)	(0.028)	(0.028)	(0.026)
Sec.Educ mother	0.087	0.077	0.039	0.148***	0.113***	0.092***
	(0.058)	(0.050)	(0.059)	(0.023)	(0.024)	(0.021)
High.Educ mother	0.117	0.111*	0.066	0.186***	0.151***	0.125***
	(0.072)	(0.062)	(0.070)	(0.032)	(0.035)	(0.029)
Same village	-0.121**	-0.098**	-0.076	-0.064***	-0.064***	-0.025
	(0.054)	(0.046)	(0.056)	(0.022)	(0.023)	(0.020)
Same caste	0.006	-0.070	-0.005	-0.007	-0.078**	-0.019
	(0.052)	(0.046)	(0.045)	(0.038)	(0.037)	(0.032)
Husband-related	0.059	0.026	0.012	0.002	-0.007	-0.038**
	(0.054)	(0.046)	(0.055)	(0.021)	(0.022)	(0.019)
Econ. status better	-0.067	-0.049	-0.047	-0.026	-0.024	-0.009
	(0.041)	(0.036)	(0.044)	(0.018)	(0.019)	(0.017)
Econ. status worse	-0.094	-0.111**	-0.081	-0.028	-0.073***	-0.023
	(0.065)	(0.055)	(0.066)	(0.028)	(0.028)	(0.025)
Father 23-33 yrs	0.072	0.051	0.006	-0.032	-0.007	-0.089
	(0.171)	(0.162)	(0.159)	(0.107)	(0.119)	(0.088)
Father 34-44 yrs	0.083	0.062	0.002	-0.014	0.008	-0.087
	(0.166)	(0.158)	(0.153)	(0.104)	(0.116)	(0.086)
Father 45-55 yrs	0.150	0.122	0.060	0.041	0.062	-0.037
	(0.170)	(0.159)	(0.158)	(0.103)	(0.115)	(0.085)
Prim.Educ father	0.017	0.000	0.016	0.039	0.013	0.035
	(0.036)	(0.032)	(0.036)	(0.024)	(0.024)	(0.024)
Sec.Educ father	0.100***	0.102***	0.094***	0.096***	0.100***	0.091***
	(0.026)	(0.024)	(0.025)	(0.020)	(0.020)	(0.020)
High.Educ father	0.144***	0.149***	0.145***	0.143***	0.147***	0.144***
	(0.036)	(0.034)	(0.033)	(0.026)	(0.028)	(0.025)
Total Income(Logs)	-0.021	0.007	-0.023	0.003	0.021**	-0.001
	(0.024)	(0.021)	(0.024)	(0.010)	(0.010)	(0.009)
Discuss work/expd/pols	0.020	0.014	-0.026	0.049*	0.031	-0.001
	(0.041)	(0.036)	(0.040)	(0.027)	(0.026)	(0.027)
Newspp.	0.136***	0.105***	0.119***	0.122***	0.098***	0.109***
	(0.027)	(0.023)	(0.026)	(0.018)	(0.018)	(0.019)
Piped water	-0.001	-0.019	-0.015	0.010	-0.013	-0.004
	(0.025)	(0.023)	(0.023)	(0.017)	(0.018)	(0.016)
Own home	-0.043	-0.052*	-0.013	-0.041*	-0.052**	-0.013
	(0.029)	(0.027)	(0.028)	(0.022)	(0.023)	(0.022)
Rural	-0.000	-0.013	0.004	-0.010	-0.018	-0.005
	(0.025)	(0.024)	(0.024)	(0.018)	(0.019)	(0.017)
Other controls	y	y	y	y	y	y
Observations	4,901	4,880	4,863	4,901	4,880	4,863

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. Other controls include dummies for region-north, south, east, west and central (central as the reference category); religion-Hindu, Muslim, Christian, Sikh and Others (others as the reference category); caste-General, SC, ST, OBC and Others (general as the reference category).

Table 1.10 Reduced form: Child Outcomes, OLS estimates

Variables	(1) Reading	(2) Math	(3) Writing
Sex Ratio 81_91	0.001***	0.001***	0.001**
	(0.000)	(0.000)	(0.000)
Female Pols. 1991	-0.004	-0.005	0.001
	(0.006)	(0.006)	(0.006)
Sex Ratio 1981	0.001	0.002**	0.002*
	(0.001)	(0.001)	(0.001)
Sex Ratio 1981^2	-0.000**	-0.000***	-0.000**
	(0.000)	(0.000)	(0.000)
Female Pols. 1980	-0.009	-0.001	-0.008
	(0.011)	(0.011)	(0.011)
Observations	4,927	4,906	4,889
All other controls	y	y	y

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. All usual controls included- marital history of the mother, child characteristics, parental-specific factors, home environment, demographic controls.Marital history of the mother includes- age at marriage, if first marriage, whether husband is from the same village, same caste, if husband is related and economic status of the natal family at the time of marriage whether same, better or worse with same as the reference category. Child characteristics such as age dummies and gender. Parental-specific factors such as their age at the time of survey, highest attained education, number of children, total household income (in logs), if house is owned and has piped water facility. Home environment includes- if mother reads newspaper and if parents discuss work, expenditure or politics. Demographic controls include residence-whether rural or urban, dummies for region-north, south, east, west and central (central as the reference category); religion-Hindu, Muslim, Christian, Sikh and Others (others as the reference category); caste-General, SC, ST, OBC and Others (general as the reference category).

Table 1.11 Robustness Checks 1, IV Estimates: Mother's Outcomes

Variables	(1) Leave	(2) Cash/jwry	(3) Neglect home	(4) Badcook	(5) Extra-marr	(6) Any 5	(7) All 5
			Panel A				
NCM	0.138	0.430***	0.152	0.098	0.329***	0.331***	0.034
	(0.107)	(0.109)	(0.106)	(0.100)	(0.087)	(0.081)	(0.083)
Observations	5,093	5,092	5,097	5,097	5,085	5,093	5,094
F-stat			11.85				

Variables	Leave	Cash/jwry	Neglect home	Badcook	Extra-marr	Any 5	All 5
			Panel B				
NCM	0.220*	0.531***	0.110	0.082	0.143	0.143	0.004
	(0.130)	(0.131)	(0.126)	(0.118)	(0.105)	(0.096)	(0.094)
Observations	5,311	5,310	5,315	5,315	5,303	5,311	
F-stat			10.26				

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. All usual controls included in all the robustness exercises- marital history of the mother, couple-specific factors, demographic controls. Marital history of the mother includes- age at marriage, if first marriage, whether husband is from the same village, same caste, if husband is related and economic status of the natal family at the time of marriage whether same, better or worse with same as the reference category. Couple-specific factors include highest level of education attained, age at the time of survey, number of children. Demographic controls include residence-whether rural or urban, dummies for region-north, south, east, west and central(central as the reference category) ; religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-SC, ST, OBC and Others (Others as the reference category).

Table 1.12 Robustness Checks 1, IV estimates: Child Outcomes

Variables	(1) Reading	(2) Math	(3) Writing	(4) Reading	(5) Math	(6) Writing
NCM	-0.133	-0.291***	-0.082	-0.127	-0.308***	-0.111
	(0.098)	(0.096)	(0.086)	(0.118)	(0.115)	(0.093)
Observations	5,017	4,992	4,977	5,243	5,219	5,200
F-stat	11.79			10.14		

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. All usual controls included- marital history of the mother, child characteristics, parental-specific factors, home environment, demographic controls.

Table 1.13 Robustness Checks 2, IV estimates: Mothers Outcomes

Variables	(1) Leave	(2) Cash/jwry	(3) Neglect home	(4) Badcook	(5) Extra-marr	(6) Any 5	(7) All 5
NCM	0.021	0.230**	0.130	-0.081	-0.068	-0.094	-0.090
	(0.116)	(0.113)	(0.113)	(0.107)	(0.089)	(0.086)	(0.086)
State FE's	y	y	y	y	y	y	y
Observations	6,197	6,196	6,201	6,201	6,188	6,197	6,197
F-stat	-	-	-	11.06	-	-	-

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. All usual controls included- marital history of the mother, couple-specific factors, demographic controls.

Table 1.14 Robustness Checks 2, IV estimates: Child Outcomes

Variables	(1) Reading	(2) Math	(3) Writing
NCM	-0.040	-0.149	-0.013
	(0.102)	(0.104)	(0.086)
State FE's	y	y	y
Observations	6,088	6,057	6,037
F-stat	-	10.80	-

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. All usual controls included- marital history of the mother, child characteristics, parental-specific factors, home environment, demographic controls.

Table 1.15 Robustness checks 3: Falsification Test

Variables	(1) Age at menarche	(2) Age at menarche
Sex ratio 1991	-0.001	
	(0.002)	
Sex ratio 1991^2	0.000	
	(0.000)	
Female politicians 1991	0.010	
	(0.016)	
Sex ratio 1981		-0.003
		(0.002)
Sex ratio 1981^2		0.000
		(0.000)
Female politicians 1980		0.042
		(0.027)
Observations	5,128	5,349

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. All usual controls included-marital history of the mother, child characteristics, parental-specific factors, home environment, demographic controls.

Table 1.16 Heterogeneous Effects: Child Outcomes, IV estimates

PANEL A

	Girls			Boys		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Reading	Math	Writing	Reading	Math	Writing
NCM	-0.304**	-0.379***	-0.238*	-0.033	-0.233**	0.074
	(0.128)	(0.132)	(0.128)	(0.116)	(0.110)	(0.091)
Observations	2,882	2,865	2,862	3,257	3,242	3,222

PANEL B

	SC			ST			OBC			General		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	Reading	Math	Writing	Reading	Math	Writing	Reading	Math	Writing	Reading	Math	Writing
NCM	-0.002	-0.391**	-0.058	-0.221	-0.745	-0.115	-0.207*	-0.268**	-0.000	-0.249	-0.000	-0.139
	(0.149)	(0.164)	(0.154)	(0.603)	(0.643)	(0.551)	(0.120)	(0.123)	(0.117)	(0.252)	(0.236)	(0.229)
Observations	1,436	1,431	1,425	492	488	486	2,450	2,434	2,427	1,761	1,754	1,746

PANEL C

	Rural			Urban		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Reading	Math	Writing	Reading	Math	Writing
NCM	-0.100	-0.348***	-0.134	-0.095	-0.182	0.177
	(0.113)	(0.105)	(0.096)	(0.138)	(0.143)	(0.128)
Observations	4,116	4,098	4,077	2,059	2,045	2,043

PANEL D

	LowSES			MedSES			HighSE(S		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	Reading	Math	Writing	Reading	Math	Writing	Reading	Math	Writing
NCM	-0.156	-0.613***	-0.221	-0.161	-0.232*	0.060	0.013	-0.064	0.122
	(0.217)	(0.231)	(0.231)	(0.136)	(0.137)	(0.131)	(0.136)	(0.136)	(0.117)
Observations	1,050	1,045	1,040	2,788	2,774	2,764	2,301	2,288	2,280

*** p<0.01, ** p<0.05, * p<0.1 Standard errors clustered at household level in parentheses. All usual controls included as in the IV regressions- marital history of the mother, child characteristics, parental-specific factors, home environment, demographic controls. Marital history of the mother includes- age at marriage, if first marriage, whether husband is from the same village, same caste, if husband is related and economic status of the natal family at the time of marriage whether same, better or worse with same as the reference category. Child characteristics such as age dummies and gender. Parental-specific factors such as their age at the time of survey, highest attained education, number of children, total household income (in logs), if house is owned and has piped water facility. Home environment includes- if mother reads newspaper and if parents discuss work, expenditure or politics. Demographic controls include residence-whether rural or urban, dummies for region-north, south, east, west and central (central as the reference category) ;religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-SC, ST, OBC and Others (Others as the reference category).

Appendix A.1

Table 1.17 OLS estimates: Mothers Outcomes

Variables	(1) Leave	(2) Cash/jwry	(3) Neglect home	(4) Badcook	(5) Extra-marr	(6) Any 5	(7) All 5
NCM	0.082***	0.059***	0.039**	0.037**	0.046***	0.048***	0.045***
	(0.017)	(0.016)	(0.016)	(0.016)	(0.012)	(0.011)	(0.013)
State-Year FE's	y	y	y	y	y	y	y
District FE's	y	y	y	y	y	y	y
Observations	6,363	6,361	6,367	6,367	6,354	6,363	6,363

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. This is Table 1.4 now controlling for state-year and district fixed effects. All usual controls as in Table 1.4 included- marital history of the mother, couple-specific factors, demographic controls.

Table 1.18 OLS estimates: Child Outcomes

	OLS			***Probit***		
Variables	(1) Reading	(2) Math	(3) Writing	(4) Reading	(5) Math	(6) Writing
NCM	-0.027*	-0.035**	-0.028*	-0.046**	-0.053**	-0.035*
	(0.015)	(0.016)	(0.015)	(0.020)	(0.021)	(0.018)
State-Year FE's	y	y	y	y	y	y
District FE's	y	y	y	y	y	y
Observations	6,250	6,216	6,192	6,020	6,032	5,829

*** p<0.01, ** p<0.05, * p<0.1
Standard errors clustered at household level in parentheses. This is Table 1.7 now controlling for state-year and district fixed effects. All usual controls as in Table 1.7 included- marital history of the mother, child characteristics, parental-specific factors, home environment, demographic controls.

In Tables 1.19, 1.20, 1.21 and 1.22, I present results obtained for Mother's and children's outcomes for a fully-consensual marriages (FCM)and partial-consensual marriages (PCM). A fully-consensual case is where the female respondent had complete say in the choice of her spouse or married to the person of her choice. A partial-consensual case is where both the parents and the respondent together have a say in choosing her spouse.

These results show that the probability of being in a fully-consensual marriage has a negative and strong impact on the response to questions of violence if the wife leaves and if she does not cook food properly. I find a significant and positive effect on children of these mother to score higher in writing. While if the mother is in a partial-consensual marriage then the propensity to respond affirmatively to responses on violence significantly decreases for all cases, and strongly increases the children's

propensity to score higher in reading and mathematics.

Table 1.19 IV Estimates 2: Mother's Outcomes

Variables	(1) Leave	(2) Cash/jwry	(3) Neglect home	(4) Badcook	(5) Extra-Marital	(6) All 5	(7) Any 5
FCM	-0.464***	-0.175	-0.132	-0.329**	0.118	-0.009	-0.235*
	(0.152)	(0.137)	(0.140)	(0.137)	(0.132)	(0.130)	(0.121)
Marriage age	-0.001	-0.005**	-0.000	-0.004**	-0.007***	-0.005***	-0.004***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
First marriage	-0.046	-0.008	-0.046	-0.132*	0.025	0.035	-0.028
	(0.075)	(0.060)	(0.064)	(0.068)	(0.045)	(0.045)	(0.049)
Mother 18-25 yrs	0.130**	0.091*	0.116**	0.100*	-0.017	-0.024	0.104**
	(0.056)	(0.053)	(0.054)	(0.053)	(0.040)	(0.038)	(0.046)
Mother 26-33 yrs	0.052	0.054	0.114***	0.043	0.014	0.000	0.078***
	(0.036)	(0.033)	(0.034)	(0.032)	(0.025)	(0.024)	(0.027)
Mother 34-41 yrs	0.062**	0.060**	0.102***	0.072***	0.019	0.014	0.092***
	(0.031)	(0.029)	(0.030)	(0.028)	(0.021)	(0.021)	(0.023)
No.of children	0.008	0.016***	0.013**	0.007	0.018***	0.016***	0.005
	(0.006)	(0.005)	(0.006)	(0.005)	(0.004)	(0.004)	(0.005)
Prim.Educ mother	0.008	0.022	0.026	-0.008	-0.017	-0.029*	0.032
	(0.028)	(0.027)	(0.027)	(0.027)	(0.018)	(0.017)	(0.024)
Sec.Educ mother	-0.088***	-0.043**	-0.042**	-0.044**	-0.027**	-0.041***	-0.023
	(0.021)	(0.019)	(0.020)	(0.019)	(0.014)	(0.013)	(0.016)
High.Educ mother	-0.164***	-0.086***	-0.059*	-0.044	-0.048*	-0.069***	-0.042*
	(0.031)	(0.029)	(0.031)	(0.029)	(0.026)	(0.024)	(0.023)
Same village	-0.030	-0.056***	-0.024	-0.005	-0.064***	-0.044***	-0.022
	(0.022)	(0.020)	(0.021)	(0.021)	(0.017)	(0.016)	(0.017)
Same caste	-0.032	-0.023	-0.045	-0.009	0.047	0.048	-0.061*
	(0.042)	(0.036)	(0.041)	(0.038)	(0.030)	(0.030)	(0.033)
Husband-related	-0.014	0.011	-0.033	-0.035*	0.107***	0.078***	-0.024
	(0.021)	(0.020)	(0.020)	(0.020)	(0.015)	(0.014)	(0.017)
Econ. status better	0.050***	0.025	0.032*	0.032*	0.040***	0.040***	0.023
	(0.018)	(0.017)	(0.017)	(0.017)	(0.012)	(0.011)	(0.015)
Econ. status worse	0.065**	0.099***	0.042	0.042	0.067***	0.053***	0.061***
	(0.028)	(0.027)	(0.027)	(0.027)	(0.016)	(0.015)	(0.023)
Father 23-33 yrs	0.049	-0.041	0.021	0.118	0.008	0.035	0.074
	(0.102)	(0.093)	(0.095)	(0.083)	(0.055)	(0.054)	(0.057)
Father 34-44 yrs	0.028	-0.058	-0.012	0.086	-0.033	-0.007	0.058
	(0.100)	(0.091)	(0.093)	(0.081)	(0.053)	(0.053)	(0.054)
Father 45-55 yrs	0.035	-0.050	0.024	0.080	-0.045	-0.035	0.075
	(0.099)	(0.091)	(0.092)	(0.080)	(0.051)	(0.052)	(0.053)
Prim.Educ father	-0.057**	-0.037	-0.015	-0.029	0.005	0.007	-0.035*
	(0.025)	(0.024)	(0.024)	(0.024)	(0.015)	(0.014)	(0.021)
Sec.Educ father	-0.018	-0.047***	-0.036*	-0.048**	-0.000	0.005	-0.049***
	(0.020)	(0.018)	(0.019)	(0.019)	(0.012)	(0.011)	(0.016)
High.Educ father	0.005	-0.008	-0.019	-0.034	0.024	0.025	-0.032
	(0.027)	(0.025)	(0.026)	(0.025)	(0.018)	(0.017)	(0.021)
Total Income(Logs)	-0.050***	-0.017**	-0.039***	-0.034***	-0.022***	-0.025***	-0.022***
	(0.009)	(0.008)	(0.009)	(0.008)	(0.006)	(0.005)	(0.007)
Rural	0.021	0.012	0.029*	0.034**	0.003	-0.005	0.022*
	(0.017)	(0.016)	(0.016)	(0.016)	(0.012)	(0.011)	(0.013)
Other controls	y	y	y	y	y	y	y
Observations	6,062	6,060	6,066	6,066	6,053	6,062	6,062
F-stat	-	-	-	11.11	-	-	-

*** p<0.01, ** p<0.05, * p<0.1

FCM: Fully Consensual Marriage. Standard errors clustered at household level in parentheses. Other controls include dummies for region-north, south, east, west and central(central as the reference category) ; religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-SC, ST, OBC and Others (Others as the reference category).

Table 1.20 IV estimates 2: Child Outcomes

Variables	Reading	Math	Writing
FCM	-0.129	0.077	0.274**
	(0.140)	(0.134)	(0.127)
Age 9	0.145***	0.126***	0.109***
	(0.017)	(0.017)	(0.017)
Age 10	0.231***	0.207***	0.172***
	(0.015)	(0.015)	(0.014)
Age 11	0.308***	0.277***	0.207***
	(0.017)	(0.017)	(0.017)
Female	-0.019	-0.043***	-0.028**
	(0.012)	(0.012)	(0.011)
No.of children	-0.033***	-0.035***	-0.019***
	(0.005)	(0.005)	(0.005)
Marriage age	0.004**	0.004**	0.003**
	(0.002)	(0.002)	(0.002)
First marriage	0.015	0.089	0.079
	(0.058)	(0.058)	(0.066)
Mother 18-25 yrs	-0.013	-0.027	0.027
	(0.052)	(0.053)	(0.052)
Mother 26-33 yrs	0.007	-0.011	0.033
	(0.031)	(0.031)	(0.030)
Mother 34-41 yrs	0.010	0.013	0.013
	(0.027)	(0.027)	(0.027)
Prim.Educ mother	0.088***	0.048*	0.061***
	(0.025)	(0.025)	(0.024)
Sec.Educ mother	0.164***	0.145***	0.110***
	(0.018)	(0.018)	(0.017)
High.Educ mother	0.203***	0.183***	0.135***
	(0.026)	(0.028)	(0.024)
Same village	-0.048**	-0.035*	-0.039**
	(0.019)	(0.020)	(0.019)
Same caste	0.004	-0.048	0.024
	(0.033)	(0.032)	(0.031)
Husband-related	-0.014	-0.014	-0.036**
	(0.017)	(0.018)	(0.016)
Econ. status better	-0.015	-0.006	-0.001
	(0.015)	(0.016)	(0.015)
Econ. status worse	-0.006	-0.027	-0.017
	(0.024)	(0.023)	(0.022)
Father 23-33 yrs	0.008	0.017	-0.082
	(0.084)	(0.091)	(0.079)
Father 34-44 yrs	0.024	0.030	-0.076
	(0.082)	(0.089)	(0.077)
Father 45-55 yrs	0.068	0.064	-0.030
	(0.081)	(0.088)	(0.076)
Prim.Educ father	0.049**	0.023	0.046**
	(0.022)	(0.021)	(0.022)
Sec.Educ father	0.102***	0.089***	0.088***
	(0.017)	(0.017)	(0.017)
High.Educ father	0.134***	0.145***	0.146***
	(0.023)	(0.023)	(0.022)
Total Income(Logs)	0.014*	0.031***	0.007
	(0.008)	(0.008)	(0.008)
Discuss work/expd/pols	0.054**	0.030	0.007
	(0.025)	(0.024)	(0.024)
Newspp.	0.107***	0.082***	0.096***
	(0.016)	(0.016)	(0.016)
Piped water	0.014	-0.007	-0.004
	(0.015)	(0.015)	(0.015)
Own home	-0.027	-0.023	-0.019
	(0.020)	(0.020)	(0.019)
Rural	-0.017	-0.042**	-0.003
	(0.016)	(0.016)	(0.015)
Other controls	y	y	y
Observations	5,958	5,927	5,904
F-stat	-	10.90	-

*** p<0.01, ** p<0.05, * p<0.1

FCM: Fully Consensual Marriage. Standard errors clustered at household level in parentheses. Other controls include dummies for region-north, south, east, west and central (central as the reference category); religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-SC, ST, OBC and Others (Others as the reference category).

Table 1.21 IV Estimates 3: Mother's Outcomes

Variables	(1) Leave	(2) Cash/jwry	(3) Neglect home	(4) Badcook	(5) Extra-Marital	(6) All 5	(7) Any 5
PCM	-0.272**	-0.564***	-0.337***	-0.272**	-0.482***	-0.463***	-0.117
	(0.121)	(0.138)	(0.123)	(0.110)	(0.101)	(0.093)	(0.091)
Marriage age	0.002	0.003	0.004*	-0.001	-0.000	0.002	-0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
First marriage	0.027	0.072	0.003	-0.071	0.068	0.087*	0.007
	(0.066)	(0.062)	(0.064)	(0.065)	(0.048)	(0.048)	(0.046)
Mother 18-25 yrs	0.119**	0.064	0.104*	0.084	-0.039	-0.048	0.096**
	(0.055)	(0.059)	(0.056)	(0.054)	(0.043)	(0.042)	(0.045)
Mother 26-33 yrs	0.079**	0.079**	0.126***	0.061*	0.026	0.018	0.088***
	(0.036)	(0.037)	(0.035)	(0.032)	(0.027)	(0.026)	(0.026)
Mother 34-41 yrs	0.071**	0.067**	0.106***	0.079***	0.018	0.016	0.096***
	(0.031)	(0.032)	(0.030)	(0.028)	(0.023)	(0.022)	(0.022)
No.of children	0.002	0.003	0.004	-0.000	0.006	0.006	0.001
	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)	(0.004)	(0.005)
Prim.Educ mother	0.026	0.058*	0.048*	0.012	0.009	-0.002	0.041*
	(0.029)	(0.030)	(0.029)	(0.027)	(0.022)	(0.021)	(0.024)
Sec.Educ mother	-0.067***	0.007	-0.013	-0.020	0.021	0.005	-0.014
	(0.024)	(0.025)	(0.024)	(0.022)	(0.018)	(0.017)	(0.019)
High.Educ mother	-0.137***	-0.020	-0.021	-0.015	0.012	-0.012	-0.031
	(0.034)	(0.036)	(0.035)	(0.033)	(0.030)	(0.028)	(0.026)
Same village	-0.045**	-0.045**	-0.019	-0.013	-0.040**	-0.028	-0.030*
	(0.021)	(0.022)	(0.021)	(0.020)	(0.018)	(0.017)	(0.016)
Same caste	0.014	0.003	-0.023	0.023	0.049	0.060*	-0.039
	(0.035)	(0.038)	(0.038)	(0.034)	(0.031)	(0.030)	(0.030)
Husband-related	-0.017	-0.009	-0.042*	-0.041**	0.079***	0.053***	-0.023
	(0.021)	(0.022)	(0.021)	(0.021)	(0.018)	(0.017)	(0.017)
Econ. status better	0.057***	0.046**	0.046**	0.040**	0.059***	0.058***	0.026*
	(0.019)	(0.020)	(0.019)	(0.018)	(0.014)	(0.014)	(0.015)
Econ. status worse	0.078***	0.126***	0.056**	0.052*	0.099***	0.084***	0.060***
	(0.029)	(0.032)	(0.029)	(0.027)	(0.022)	(0.021)	(0.023)
Father 23-33 yrs	-0.018	-0.137	-0.037	0.059	-0.064	-0.041	0.044
	(0.106)	(0.107)	(0.101)	(0.091)	(0.074)	(0.071)	(0.057)
Father 34-44 yrs	-0.028	-0.145	-0.064	0.035	-0.097	-0.074	0.032
	(0.104)	(0.105)	(0.099)	(0.089)	(0.072)	(0.070)	(0.054)
Father 45-55 yrs	-0.005	-0.127	-0.022	0.041	-0.105	-0.094	0.056
	(0.103)	(0.105)	(0.098)	(0.087)	(0.071)	(0.069)	(0.053)
Prim.Educ father	-0.047*	-0.018	-0.002	-0.020	0.020	0.022	-0.032
	(0.025)	(0.026)	(0.025)	(0.024)	(0.018)	(0.017)	(0.021)
Sec.Educ father	-0.021	-0.049**	-0.038**	-0.052***	0.001	0.005	-0.053***
	(0.020)	(0.020)	(0.019)	(0.018)	(0.014)	(0.013)	(0.015)
High.Educ father	0.002	-0.013	-0.023	-0.038	0.022	0.022	-0.035*
	(0.027)	(0.027)	(0.026)	(0.025)	(0.020)	(0.019)	(0.021)
Total Income(Logs)	-0.035***	0.007	-0.023**	-0.021**	-0.002	-0.005	-0.015**
	(0.010)	(0.011)	(0.010)	(0.010)	(0.008)	(0.007)	(0.008)
Rural	0.035**	0.028	0.038**	0.044***	0.011	0.005	0.029**
	(0.017)	(0.017)	(0.017)	(0.016)	(0.013)	(0.013)	(0.013)
Other controls	y	y	y	y	y	y	y
Observations	6,249	6,247	6,253	6,253	6,240	6,249	6,249
F-stat	-	-	-	8.86	-	-	-

*** p<0.01, ** p<0.05, * p<0.1

PCM: Partial Consensual Marriage. Standard errors clustered at household level in parentheses. Other controls include dummies for region-north, south, east, west and central (central as the reference category); religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-SC, ST, OBC and Others (Others as the reference category).

Table 1.22 IV estimates 3: Child Outcomes

Variables	Reading	Math	Writing
PCM	0.250**	0.311***	0.062
	(0.122)	(0.114)	(0.101)
Age 9	0.153***	0.134***	0.115***
	(0.017)	(0.017)	(0.016)
Age 10	0.233***	0.206***	0.170***
	(0.015)	(0.015)	(0.014)
Age 11	0.318***	0.286***	0.209***
	(0.017)	(0.018)	(0.017)
Female	-0.018	-0.042***	-0.027**
	(0.012)	(0.012)	(0.011)
No.of children	-0.028***	-0.029***	-0.020***
	(0.006)	(0.006)	(0.006)
Marriage age	0.000	0.000	0.003
	(0.003)	(0.002)	(0.002)
First marriage	0.000	0.051	0.046
	(0.061)	(0.061)	(0.062)
Mother 18-25 yrs	-0.000	-0.019	0.030
	(0.052)	(0.055)	(0.051)
Mother 26-33 yrs	-0.001	-0.029	0.015
	(0.032)	(0.032)	(0.030)
Mother 34-41 yrs	0.007	0.008	0.009
	(0.028)	(0.028)	(0.026)
Prim.Educ mother	0.083***	0.035	0.062***
	(0.026)	(0.025)	(0.024)
Sec.Educ mother	0.137***	0.114***	0.105***
	(0.022)	(0.023)	(0.020)
High.Educ mother	0.171***	0.144***	0.133***
	(0.031)	(0.032)	(0.027)
Same village	-0.063***	-0.041**	-0.024
	(0.019)	(0.019)	(0.017)
Same caste	0.010	-0.072**	0.001
	(0.029)	(0.030)	(0.026)
Husband-related	-0.000	0.003	-0.035**
	(0.019)	(0.019)	(0.017)
Econ. status better	-0.025	-0.020	-0.003
	(0.016)	(0.017)	(0.015)
Econ. status worse	-0.011	-0.041*	-0.020
	(0.025)	(0.025)	(0.023)
Father 23-33 yrs	0.040	0.059	-0.064
	(0.094)	(0.104)	(0.080)
Father 34-44 yrs	0.057	0.069	-0.060
	(0.092)	(0.102)	(0.078)
Father 45-55 yrs	0.098	0.097	-0.026
	(0.090)	(0.101)	(0.077)
Prim.Educ father	0.042*	0.015	0.048**
	(0.022)	(0.022)	(0.022)
Sec.Educ father	0.103***	0.092***	0.096***
	(0.018)	(0.017)	(0.017)
High.Educ father	0.137***	0.146***	0.150***
	(0.023)	(0.024)	(0.022)
Total Income(Logs)	0.006	0.016*	0.003
	(0.009)	(0.009)	(0.008)
Discuss work/expd/pols	0.044*	0.015	0.006
	(0.026)	(0.025)	(0.025)
Newspp.	0.110***	0.093***	0.100***
	(0.017)	(0.016)	(0.016)
Piped water	0.009	-0.015	-0.003
	(0.015)	(0.016)	(0.015)
Own home	-0.030	-0.028	-0.021
	(0.021)	(0.021)	(0.019)
Rural	-0.022	-0.050***	-0.005
	(0.016)	(0.017)	(0.015)
Other controls	y	y	y
Observations	6,139	6,107	6,084
F-stat	-	8.82	-

*** p<0.01, ** p<0.05, * p<0.1

PCM: Partial Consensual Marriage. Standard errors clustered at household level in parentheses. Other controls include dummies for region-north, south, east, west and central (central as the reference category); religion-Hindu, Muslim, Christian, Sikh and Others (Others as the reference category); caste-SC, ST, OBC and Others (Others as the reference category, which includes those in general category as well).

Table 1.23 Regional Differences in Type of Marriage

Type of Marriage	North	South	East	West	Central	Total
Full-consensual	0.022	0.055	0.094	0.055	0.009	395
Partial-consensual	0.462	0.829	0.437	0.712	0.401	4,802
Non-consensual	0.516	0.116	0.468	0.234	0.590	3,616
Total	1,973	1,627	1,897	1,253	2,130	

Table 1.24 Sex Ratio Statistics by Region

Variable	*Mean*	*Std. Dev.*	*Min.*	*Max.*	*Region*
Sex Ratio 1981					
	849.812	52.837	671	933	North
	944.599	40.678	886	1144	South
	854.215	80.548	523	1020	East
	900.436	43.759	772	1204	West
	866.085	62.838	411	971	Central
Sex Ratio 1991					
	864.781	36.759	736	929	North
	956.882	39.093	886	1141	South
	872.747	61.754	581	1003	East
	901.387	70.086	388	1115	West
	879.746	37.984	744	992	Central
Sex Ratio 2001					
	863.649	40.998	587	927	North
	972.905	39.908	893	1147	South
	898.939	50.72	327	1043	East
	908.806	47.003	757	1173	West
	891.722	42.701	664	991	Central
N=8,880					

Chapter 2

Assortative Mating, Marital Stability and the Role of Business Cycles

2.1 Introduction

Various literatures have identified the strong negative correlation between divorce and a wide range of outcomes. Among them are Kitson and Morgan (1990), Amato (2000). In particular divorced individuals have lower economic well-being , lower psychological welfare and perform worse on health aspects.[1] Families, especially children are greatly affected by the consequences of divorce as shown by Allison and Furstenberg (1989); Gruber (2004). These studies have found that children of divorced parents tend to have lower educational attainment, lower incomes, marry earlier, separate often and have higher probability of committing suicide. The effects of marital dissolution on behaviour, psychological distress and academic performance are pervasive and long lasting. And these effects are larger for children who are very young at the time of dissolution as shown by Allison and Furstenberg (1989).

In light of this, efforts have been made to identify causes of marital instability. One of the causes is macro-level indicators such as unemployment or insufficient

[1] Aasve et al. (2007), Blanchflower and Oswald (2004) , Richards et al. (1997)

earnings as documented by Cherlin (1992) and others[2], men's declining labour market opportunities (Oppenheimer 1997 and Ruggles 1997), rising inflation (Nunley, 2010) and weakening consumer confidence (Fischer and Liefbroer, 2006). A recession can affect marital stability in two main ways. First, economic hardship caused by factors such as job loss, home foreclosures, wage declines, adds financial stress and marital unhappiness which could subsequently increase the risk of marital dissolution[3]. Second, economic barriers make divorce costly due to legal fees, rising cost of housing and childcare costs resulting from decreasing economies of scale. These associated costs of divorce may bring couples together to improve their relationship and become resilient (Ogburn and Thomas 1922; Wilcox 2009; Amato and Beattie 2011; Cohen 2014).

This paper contributes to one strand of the economic literature that studies whether certain combinations of spouses characteristics can explain the likelihood of divorce. Previous literature, mainly by Becker (1974); Becker et al. (1977); Ermisch (2003) has documented that in a marriage market, the competition for spouse leads to sorting of mates by education, wealth, attractiveness leading to positive (mating of likes) versus negative (mating of unlikes) mating. Shared gains from marriage depend on the traits of each spouse. A lot of work in this area can be found in the sociological literature. Both disciplines have focused on four dimensions which are: age at marriage, education, ethnicity and religious denomination and evidence shows that assortative mating along these lines is important for a successful duration of marriage.[4]

In this study, I test the relation between spouses characteristics and the probability of dissolution using the Panel Study of Income Dynamics 1968-2011. In addition to this, I test if this relation between spouses varies with the state of the economy. This analysis addresses two questions: Do spouses with similar traits have a lower probability of exiting their marriage? Does this vary with being in a recession or not? Obtaining answers to these questions could be a step in the attempt to understand

[2]Conger et al. (1990); Liem and Liem (1990)

[3]See Conger and Elder (1994); Hardie and Lucas. (2010); White and Rogers (2000); Bumpass et al. (1991); Jensen and Smith (1990) Jalovaara (2003) and Hansen (2005)

[4]See Becker et al. (1977); Kalmijn (1998); Weiss and Willis (1997); Frimmel et al. (2013)

factors affecting marital stability. More importantly, determining if assortatively mated couples are affected by business cycle fluctuations, could be an important component in understanding stability of marriages. This will enhance discerning factors affecting divorce, in particular the well-being of the vulnerable population.

This paper presents descriptive evidence to suggest factors affecting marital dissolution. To the best of my knowledge, this is the first attempt to uncover the relation between assortative mating and the risk of dissolution taking into account the role of business cycles. The findings suggest that higher education at marriage and mixed ethnicity greatly increases the couples hazard of ending their marriages. In contrast, race and religiousness have a very stabilizing effect on the hazard of dissolution. Two papers closely related to the current study are that of Weiss and Willis (1997); Frimmel et al. (2013). The latter, shows that changes in assortative mating patterns along the four dimensions are not responsible for the increasing marital instability in Austria. The former, in the context of search theory, investigates the role of surprises consisting of changes in predicted earning capacity of either spouse using the National Longitudinal Survey of 1972 for the United States.

2.2 Literature Review

The body of research has long speculated the influence of economic changes on social conditions. It was noted by Willcox as early as 1893 that divorce rate is influenced by business conditions.[5] Low divorce rates observed in 1873-79 and 1884-86 were periods of depression in trade for the United States. However, there is little empirical evidence on whether such a link exists. Amato and Beattie (2011) conduct state-level analysis of divorce rates on unemployment rates using vital statistics from 1960-2005 at five year intervals, controlling for state and year fixed effects. The authors find evidence of pro-cyclical divorce in the period starting after 1980. They find the magnitude of their estimated effect to be very large and statistically significant although with large

[5] Willcox (1893)

standard errors possibly due to the few years of data in their analysis (Hellerstein and Morrill, 2010). Arkes and Shen (2013) use the National Longitudinal Survey of Youth (NLSY)1979 to study pro-cyclicality of divorce for this cohort and do not find evidence of pro-cyclicality. Hellerstein and Morrill (2010) using data from the Bureau of Labour Statistics for 1976-2009, examine the impact of macroeconomic conditions on marital stability by approximating macroeconomic conditions with the state unemployment rates. Controlling for state and year fixed effects and state-specific time dummies, they find that divorce is pro-cyclical over the period in their study. Their results are robust to two alternative measures of macroeconomic conditions, namely log per capita income and state per capita GDP.

Some studies have examined how economic factors affect divorce rates using macro-level economic variables to avoid endogeneity of economic outcomes. South and Messner, 1986 estimated a time series model for divorce rates for the period 1948-79. He found that higher national unemployment rate and lower Gross National Product growth are associated with higher divorce rates suggesting counter-cyclical divorce rates. Fischer and Liefbroer (2006) use data from the Netherlands and also find a negative relationship between consumer confidence and marital dissolution rates, implying counter-cyclicality of dissolution rates. In contrast, Ruggles (1997) using data from eleven censuses, 1880 to 1990, found that higher female labour force participation and greater growth in nonfarm employment were related to higher divorce rates indicating pro-cyclical divorce rates. Another study by Ono (1998) measured marriage histories over the period 1950-87 using the Current Population Survey data from 1980, 1985 and 1990. This study found a positive effect of husbands' and wives' national median income on probability of separation, again suggesting pro-cyclical divorce rates. Using data from the British Household Panel Survey (1991-98) Böheim and Ermisch (2001) study the role of economic circumstances on the marital dissolution. They show that unexpected improvements in finances substantially reduces the dissolution risk, their results strongly support the importance of new information in decisions concerning

partnership dissolution.

A potential shortcoming of South and Messner (1986) as noted by Arkes and Shen (2013) is that there were no cohort or period controls included other than the Korean and Vietnam wars, so there could be a problem of incidental correlation between unemployment rate and any cohort or period effect. The two authors have also pointed out that Ruggles (1997) and Ono (1998) did not use any geographical controls, thus their results have possibly been affected by unobserved heterogeneity. This would imply that areas with higher incomes had higher divorce rates due to spurious correlation of certain factors with income. Hellerstein and Morrill (2010) have argued that by using national level time series data, South and Messner (1986) and Fischer and Liefbroer (2006) are unable to identify spurious correlations and are unable to control for changes in divorce rates and the economy.

The increase in divorces in prosperity and decline in depression is interesting. The relevant literature concludes that it is theoretically ambiguous whether and how divorce rates vary with the business cycle. There is no clear prediction if marital dissolution rates should be pro-cyclical or counter-cyclical or even if they should vary systematically over the business cycle (Hellerstein and Morrill, 2010). It has been argued that recession leads to rising stress levels and therefore increases the risk of marital dissolution. On the other hand, due to the increase in economic costs of divorce, couples may choose to keep their differences aside and either put off their decision to divorce completely or postpone it to later time. [6]

The factors affecting dissolution also depend on the traits of each spouse. In general, people have a tendency to choose partners with a similar social background. Sociologists such as Hendrickx et al. (1991), Kalmijn (1998) and Mare (1991) have studied assortative mating with respect to social backgrounds such as education, class, religion, ethnicity, age, among others.[7] Economic theory, following Becker et al. (1977)

[6] Amato and Beattie (2011)

[7] The three authors have predominantly focused on assortative mating in people's first marriages or cohabiting unions

and Weiss and Willis (1997), regards marriage as a voluntary partnership for the purpose of joint production and consumption including the production of children. The marriage market determines the assignment of partners and the sharing gains of marriage (Becker, 1993). The expected gains from marriage depend on the traits of each spouse. The interaction between these characteristics induces assortative mating. Economists have shown that an efficient marriage market is characterized by the match of spouses with similar characteristics such as intelligence, physical attractiveness (Stevenson and Wolfers, 2007). Such a matching process of likes, known as positive assortative mating increases complementarities in household production and may boost intergenerational persistence of wealth, income, education and other economic outcomes. On the other hand, negative assortative mating, matching of unlikes is optimal for traits that are substitutes in household production, for example, wage earning power. Positive assortative mating refers to a positive correlation in sorting between the values of traits of husbands and wives.

2.3 Data and estimation strategy

For the analysis in this paper, I use data from the Panel Study of Income Dynamics of United States (PSID) covering the period of 1968-2011. The long time span of the dataset allows for analyses of business cycles that have occurred between 1968-2011, which is particularly useful for the current study. The marriage history file of the PSID provides records for individuals of marriage-eligible age which contain all known cumulative data about the timing and circumstances of his or her marriages up to and including 2011. This file contains details about marriage events of eligible people living in a PSID family at the time of the interview in any wave between 1985 and the most recent wave in 2011. This includes marriages prior to 1985 as provided through restrospective reports. Data obtained on variables such as number of marriages, beginning and end dates for the first and most recent marriages, marital status of the individual at the time of the most recent interview. The number of individuals reporting more than two marriages is 3844, 2663 report all their marriages and 1181

do not.

This analysis is restricted only to individuals in their first marriages, thus there are 8,329 couple, of these, 1,687 have been married before the start of the survey in 1968 and the remaining 6,642 enter their first marriage in or after 1968. So, there is a stock sample (those married before start of survey in 1968) with follow up and a flow sample (those married in or after 1968). In order to take account of length-biased sampling, there is a need to condition on the fact that the couples who have survived sufficiently long in the state to be at risk of being sampled in the stock and it has to be done for both completed and censored spells (Jenkins, 2005). Marriage start and end dates are known for everyone in our sample. In the analysis, only those from the flow sample are considered, so I follow 6,642 first marriages that have taken place between 1968 and 2011. Furthermore, 81 of these marriages ended in widowhood, 23.52% of the marriages ended in divorce or separation and 75.26% survived.

The risk set, which is the set of couples who are at the risk of an event occurrence at each point in time is 6,642 couples. The hazard rate is the conditional probability that a marriage will end in a particular time, t for a particular couple, given that the couple is at risk at that time. Figure 1 shows the hazard function for the sample considered. In this sample, individuals are couples and time is measured in years starting from 1968, the start of the PSID up till the survey in 2011.[8] I refer to these observations as couple-years since they are in a person-period format. Thus, couples who ended their marriage in year 1969 contribute 1 couple-year, those who ended their marriage in 1974 contribute 6 couple-years and so on.

For the 6,642 couples there are a total of 78,303 couple-years. This total is the sum of the number at risk of ending their marriages in each of the 43 years. Those couples whose marriages did not end by 2011, or those who dropped out of the study and those where one of the spouses had become widowed are censored and they contribute what is known about them, that is, they did not end their marriages in any of the

[8]The last survey available at the time of writing this paper was 2011

years in which they were observed. These observations are right censored since their marriages did not end till the last time that they were observed. 81 marriages ended in widowhood, which means that 2,155 of the couple-years ended in widowhood. Those couples who ended their marriages are followed until the divorce or separation after which they are not followed, so they are out of the sample. 17.75% of them ended in divorce or separation and remaining approximately 80% remain intact till the end of survey year, in 2011.

Assortative Mating: I use information on age at marriage, educational level attained, religious preferences and ethnicity because according to the literature, these are the variables on which spouses choose to sort themselves into marriage resulting in assortative mating. Age at marriage is divided into five categories: couples where (i) husband is younger by 1 year or upto (and including) 4 years older than the wife (reference category); (ii) husband is older by 5 to 10 years; (iii) husband is older by 11 or more years; (iv) wife is older by 2 to 6 years; (v) wife is older by more than 7 years. In creating these age categories, I assume that assortatively mated couples are likely to be similar in age, while negatively matched couples tend to be having higher age differences. Husbands younger than wives by one year is, I believe, a negligible difference and close to being equal, as compared to husband being younger than wife by two years or more. For the main analysis, these categories are grouped as follows: (i) husband and wife are in the same educational category; (ii) husband is in a higher educational category than the wife; (iii) husband is in a lower category than the wife. Later, I relax the assumption on level of education attained and categorize it as: both are high school drop-outs (reference group), both are high school graduates, both attended some college, both are college graduates or have some postgraduate experience. In addition to these categories, I include: husband is in a higher educational category than the wife (H>W); husband is in a lower category than the wife (H<W).

Beginning in 1997, questions about birth location, race and ethnicity were asked. I use the information on ethnicity and categorize couples as: (i) both are americans,

including african-americans or mexican americans (base group); (ii) both are from other national origins (such as french, irish, scottish, iranian etc.) or both have nonspecific hispanic identity such as latinos, chicanos; (iii) both have racial ethnicity such as white or caucasian, black or religious ethnicity, for example jewish, baptist and others which includes country people; (iv) husband and wife belong to different ethnic groups or have mixed ethnicity. In terms of religious preferences, there are five divisions: (i) both are catholics; (ii) both are jewish; (iii) both belong to other christian denominations such as protestant, lutheran, baptist etc; (iv) both belong to other religions such as muslim (base group); (v) husband and wife have different religious preferences or have mixed religious preferences.

Controls: Dummies are included for year of marriage which are divided into decades from 1968-1979, 1980-1989, 1990-1999 and 2000-2011. Controls are added for state fixed effects and a dummy variable represents the passing of the Unilateral divorce laws. The traditional "fault" model of termination of marriage lasted in the United States until the 1970's. Then a new wave of no-fault unilateral divorce laws swept across the country, mainly during the course of 1970's that allowed people to seek a divorce without the consent of their spouse, although the process of removing fault grounds for spouses to ask for divorce had already began before the 1950s (Gruber, 2004). Figure 2.4 shows the adoption of unilateral divorce laws by states. Table 2.1 presents descriptive statistics for this sample. Weighted summary statistics are presented in the Appendix A.2.

On average, marriages last for 21 years in this sample. The survival time of marriage, in other words, the elapsed duration since the start of the marriage spell is approximately 10 years. Over the decades, the number of people getting married has declined, in 1968, 51% of marriages took place which went down to 13% in the 1990s and even further declined in the 2000s. 75% of couples are positively matched on age, 55% of couples are matched on education. In terms of education, the number of couples where both spouses are high school graduates (20%) and those where both are college

Table 2.1 Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Year of marriage	1980.947	9.691	1968	2011	78303
Year of marriage end	2002.161	9.173	1969	2011	78303
Survival time of marriage	9.810	8.497	0	43	78303
Marriage duration	21.171	11.177	1	43	78303
Age:					
H ≥ W (-1/4)	0.747	0.435	0	1	72659
H > W (5+)	0.163	0.37	0	1	72659
W > H (2+)	0.089	0.285	0	1	72659
Education:					
HS^{-}	0.085	0.279	0	1	71223
HS^{+}	0.198	0.398	0	1	71223
SC	0.084	0.277	0	1	71223
C^{+}	0.180	0.384	0	1	71223
H > W	0.208	0.406	0	1	71223
W > H	0.245	0.43	0	1	71223
Ethnicity:					
Both American+	0.135	0.342	0	1	44934
Both Other national orig.+	0.562	0.496	0	1	44934
Both Racial etc.	0.250	0.433	0	1	44934
Mixed Ethnicity	0.053	0.224	0	1	44934
Religion:					
Both Catholics	0.294	0.455	0	1	72199
Both Jewish	0.023	0.151	0	1	72199
Both Other Christian denoms	0.657	0.475	0	1	72199
Both Other religions	0.010	0.099	0	1	72199
Mixed Religion	0.016	0.124	0	1	72199
Year of marriage:					
1968-79	0.512	0.5	0	1	78303
1980-89	0.297	0.457	0	1	78303
1990-99	0.133	0.339	0	1	78303
2000-11	0.058	0.234	0	1	78303
Economy:					
Severe	0.102	0.302	0	1	78303
Mild	0.1	0.3	0	1	78303
Boom	0.164	0.370	0	1	78303
Region:					
North-East	0.162	0.368	0	1	63015
Mid-West	0.234	0.423	0	1	63015
South	0.427	0.495	0	1	63015
West	0.178	0.382	0	1	63015

graduates or higher (18%) is closely similar. Majority of the couples are composed of both spouses belonging to or having other national origins such as French, German, Iranian and 25% of them identify themselves as having racial ethnic background, while only 13% identify themselves to be Americans which in this sample includes Mexican-Americans, Afro-Americans. Christianity is the major religious group in the United States, with 65% of couples altogether belonging to different Christian denominations, while 30% are reported to be Catholic.

Data on business cycles is obtained from the National Bureau of Economic Research (NBER), officially charged with declaring a recession for the United States. Whether a recession is severe or mild or whether it has ended is based on the decision of the business cycle dating committee members and press releases made by the NBER. These decisions are based primarily on three broad categories:

- Length, duration of recession in months;
- Depth, based on indicators(%) which are Real Gross National Product, Industrial production, Non-farm employment and Unemployment rate.
- Width of the recession, that is, % of the industries that experience employment decline.

A period of recession is from Peak to Trough as shown in Table 2.2. The peak represents a boom in the economy, so the quarters leading to a peak are coded as 1, representing a boom. For example, just before the recession of 1973(Q4)–1975(Q1), the US economy had a experienced a period of high growth, which is shown by the peak in the fourth quarter of 1973, so the variable boom is coded 1 for the year equal to 1973. During the period of the survey, between 1968–2011[9], some recessions were severe and others were mild. For example, for the first recession in the Table 2.2, the variable mild is coded as 1 for year equal to 1970 since evidence[10] shows that there was a mild recession in 1970. And similarly for the recession of 1973-75, the variable severe is equal to 1 if the year is 1974. If the period of recession which started previously goes further than the first quarter of any given year, then that year is a recession year depending on whether it was severe or mild. For instance, the recent financial recession started in the last quarter of 2007 and lasted up till the second quarter of 2009, so the variable severe is equal to 1 for year 2009.

Table 2.2 Business cycle dates

Peak	**Trough**	**Duration in Months**	**Severe**	**Mild**	**Boom**
December, 1969(IV)	November, 1970 (IV)	11		1970	1969
November, 1973(IV)	March, 1975 (I)	16	1974		1973
January, 1980(I)	July, 1980 (III)	6		1980	1979
July, 1981(III)	November, 1982 (IV)	16	1981, 1982		
July, 1990(III)	March, 1991(I)	8		1990	1989
March, 2001(I)	November, 2001 (IV)	8		2001	
December, 2007 (IV)	June, 2009 (II)	18	2009		2007

Source: NBER Business cycle dates

[9]Note that the PSID was an annual survey from 1968-1997, thereafter it became biennial.
[10]US Business Cycle Expansions and Contractions available at http://www.nber.org/cycles.html

Methodology

To investigate which factors affect the probability of observing an end to a marriage, I use the yearly data obtained from the PSID covering 1968-2011 to estimate a discrete time duration model with time-varying covariates. The specification considered is a proportional hazard model with a piecewise-constant baseline hazard. I use a baseline hazard with 11 parameters, λ_j^* (j = 1,2,....11). Therefore, I assume that the hazard is constant for durations of marriage spells of every 2 years until the thirty-first year of marriage. The baseline has been divided as 0-2,3-5,...,24-26, 27-30 and 31-43. This is because the hazard is shown to be increasing in the first few years after marriage and as marriage progresses but remains constant or changes very little after the thirty-first year as shown in the Figure 2.1 below.

I also incorporate unobserved individual heterogeneity through the inclusion of a multiplicative error term in the hazard function, for which a gamma distribution with mean 1 and variance σ^2 is assumed. Accounting for unobserved individual heterogeneity is important because differences between individuals in their hazards that are unaccounted for by the explanatory variables, will tend to produce evidence for a declining hazard, otherwise known as negative duration dependence[11] (Heckman and Singer 1982; Lancaster 1990; Allison 1982).

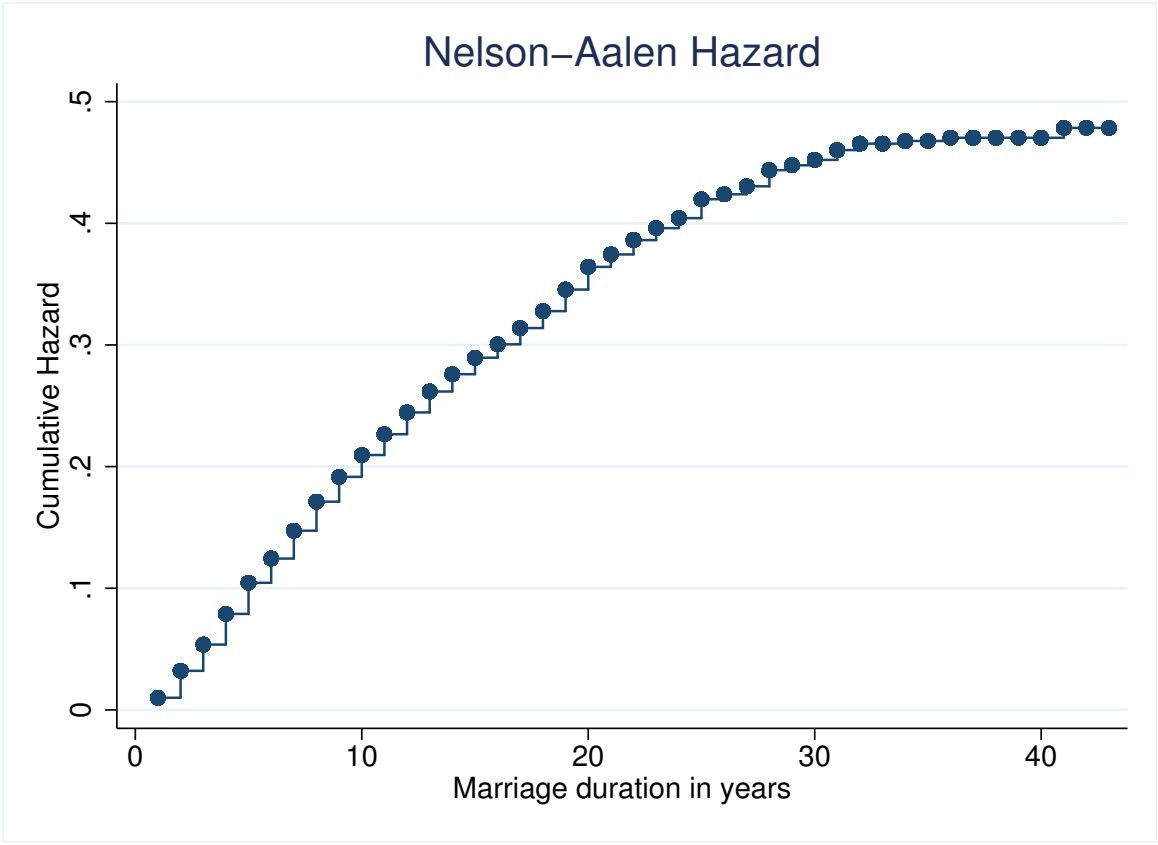
The hazard function for couple i in period t is specified as being proportional to $exp(f(X_i, W_t, Z_{it}))$, where the following specification for $f(X_i, W_t, Z_{it})$ is adopted

$$f(X_i, W_t, Z_{it}) = \beta_x X_i + \beta_t W_t + \beta_z Z_{it} \tag{2.1}$$

X_i is a vector that includes binary variables related to the wife's characteristics such as age, education, ethnicity and religious preferences; binary indicators for the couple characteristics which reflect their assortative mating behaviour, whether they are positively or negatively matched in each of the four dimensions and the geographical location given by the state fixed effects. W_t is a vector of time dummies which

[11] The probability of leaving the marriage declines over time.

Fig. 2.1 Cumulative Hazard Rate



indicate the year of marriage for each couple and binary variables to indicate the business cycles, whether it was a boom or a mild/ severe recession. Z_{it} is a vector of interaction terms, where the variables representing business cycles are interacted with couples assortative mating variables on age at marriage, level of education, ethnicity and religious preferences.

Estimation of the parameters of interest can be performed by using standard likelihood methods. Every couple is observed for a single marriage spell. The model used here can be seen as a sequence of binary choice problems defined on the surviving population at each duration, therefore each marriage spell originates several observations. Treating each pair as (i,t) as a different observation, leads to 78,303 observations from 6,642 marriage spells.

For couple i, define τ_{it} as the elapsed duration since the start of the spell in period t and let T_i be the total duration of the spell. Under the assumption of a proportional

hazard model with a piecewise-constant baseline hazard and unobserved heterogeneity, the hazard function at τ_{it} is given by (Jenkins, 2005, p. 39)

$$\lambda(\tau_{it}|X_i, W_t, Z_{it}, v_i) = \lambda_{\tau_{it}} exp(f(X_i, W_t, Z_{it}))v_i$$

where v_i is the unobserved component for couple i and $\lambda_{\tau_{it}} = \lambda_j^*$ for $\tau_{it} \leq 10$ and $\lambda_{\tau_{it}} = \lambda_{11}^*$ for $\tau_{it} \geq 11$. [12] Standard results imply that the survival function for T_i can be written as

$$S(T_i|X_i, W_t, Z_{it}, v_i) = exp(-v_i \sum_{t=1}^{T_i} \lambda_{\tau_{it}} exp((f(X_i, W_t, Z_{it}))))$$

Assuming that the unobserved component has a gamma distribution with mean 1 and variance σ^2, v_i can be integrated out of $S(T_i|X_i, W_t, Z_{it}, v_i)$ which results in

$$S(T_i|X_i, W_t, Z_{it}, v_i) = \left(1 + \sigma^2 \sum_{t=1}^{T_i} \lambda_{\tau_{it}} exp(f(X_i, W_t, Z_{it}))\right)^{-\sigma^{-2}}$$

Therefore, the contribution to the log-likelihood function from couple i can be written as

$$ln(L_i) = ln[S(T_i - 1|X_i, W_t, Z_{it}) - c_i S(T_i|X_i, W_t, Z_{it})]$$

where c_i is a dummy variable that equals 1 for completed spells and is 0 for (right) censored ones.

Adding an unobserved heterogeneity term captures match quality, however it places strong assumption as it is assumes v_i to be uncorrelated with the X_i, W_t and Z_{it}. So, v_i enters as a random effect into the model and there is no way to test if these random effects are correlated with the regressors. Using a frailty model explicitly formulates the nature of dependence of related failure times, in this case, occurrences of dissolution. Frailty models condition out the individual-specific effects to make accurate inferences. Provided that the frailty distribution is correctly specified, this approach is expected to be more efficient (Lin, 1994). Results are presented assuming two types of frailty

[12] because the elapsed duration since the start of the marriage spell is approximately 10 years, and $\lambda_{\tau_{it}} = \lambda_{11}^*$ for $\tau_{it} \geq 11$ if the survival time is greater than 10

distributions, namely the gamma and the gaussian (normal) distribution. However, results obtained from both sets of regressions, that is, the one assuming distribution for the frailty and the one without, are similar. This suggests that results with the inclusion of the unobserved heterogeneity term, v_i are invariant to those without v_i's.

2.4 Results

The analysis is based on sample period 1968-2011. Starting from 1985, marriage history files are available which provide retrospective information about couples marital life. I concentrate only on first marriages which constitute 76% of the sample. First marriages are those where both spouses are reported to be in their first marriages. In all the tables presented, hazard ratios are reported instead of coefficients. These should be interpreted as the proportional effect on the hazard of dissolution by a one unit change in the regressor. A figure greater than 1, indicates an increase in the hazard of divorce and a figure lower than 1, indicates a decrease in the hazard.

The first set of results, shown in Table 2.3, are complementary log-log specifications estimated by maximum likelihood. I include state fixed effects and year of marriage fixed effects in all regressions. Column (1) and (2) present hazard ratios, without conditioning on the state of the economy. In Column (2) I control for the number of children. Columns (3)-(6) condition on business cycles as well as, augment it by adding interaction terms where every indicator on assortative mating (age, education, ethnicity and religion) is systematically interacted with the state of the economy, represented by dummy variables for severe, mild recession or periods of economic growth.This gives a sense of coefficient stability over the set of controls.

Main Effects

Estimates in Table 2.3, show that the hazard of dissolution increases, by over 30%, if the wife is more educated than her husband, compared to couples that have similar educational levels. I do not find any effects of differences in age at marriage between spouses. Nonetheless, spouses who belong to the same racial groups, for instance, if both are caucasian, blacks or jewish, face a decline in dissolution hazard. On the other hand, those couples who identify themselves as being from a mixed ethnic background are shown to face a sharp increase in the risk of marriage termination. Furthermore, religion plays a very stabilizing effect, in particular, couples where both spouses are Catholic, Jewish or from other Christian denominations are likely to experience a significantly lower hazard of marital dissolution. This decrease in the hazard is much higher, over 90% for couples who are reportedly Catholic, followed by Jewish and other Christian groups, in comparison to couples from other religious faiths. These estimates are significant in the specifications, even after controlling for the number of children and state of the economy, and size of the estimates remains relatively stable.

A number of mechanisms could generate these results. Couples where the wife is more educated than her husband, women are inclined to have more bargaining power, tend to be more independent especially financially as they can increase their labor supply and reduce their home-production time due to advancement in household technology in the 1950's and 1960's. Moreover, with the invention of the pill, women could accumulate human capital without disrupting their education and labor market plans and prospects.[13] These factors can have further consequences leading to marriage break-down.

Fixed variables such as ethnicity and religion strongly influence dissolution risk in all instances. A large proportion of all marriages are to individuals of the same ethnicity and religion. The coefficients in Tables 2.3 and 2.4 show that the couples of mixed ethnicities are more likely to dissolve their marriages while those of the same

[13]See Gray (1998) ; Stevenson and Wolfers (2007)

racial ethnicity are less likely to do so. Bumpass et al. (1991), Lehrer and Chiswick (1993), Tzeng (1992), Böheim and Ermisch (2001), Heaton (2002), have also previously found the same. Moreover, if both spouses are Catholics, they are likely to experience the largest decrease in dissolution risk, by 93%, perhaps because the Catholic church does not allow divorce. This decline in the hazard is followed by those reportedly Jewish, 82% and those belonging to various other Christian denominations who face a decrease of 72%. These findings are consistent with the relevant literature such as that of Lehrer and Chiswick (1993); Weiss and Willis (1997); Kalmijn et al. (2005), Rosenfeld (2008); Frimmel et al. (2013). However, this finding is in contrast with Böheim and Ermisch (2001), who found that spouses with similar religious faiths have a higher dissolution rate than those who differ in their beliefs.

Consistent with the theoretical explanations of Becker et al. (1977), the risk of dissolution declines with woman's age at the time of the marriage as shown in Tables 2.3, 2.4 and 2.5. This is consistent with the findings of Böheim and Ermisch (2001). Women who are married when they are in twenties and thirties face a lower hazard of dissolution compared to those married in their teens. Also, women who are college graduates or higher face a lower risk. This study does not find any effects of the number of children, while the passing of the unilateral divorce law increases the risk of marital break-up.

Interaction Effects

Since evidence shows that marital break-up often causes negative externalities, there is strong policy interest in monitoring divorces and their consequences. It is of particular interest and maybe a matter of policy concern to know if marriages, formed by spouses of specific characteristics, are negatively or positively affected by recessionary and/or expansionary episodes. Heterogeneity in the effect of business cycles is analyzed using dummy variables representing an economic boom. To examine whether sensitivity of marital dissolution to business cycle shocks depends on spouses characteristics,

the dummy variables for assortative mating categories are interacted with the shocks. Columns (3)-(6) of Table 2.3 show a positive effect of periods of enhanced economic growth, in decreasing the risk of marriage dissolution. However, this effect also varies with couples where both spouses have mixed ethnicities as seen from Column (4). Thus, spouses of mixed ethnic groups have a higher hazard of dissolution, nevertheless, they still face a higher risk even in a period of economic expansion, all else equal. Column (3) shows that, if the wife is older than her husband by 2-6 years, then the risk of marital break-up is greater and depends on the period of severe recession. Both spouses are Jewish decreases the dissolution hazard by 90% all else equal, however, the overall effect of Jewish couples is determined by the presence of a severe recession, where the magnitude of the risk is large and so the standard errors. In general, the magnitude and the standard errors on estimates of mixed ethnicities and mixed religion are large.

Table 2.4 presents results for a Gaussian frailty model. These estimates are similar to the ones presented before with regards to all the variables in the regression specifications. The next set of results in Table 2.5 shows estimates using a Gamma frailty model. These also corroborate the earlier findings and confirm the stability of the main results obtained in Table 2.3. The Likelihood-Ratio test of gamma variance as well as that of ρ are statistically significant. If the statistic is zero, the random effects estimator does not differ significantly from the pooled estimator. However, in the case of estimates presented using the Gamma frailty model, not all specifications could be executed for the purposes of the current analysis, in particular, Table 2.5 does not show regressions which included interaction terms on ethnicity, this is due to technical difficulties encountered at various times.

Further Regressions

In Table 2.6, I present estimates using a full set of interactions of the characteristics of the couple. Level of education attained is categorized as: both are high school

drop-outs (reference group), both are high school graduates, both attended some college, both are college graduates or have some postgraduate experience. In addition to these categories, I include: husband is in a higher educational category than the wife (H>W); husband is in a lower category than the wife (H<W). Also, business cycle is now represented by a binary indicator which is equal to 1 in periods of economic expansion and 0 otherwise. These results show that the hazard of dissolution decreases by almost 60% if the spouses are both college graduates or even higher, compared to when they are both high school dropouts. Certainly this would make sense since more educated couples are perhaps able to make better choices in life, particularly in terms of who to marry. In terms of age, spouses where the wife is older than the husband by 2 or more years tend to face a lower dissolution hazard by almost 25-30%. This bears resemblance to the findings in Table 2.3 where a similar effect of a decrease in hazard was observed when wife is older than her husband by 2-6 years.

With regards to ethnicity, couples where both spouses who belong to other national origin such as French, Irish, Italian etc. face an incline in dissolution hazard. Similarly, couples who identify themselves as being from a mixed ethnic background are shown to face a sharp increase in the risk of marriage termination, almost ten times higher as compared to couples where both spouses are reportedly Americans. In contrast, spouses belonging to same racial groups, for instance, if both are caucasian, blacks or jewish, face a decline in dissolution hazard. Furthermore, religious preferences play a vital role, in particular, if spouses belong to other Christian denominations (i.e various non-Catholic groups), belong to other religious faiths, or from a mixed religious background, then they are likely to experience a significantly higher risk of divorce or separation, in comparison to those couples where both spouses share Catholic beliefs. This risk is highest for couples with mixed religious faiths, then for those belonging to other religions and lastly, for those of other Christian denominations.

In addition, as a further exercise, Table 2.8 shows results without controlling for the number of children, unilateral divorce. The number of children and unilateral

divorce were dropped simply to exclude post-marital controls and keep the analysis using information at the time of marriage. These results are presented as, those with and without the inclusion of the ethnicity sample. Estimation was also done including a higher number of baseline hazard parameters, but there was no significant change in the results that are already shown here (results not shown). Couples belonging to racial background have a lower risk of dissolving by about 53%. Those belonging to mixed ethnic backgrounds are very strongly prone to dissolution, the magnitude of this effect is extremely high, and so are the standard errors. This effect stays even in the presence of a boom. The hazard also increases with the date of couples marriage, for example, couples married in the 1980's or later face a greater risk as compared to those married in the 1970's.

To conclude, the main effect of the business cycle only comes through the binary variable representing boom. A period of economic growth reduces the risk of divorce, but this risk is higher for couples with mixed ethnicities. A question may arise on the role of cohabitation. However, cohabitation in the US has never really been perceived as an important issue especially in the decades of 1970-90's during which cohabitation was not a very big phenomena in the US. Stevenson and Wolfers (2007) have shown that marriage appears to be more cherished in the US with 4.7% of adult population in nonmarital cohabitation.[14] Kiernan et al. (2011) have shown that the proportion of cohabiting parents is lower in the US than in the UK, using data for 1998-2000 of the Fragile Families Study (FFS). These authors have shown that in the US, marriage seems to carry greater economic returns and that cohabiting mothers in the US do not see a sizeable benefit to their partnership unless it is through marriage.

2.5 Conclusions

Using a rich panel data set from the United States for the period of 1968-2011, I test the relation between spouses characteristics and the hazard of marital dissolution.

[14] figure based on US Census Bureau (2007)

Four dimensions of assortative mating are considered, in accordance with the previous literature which are: age at marriage, educational attainment, ethnicity and religion. This paper provides descriptive evidence and tests the association between these couple-specific traits and the risk of marital dissolution, and more importantly whether this association varies if the economy is in a recession or boom. In doing so, it happens to be the first paper to examine the role of business cycles in the given context, but it is also the first to provide suggestive evidence for the United States, in my knowledge.

Results show that fixed variables such as ethnicity and religion strongly influence the risk of marital dissolution. Couples in which both spouses reportedly belong to the same racial or ethnic backgrounds, have same religious affiliations have a much lower risk of marriage break-down. Higher education of the wife also increases the hazard of dissolution. Nevertheless, if both spouses are college graduates or have higher educational attainment then their risk of marital breakdown is lower. Although it does not lend much credence to the novel aspect of the paper, but, the only robust effect of the business cycles is the stabilising effect of a boom. The risk of separation greatly increases for spouses of mixed ethnicity even in the presence of an economic expansion. There are no observed effects of periods of recession and their interaction with assortative mating.

There are, however, a few limitations to this study. First, I have not controlled for household income. It can be argued that labor supply has an important impact on divorce risk and that specialization within a household may differ with the changes in labour supply. However, controlling for education is a reasonably good proxy for the earning capacity of an individual and their roles at home. Second, unobserved quality of match amongst couples, is likely to be correlated with their observed characteristics at the time of marriage. This selection can promote their decision to marry in the first place and affect their chances of dissolution. Processes leading to marriage formation and why individuals decide to marry have been previously analysed, extensively by Becker et al. (1977). The paper does not address this concern at all, nevertheless, at

this stage, this paper provides only suggestive first hand evidence on a topic that was unexplored earlier, and thus contributes to the broad literature on marital instability. Insofar, the interest was in using the data, from when the couple enters the survey after marriage, based on the information they have about each other, to predict their risk of marital dissolution. Future avenues of this research may look to examine the issues arising from selection effects, as well as further possibilities.

Table 2.3 Dissolution Risk: Baseline results

	Without any frailty distribution						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Marital Dissolution						
Education: H&W							
H>W	0.925	0.921	0.920	0.975	0.914	0.927	0.990
	(0.112)	(0.117)	(0.119)	(0.150)	(0.122)	(0.120)	(0.156)
H<W	1.364***	1.350**	1.364**	1.235	1.375**	1.367***	1.256
	(0.154)	(0.162)	(0.166)	(0.183)	(0.171)	(0.165)	(0.190)
Age: H&W							
H>W (5-10 yrs)	1.026	0.935	0.901	0.942	0.952	0.942	0.902
	(0.136)	(0.132)	(0.161)	(0.135)	(0.139)	(0.135)	(0.162)
H>W (11+ yrs)	1.083	1.055	1.031	1.093	1.086	1.089	1.012
	(0.373)	(0.409)	(0.553)	(0.430)	(0.441)	(0.428)	(0.555)
W>H (2-6 yrs)	0.879	0.821	0.671*	0.818	0.805	0.812	0.676*
	(0.144)	(0.144)	(0.156)	(0.146)	(0.148)	(0.145)	(0.160)
W>H (7+ yrs)	0.481	0.468	0.799	0.499	0.475	0.496	0.797
	(0.265)	(0.296)	(0.607)	(0.318)	(0.312)	(0.316)	(0.612)
Ethnicity: H&W							
Both Other National orig.	1.403	1.331	1.322	1.302	1.101	1.287	1.061
	(0.372)	(0.371)	(0.376)	(0.370)	(0.347)	(0.366)	(0.335)
Both Racial	0.460**	0.389***	0.373***	0.367***	0.325***	0.363***	0.323***
	(0.153)	(0.136)	(0.133)	(0.131)	(0.130)	(0.130)	(0.130)
Both Mixed	11.396***	11.461***	11.346***	11.150***	9.640***	11.117***	9.738***
	(2.970)	(3.161)	(3.184)	(3.110)	(2.979)	(3.095)	(3.028)
Religion: H&W							
Both Catholic	0.090***	0.076***	0.084***	0.079***	0.073***	0.063***	0.058***
	(0.059)	(0.051)	(0.059)	(0.055)	(0.053)	(0.049)	(0.047)
Both Jewish	0.167*	0.132*	0.144*	0.135*	0.125*	0.072**	0.070**
	(0.167)	(0.138)	(0.154)	(0.144)	(0.139)	(0.084)	(0.086)
Both Other Christian denoms	0.367*	0.304**	0.329*	0.319*	0.274**	0.231**	0.204**
	(0.207)	(0.177)	(0.195)	(0.189)	(0.169)	(0.156)	(0.143)
Both Mixed	1.728	1.771	1.959	1.872	1.815	1.322	1.397
	(0.856)	(0.918)	(1.033)	(0.986)	(0.985)	(0.819)	(0.898)
No. of children		0.996	0.992	0.994	0.991	0.994	0.990
		(0.044)	(0.045)	(0.045)	(0.046)	(0.045)	(0.046)
Unilateral Divorce	1.491	1.573*	1.629*	1.624*	1.687*	1.636*	1.704*
	(0.396)	(0.426)	(0.446)	(0.444)	(0.474)	(0.448)	(0.479)
Economy:							
Severe			0.775	0.820	0.531	0.616	0.344
			(0.132)	(0.170)	(0.222)	(0.531)	(0.334)
Mild			1.277*	1.173	1.114	1.069	0.834
			(0.187)	(0.229)	(0.432)	(1.173)	(0.970)
Boom			0.437***	0.455***	0.216***	0.151*	0.074**
			(0.072)	(0.091)	(0.097)	(0.167)	(0.088)
Interactions:							
Severe*Age: H >W (5-10 yrs)			1.192				1.283
			(0.481)				(0.525)
Severe*Age: H >W (11+ yrs)			0.873				0.873
			(0.997)				(1.004)
Severe*Age: H <W (2-6 yrs)			2.077*				2.122*
			(0.866)				(0.906)
Severe*Age: H <W (7+ yrs)			0.916				0.867
			(1.139)				(1.095)
Mild*Age: H >W (5-10 yrs)			0.520				0.540
			(0.239)				(0.250)

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	Without any frailty distribution						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables			Marital Dissolution				
Mild*Age: H >W (11+ yrs)			2.136				2.258
			(1.880)				(2.004)
Mild*Age: H <W (2-6 yrs)			1.154				1.225
			(0.553)				(0.596)
Mild*Age: H <W (7+ yrs)			0.000				0.000
			(0.004)				(0.003)
Boom*Age: H >W (5-10 yrs)			1.694				1.678
			(0.574)				(0.576)
Boom*Age: H >W (11+yrs)			0.742				0.717
			(0.842)				(0.817)
Boom*Age: H <W (2-6 yrs)			1.447				1.232
			(0.636)				(0.561)
Boom*Age: H <W (7+ yrs)			0.000				0.000
			(0.000)				(0.000)
Severe*Educ: H >W				0.829			0.789
				(0.301)			(0.293)
Severe*Educ: W >H				1.277			1.283
				(0.382)			(0.393)
Mild*Educ: H >W				0.736			0.746
				(0.270)			(0.276)
Mild*Educ: W >H				1.303			1.402
				(0.378)			(0.414)
Boom*Educ: H >W				0.981			0.877
				(0.324)			(0.296)
Boom*Educ: W >H				1.219			1.061
				(0.352)			(0.313)
Severe*Ethnic: Both National orig.					1.587		1.698
					(0.707)		(0.766)
Severe*Ethnic: Both Racial etc					1.282		1.188
					(0.782)		(0.733)
Severe*Ethnic: Both Mixed					2.294		2.171
					(1.263)		(1.213)
Mild*Ethnic: Both National orig.					1.320		1.397
					(0.564)		(0.608)
Mild*Ethnic: Both Racial etc					0.854		0.856
					(0.529)		(0.532)
Mild*Ethnic: Both Mixed					0.859		0.869
					(0.394)		(0.404)
Boom*Ethnic: Both National orig.					1.840		1.949
					(0.870)		(0.932)
Boom*Ethnic: Both Racial etc					2.387		2.473
					(1.391)		(1.443)
Boom*Ethnic: Both Mixed					5.582***		5.351***
					(2.893)		(2.824)
Severe*Religion: Both Catholic						1.265	1.142
						(1.187)	(1.084)
Severe*Religion: Both Jewish						7.195*	7.506*
						(8.364)	(8.863)
Severe*Religion: Both Christian denoms.						1.338	1.286
						(1.168)	(1.136)
Severe*Religion: Both Mixed						1.388	0.944
						(1.593)	(1.119)
Mild*Religion: Both Catholic						1.201	1.169
						(1.399)	(1.369)

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	Without any frailty distribution						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Marital Dissolution						
Mild*Religion: Both Jewish						1.568	1.866
						(2.462)	(2.946)
Mild*Religion: Both Christian denoms.						1.136	1.314
						(1.259)	(1.466)
Mild*Religion: Both Mixed						1.011	1.098
						(1.188)	(1.305)
Boom*Religion: Both Catholic						2.339	2.128
						(2.744)	(2.509)
Boom*Religion: Both Jewish						0.000	0.000
						(0.000)	(0.000)
Boom*Religion: Both Christian denoms.						3.294	2.771
						(3.672)	(3.106)
Boom*Religion: Both Mixed						6.742	3.816
						(8.189)	(4.720)
Wife's Characteristics							
Age: 20-29	0.683***	0.670***	0.673***	0.677***	0.665***	0.675***	0.661***
	(0.079)	(0.081)	(0.082)	(0.083)	(0.084)	(0.083)	(0.084)
Age: 30-39	0.627**	0.677*	0.684*	0.684*	0.675*	0.687*	0.668*
	(0.129)	(0.151)	(0.154)	(0.155)	(0.157)	(0.155)	(0.155)
Age: 40+	1.058	2.178	2.308	2.294	2.483*	2.289	2.460*
	(0.521)	(1.091)	(1.176)	(1.167)	(1.300)	(1.165)	(1.289)
Educ: HS+	0.789	0.786	0.777	0.778	0.789	0.784	0.790
	(0.143)	(0.149)	(0.150)	(0.149)	(0.157)	(0.151)	(0.157)
Educ: SC	0.658**	0.666**	0.657**	0.660**	0.669*	0.661**	0.671*
	(0.129)	(0.137)	(0.137)	(0.138)	(0.145)	(0.138)	(0.146)
Educ: C+	0.374***	0.369***	0.364***	0.366***	0.365***	0.369***	0.365***
	(0.081)	(0.086)	(0.086)	(0.087)	(0.091)	(0.087)	(0.091)
Ethnic: Other national orig.	1.027	1.111	1.141	1.149	1.158	1.157	1.171
	(0.229)	(0.263)	(0.277)	(0.279)	(0.295)	(0.280)	(0.298)
Ethnic: Hispanic orig	0.239**	0.279**	0.277**	0.278**	0.274*	0.280*	0.273*
	(0.152)	(0.180)	(0.181)	(0.181)	(0.181)	(0.182)	(0.181)
Ethnic: Racial	1.003	1.118	1.156	1.177	1.146	1.181	1.146
	(0.280)	(0.325)	(0.345)	(0.351)	(0.359)	(0.352)	(0.359)
Ethnic: Others	2.131**	2.084*	2.293**	2.284**	2.168*	2.279**	2.239*
	(0.786)	(0.826)	(0.927)	(0.922)	(0.912)	(0.920)	(0.942)
Religion: Catholic	0.799	0.671	0.685	0.686	0.686	0.714	0.664
	(0.711)	(0.614)	(0.646)	(0.646)	(0.681)	(0.674)	(0.661)
Religion: Jewish	0.418*	0.447	0.464	0.450	0.486	0.470	0.486
	(0.206)	(0.229)	(0.244)	(0.236)	(0.266)	(0.246)	(0.267)
Religion: Other Christian denoms.	0.197***	0.196***	0.228**	0.216***	0.207***	0.219***	0.202***
	(0.105)	(0.110)	(0.132)	(0.125)	(0.126)	(0.126)	(0.124)
Couple-years: N	43,764	40,222	40,222	40,222	40,222	40,222	40,222
Number of id	3,520	3,012	3,012	3,012	3,012	3,012	3,012
Log likelihood	-2672	-2459	-2435	-2440	-2431	-2436	-2419

Standard errors Eform in parentheses. Other controls include: baseline hazard parameters, year of marriage and state fixed effects

*** p<0.01, ** p<0.05, * p<0.1

Table 2.4 Dissolution Risk: Gaussian Frailty

	Gaussian Frailty Distribution					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Marital Dissolution					
Education: H&W						
H>W	0.921	0.920	0.975	0.914	0.927	0.990
	(0.117)	(0.119)	(0.150)	(0.122)	(0.120)	(0.156)
H<W	1.350**	1.364**	1.235	1.375**	1.367***	1.256
	(0.162)	(0.166)	(0.183)	(0.171)	(0.165)	(0.190)
Age: H&W						
H>W (5-10 yrs)	0.935	0.901	0.942	0.952	0.942	0.902
	(0.132)	(0.161)	(0.135)	(0.139)	(0.135)	(0.162)
H>W (11+ yrs)	1.055	1.031	1.093	1.086	1.089	1.012
	(0.409)	(0.553)	(0.430)	(0.441)	(0.428)	(0.555)
W>H (2-6 yrs)	0.821	0.671*	0.818	0.805	0.812	0.676*
	(0.144)	(0.156)	(0.146)	(0.148)	(0.145)	(0.160)
W>H (7+ yrs)	0.468	0.799	0.499	0.475	0.496	0.797
	(0.296)	(0.607)	(0.318)	(0.312)	(0.316)	(0.612)
Ethnicity: H&W						
Both Other National orig.	1.331	1.322	1.302	1.101	1.287	1.061
	(0.371)	(0.376)	(0.370)	(0.347)	(0.366)	(0.335)
Both Racial	0.389***	0.373***	0.367***	0.325***	0.363***	0.323***
	(0.136)	(0.133)	(0.131)	(0.130)	(0.130)	(0.130)
Both Mixed	11.461***	11.346***	11.150***	9.640***	11.117***	9.738***
	(3.161)	(3.184)	(3.110)	(2.979)	(3.095)	(3.028)
Religion: H&W						
Both Catholic	0.076***	0.084***	0.079***	0.073***	0.063***	0.058***
	(0.051)	(0.059)	(0.055)	(0.053)	(0.049)	(0.047)
Both Jewish	0.132*	0.144*	0.135*	0.125*	0.072**	0.070**
	(0.138)	(0.154)	(0.144)	(0.139)	(0.084)	(0.086)
Both Other Christian denoms	0.304**	0.329*	0.319*	0.274**	0.231**	0.204**
	(0.177)	(0.195)	(0.189)	(0.169)	(0.156)	(0.143)
Both Mixed	1.771	1.959	1.872	1.815	1.322	1.397
	(0.918)	(1.033)	(0.986)	(0.985)	(0.819)	(0.898)
No. of children	0.996	0.992	0.994	0.991	0.994	0.990
	(0.044)	(0.045)	(0.045)	(0.046)	(0.045)	(0.046)
Unilateral Divorce	1.573*	1.629*	1.624*	1.687*	1.636*	1.704*
	(0.426)	(0.446)	(0.444)	(0.474)	(0.448)	(0.479)
Economy:						

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	Gaussian Frailty Distribution					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables			Marital Dissolution			
Severe		0.775	0.820	0.531	0.616	0.344
		(0.132)	(0.170)	(0.222)	(0.531)	(0.334)
Mild		1.277*	1.173	1.114	1.069	0.834
		(0.187)	(0.229)	(0.432)	(1.173)	(0.970)
Boom		0.437***	0.455***	0.216***	0.151*	0.074**
		(0.072)	(0.091)	(0.097)	(0.167)	(0.088)
Interactions:						
Severe*Age: H >W (5-10 yrs)		1.192				1.283
		(0.481)				(0.525)
Severe*Age: H >W (11+ yrs)		0.873				0.873
		(0.997)				(1.004)
Severe*Age: H <W (2-6 yrs)		2.077*				2.122*
		(0.866)				(0.906)
Severe*Age: H <W (7+ yrs)		0.916				0.867
		(1.139)				(1.095)
Mild*Age: H >W (5-10 yrs)		0.520				0.540
		(0.239)				(0.250)
Mild*Age: H >W (11+ yrs)		2.136				2.258
		(1.880)				(2.004)
Mild*Age: H <W (2-6 yrs)		1.154				1.225
		(0.553)				(0.596)
Mild*Age: H <W (7+ yrs)		0.000				0.000
		(0.004)				(0.003)
Boom*Age: H >W (5-10 yrs)		1.694				1.678
		(0.574)				(0.576)
Boom*Age: H >W (11+yrs)		0.742				0.717
		(0.842)				(0.817)
Boom*Age: H <W (2-6 yrs)		1.447				1.232
		(0.636)				(0.561)
Boom*Age: H <W (7+ yrs)		0.000				0.000
		(0.000)				(0.000)
Severe*Educ: H >W			0.829			0.789
			(0.301)			(0.293)
Severe*Educ: W >H			1.277			1.283
			(0.382)			(0.393)
Mild*Educ: H >W			0.736			0.746
			(0.270)			(0.276)

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	Gaussian Frailty Distribution					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Marital Dissolution					
Mild*Educ: W >H			1.303			1.402
			(0.378)			(0.414)
Boom*Educ: H >W			0.981			0.877
			(0.324)			(0.296)
Boom*Educ: W >H			1.219			1.061
			(0.352)			(0.313)
Severe*Ethnic: Both National orig.				1.587		1.698
				(0.707)		(0.766)
Severe*Ethnic: Both Racial etc				1.282		1.188
				(0.782)		(0.733)
Severe*Ethnic: Both Mixed				2.294		2.171
				(1.263)		(1.213)
Mild*Ethnic: Both National orig.				1.320		1.397
				(0.564)		(0.608)
Mild*Ethnic: Both Racial etc				0.854		0.856
				(0.529)		(0.532)
Mild*Ethnic: Both Mixed				0.859		0.869
				(0.394)		(0.404)
Boom*Ethnic: Both National orig.				1.840		1.949
				(0.870)		(0.932)
Boom*Ethnic: Both Racial etc				2.387		2.473
				(1.391)		(1.443)
Boom*Ethnic: Both Mixed				5.582***		5.351***
				(2.893)		(2.824)
Severe*Religion: Both Catholic					1.265	1.142
					(1.187)	(1.084)
Severe*Religion: Both Jewish					7.195*	7.506*
					(8.364)	(8.863)
Severe*Religion: Both Christian denoms.					1.338	1.286
					(1.168)	(1.136)
Severe*Religion: Both Mixed					1.388	0.944
					(1.593)	(1.119)
Mild*Religion: Both Catholic					1.201	1.169
					(1.399)	(1.369)
Mild*Religion: Both Jewish					1.568	1.866
					(2.462)	(2.946)
Mild*Religion: Both Christian denoms.					1.136	1.314

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	Gaussian Frailty Distribution					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Marital Dissolution					
					(1.259)	(1.466)
Mild*Religion: Both Mixed					1.011	1.098
					(1.188)	(1.305)
Boom*Religion: Both Catholic					2.339	2.128
					(2.744)	(2.509)
Boom*Religion: Both Jewish					0.000	0.000
					(0.000)	(0.000)
Boom*Religion: Both Christian denoms.					3.294	2.771
					(3.672)	(3.106)
Boom*Religion: Both Mixed					6.742	3.816
					(8.189)	(4.720)
Wife's Characteristics						
Age: 20-29	0.670***	0.673***	0.677***	0.665***	0.675***	0.661***
	(0.081)	(0.082)	(0.083)	(0.084)	(0.083)	(0.084)
Age: 30-39	0.677*	0.684*	0.684*	0.675*	0.687*	0.668*
	(0.151)	(0.154)	(0.155)	(0.157)	(0.155)	(0.155)
Age: 40+	2.178	2.308	2.294	2.483*	2.289	2.460*
	(1.091)	(1.176)	(1.167)	(1.300)	(1.165)	(1.289)
Educ: HS+	0.786	0.777	0.778	0.789	0.784	0.790
	(0.149)	(0.150)	(0.149)	(0.157)	(0.151)	(0.157)
Educ: SC	0.666**	0.657**	0.660**	0.669*	0.661**	0.671*
	(0.137)	(0.137)	(0.138)	(0.145)	(0.138)	(0.146)
Educ: C+	0.369***	0.364***	0.366***	0.365***	0.369***	0.365***
	(0.086)	(0.086)	(0.087)	(0.091)	(0.087)	(0.091)
Ethnic: Other national orig.	1.111	1.141	1.149	1.158	1.157	1.171
	(0.263)	(0.277)	(0.279)	(0.295)	(0.280)	(0.298)
Ethnic: Hispanic orig	0.279**	0.277**	0.278**	0.274*	0.280*	0.273*
	(0.180)	(0.181)	(0.181)	(0.181)	(0.182)	(0.181)
Ethnic: Racial	1.118	1.156	1.177	1.146	1.181	1.146
	(0.325)	(0.345)	(0.351)	(0.359)	(0.352)	(0.359)
Ethnic: Others	2.084*	2.293**	2.284**	2.168*	2.279**	2.239*
	(0.826)	(0.927)	(0.922)	(0.912)	(0.920)	(0.942)
Religion: Catholic	0.671	0.685	0.686	0.686	0.714	0.664
	(0.614)	(0.646)	(0.646)	(0.681)	(0.674)	(0.661)
Religion: Jewish	0.447	0.464	0.450	0.486	0.470	0.486
	(0.229)	(0.244)	(0.236)	(0.266)	(0.246)	(0.267)
Religion: Other Christian denoms.	0.196***	0.228**	0.216***	0.207***	0.219***	0.202***

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	Gaussian Frailty Distribution					
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Marital Dissolution					
	(0.110)	(0.132)	(0.125)	(0.126)	(0.126)	(0.124)
Couple-years: N	40,222	40,222	40,222	40,222	40,222	40,222
Number of id	3,012	3,012	3,012	3,012	3,012	3,012
Log likelihood	-2459	-2435	-2440	-2431	-2436	-2419
LR test of rho=0	1.157	1.908	1.909	2.886	1.915	2.843

Standard errors Eform in parentheses. Other controls include: baseline hazard parameters, year of marriage and state fixed effects

*** p<0.01, ** p<0.05, * p<0.1

Table 2.5 Dissolution Risk: Gamma Frailty Distribution

	Gamma Frailty Distribution		
	(1)	(2)	(3)
Variables	Dissolution hazard		
Age: 20-29	0.676***	0.678***	0.684***
	(0.080)	(0.078)	(0.079)
Age: 30-39	0.690	0.697*	0.697*
	(0.156)	(0.151)	(0.152)
Age: 40+	2.231*	2.365*	2.350*
	(1.087)	(1.160)	(1.151)
Educ: HS+	0.808	0.799	0.800
	(0.149)	(0.147)	(0.148)
Educ: SC	0.711	0.702*	0.703*
	(0.169)	(0.140)	(0.141)
Educ: C+	0.404***	0.399***	0.400***
	(0.111)	(0.088)	(0.089)
Ethnic: Other national orig.	1.108	1.133	1.142
	(0.243)	(0.255)	(0.257)
Ethnic: Hispanic orig	0.292*	0.291*	0.291*
	(0.185)	(0.185)	(0.185)
Ethnic: Racial	1.110	1.134	1.156
	(0.310)	(0.316)	(0.323)
Ethnic: Others	1.762	1.951*	1.945*
	(0.808)	(0.765)	(0.767)
Religion: Catholic	0.713	0.729	0.730
	(0.604)	(0.627)	(0.628)
Religion: Jewish	0.406	0.430*	0.420*
	(0.235)	(0.211)	(0.207)
Religion: Other Christian denoms	0.192***	0.225***	0.214***
	(0.104)	(0.119)	(0.114)
Education: H&W			
H>W	0.936	0.936	0.981
	(0.117)	(0.116)	(0.146)
H<W	1.316*	1.331**	1.200
	(0.199)	(0.153)	(0.172)
Age: H&W			
H>W (5-10 yrs)	0.918	0.884	0.929
	(0.158)	(0.154)	(0.131)
H>W (11+ yrs)	1.051	1.008	1.081
	(0.394)	(0.525)	(0.407)
W>H (2-6 yrs)	0.841	0.690*	0.835

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	Gamma Frailty Distribution		
	(1)	(2)	(3)
Variables	Dissolution hazard		
	(0.142)	(0.155)	(0.143)
W>H (7+ yrs)	0.465	0.781	0.499
	(0.308)	(0.580)	(0.310)
Ethnicity: H&W			
Both Other National orig.	1.311	1.307	1.285
	(0.346)	(0.349)	(0.344)
Both Racial	0.408***	0.395***	0.388***
	(0.135)	(0.133)	(0.131)
Both Mixed	10.412***	10.335***	10.185***
	(3.838)	(2.589)	(2.611)
Religion: H&W			
Both Catholic	0.074***	0.083***	0.079***
	(0.047)	(0.054)	(0.051)
Both Jewish	0.124**	0.135**	0.128**
	(0.123)	(0.135)	(0.127)
Both Other Christian denoms	0.323*	0.347*	0.335*
	(0.187)	(0.193)	(0.187)
Both Mixed	1.577	1.743	1.673
	(0.883)	(0.873)	(0.843)
No. of children	0.997	0.994	0.996
	(0.043)	(0.043)	(0.044)
Unilateral Divorce	1.527	1.584*	1.581*
	(0.423)	(0.416)	(0.417)
Economy:			
Severe		0.791	0.835
		(0.134)	(0.172)
Mild		1.233	1.102
		(0.183)	(0.220)
Boom		0.448***	0.464***
		(0.074)	(0.093)
Interactions:			
Severe*Age: H >W (5-10 yrs)		1.203	
		(0.483)	
Severe*Age: H >W (11+ yrs)		0.886	
		(1.008)	
Severe*Age: H <W (2-6 yrs)		2.041*	
		(0.842)	
Severe*Age: H <W (7+yrs)		0.937	
		(1.164)	

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	Gamma Frailty Distribution		
	(1)	(2)	(3)
Variables		Dissolution hazard	
Mild*Age: H >W (5-10 yrs)		0.539	
		(0.248)	
Mild*Age: H >W (11+ yrs)		2.170	
		(1.908)	
Mild*Age: H <W (2-6 yrs)		1.186	
		(0.568)	
Mild*Age: H <W (7+yrs)		0.000	
		(0.001)	
Boom*Age: H >W (5-10 yrs)		1.716	
		(0.577)	
Boom*Age: H >W (11+yrs)		0.754	
		(0.853)	
Boom*Age: H <W (2-6 yrs)		1.420	
		(0.619)	
Boom*Age: H <W (7+yrs)		0.000	
		(0.000)	
Severe*Educ: H >W			0.837
			(0.302)
Severe*Educ: W >H			1.278
			(0.380)
Mild*Educ: H >W			0.789
			(0.291)
Mild*Educ: W >H			1.373
			(0.402)
Boom*Educ: H >W			0.988
			(0.325)
Boom*Educ: W >H			1.226
			(0.352)
Couple-years: N	40,222	40,222	40,222
Log likelihood	-2449	-2427	-2431
LR test of Gamma var=0	20.71	18.50	18.72

Standard errors Eform in parentheses. Other controls include: baseline hazard parameters, year of marriage and state fixed effects

*** p<0.01, ** p<0.05, * p<0.1

Table 2.6 Dissolution Risk: II

	Without any frailty distribution						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Marital Dissolution						
Education: H&W							
Both: HS+	1.209	1.198	1.191	1.153	1.200	1.199	1.151
	(0.364)	(0.369)	(0.369)	(0.379)	(0.375)	(0.371)	(0.383)
Both: SC	1.074	1.011	1.007	1.002	1.012	1.012	0.997
	(0.335)	(0.326)	(0.327)	(0.346)	(0.331)	(0.328)	(0.347)
Both: C+	0.433***	0.425***	0.428**	0.484**	0.430**	0.433**	0.467**
	(0.138)	(0.140)	(0.142)	(0.169)	(0.144)	(0.143)	(0.165)
H>W	1.043	1.027	1.026	1.040	1.026	1.035	1.037
	(0.312)	(0.315)	(0.316)	(0.340)	(0.319)	(0.318)	(0.342)
W>H	1.064	1.049	1.048	1.048	1.057	1.056	1.054
	(0.313)	(0.317)	(0.319)	(0.339)	(0.325)	(0.321)	(0.344)
Age: H&W							
H>W (5-10 yrs)	1.074	0.990	0.906	0.992	0.992	0.992	0.915
	(0.136)	(0.134)	(0.136)	(0.135)	(0.137)	(0.135)	(0.138)
H>W (11+ yrs)	1.071	1.127	1.244	1.159	1.152	1.166	1.234
	(0.361)	(0.427)	(0.507)	(0.441)	(0.444)	(0.444)	(0.507)
W>H (2-6 yrs)	0.790	0.746*	0.717*	0.748*	0.740*	0.746*	0.729*
	(0.123)	(0.125)	(0.131)	(0.126)	(0.126)	(0.125)	(0.134)
W>H (7+ yrs)	0.486	0.497	0.668	0.512	0.509	0.519	0.678
	(0.256)	(0.311)	(0.425)	(0.321)	(0.325)	(0.326)	(0.433)
Ethnicity: H&W							
Both Other National orig.	1.458***	1.489***	1.500***	1.503***	1.426**	1.491***	1.413**
	(0.213)	(0.229)	(0.232)	(0.232)	(0.233)	(0.230)	(0.231)
Both Racial	0.509***	0.466***	0.465***	0.466***	0.415***	0.465***	0.413***
	(0.095)	(0.093)	(0.093)	(0.093)	(0.090)	(0.093)	(0.089)
Mixed Ethnicity	11.451***	12.018***	11.932***	11.920***	10.592***	11.861***	10.681***
	(2.174)	(2.468)	(2.496)	(2.471)	(2.326)	(2.474)	(2.367)
Religion: H&W							
Both Jewish	2.108**	1.672	1.682	1.657	1.676	1.825	1.795
	(0.752)	(0.689)	(0.698)	(0.685)	(0.699)	(0.764)	(0.758)
Both Other Christian denoms	1.858***	1.985***	2.004***	2.000***	2.004***	1.911***	1.960***
	(0.270)	(0.309)	(0.314)	(0.313)	(0.316)	(0.316)	(0.328)
Both Other religions (Hindu, Muslims)	2.254**	2.679***	2.784***	2.773***	2.848***	3.194***	3.212***
	(0.835)	(1.016)	(1.061)	(1.056)	(1.093)	(1.287)	(1.306)
Mixed Religion	7.389***	9.319***	9.749***	9.580***	9.906***	8.670***	9.620***
	(2.058)	(2.821)	(2.971)	(2.902)	(3.063)	(2.711)	(3.096)
Boom			0.453***	0.513	0.265***	0.181	0.104
			(0.069)	(0.392)	(0.115)	(0.193)	(0.145)
Interactions:							
Boom*Age: H >W (5-10 yrs)			1.710*				1.674
			(0.557)				(0.555)
Boom*Age: H >W (11+yrs)			0.662				0.665
			(0.717)				(0.729)
Boom*Age: H <W (2-6 yrs)			1.315				1.109
			(0.549)				(0.480)
Boom*Age: H <W (7+ yrs)			0.000				0.000
			(0.000)				(0.000)
Boom*Both HS+				1.313			1.309
				(1.058)			(1.095)
Boom*Both SC				1.038			1.056
				(0.871)			(0.920)
Boom*Both C+				0.407			0.466

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	Without any frailty distribution						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Marital Dissolution						
				(0.365)			(0.431)
Boom*H>W				0.939			0.910
				(0.758)			(0.761)
Boom*W>H				1.022			0.954
				(0.809)			(0.783)
Boom*Both Other Nat. orig.					1.527		1.692
					(0.704)		(0.790)
Boom*Both racial					2.185		2.270
					(1.240)		(1.292)
Boom*Mixed Ethnicity					4.584***		4.448***
					(2.296)		(2.288)
Boom*Both Catholics						2.103	2.034
						(2.376)	(2.313)
Boom*Both Jewish						0.000	0.000
						(0.000)	(0.000)
Boom*Both other Christians						2.821	2.435
						(3.027)	(2.621)
Boom*Mixed Religion						5.929	2.988
						(6.950)	(3.582)
No. of children		1.014	1.013	1.013	1.011	1.014	1.012
		(0.044)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)
Unilateral Divorce	1.369	1.416	1.458	1.461	1.477	1.451	1.482
	(0.355)	(0.376)	(0.390)	(0.390)	(0.399)	(0.387)	(0.401)
Year of Marriage FE's	y	y	y	y	y	y	y
State FE's	y	y	y	y	y	y	y
Baseline parameters	y	y	y	y	y	y	y
Couple-years: N	43,764	40,222	40,222	40,222	40,222	40,222	40,222
Number of id	3,520	3,012	3,012	3,012	3,012	3,012	3,012
Log likelihood	-2695	-2483	-2464	-2464	-2459	-2464	-2453

Coefficients to be interpreted as hazard ratios. Standard errors Eform in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 2.7 Determinants of dissolution risk, Robustness checks

	Without Ethnicity		Include Ethnicity	
	(1)	(2)	(3)	(4)
Variables		Marital Dissolution		
Education: H&W				
Both: HS+	1.279	1.244	1.216	1.164
	(0.250)	(0.247)	(0.364)	(0.374)
Both: SC	1.292	1.268	1.079	1.073
	(0.275)	(0.276)	(0.335)	(0.358)
Both: C+	0.383***	0.427***	0.434***	0.468**
	(0.087)	(0.098)	(0.137)	(0.158)
H>W	1.077	1.042	1.045	1.033
	(0.210)	(0.208)	(0.310)	(0.330)
W>H	1.246	1.222	1.065	1.053
	(0.237)	(0.237)	(0.312)	(0.332)
Age: H&W				
H>W (5-10 yrs)	0.895	0.888	1.073	1.021
	(0.102)	(0.105)	(0.135)	(0.141)
H>W (11+ yrs)	1.385	1.357	1.079	0.999
	(0.396)	(0.405)	(0.361)	(0.380)
W>H (2-6 yrs)	0.974	0.998	0.790	0.769
	(0.135)	(0.142)	(0.122)	(0.130)
W>H (7+ yrs)	0.876	1.081	0.481	0.641
	(0.329)	(0.404)	(0.252)	(0.340)
Ethnicity: H&W				
Both Other National orig.			1.456***	1.409**
			(0.212)	(0.219)
Both Racial			0.512***	0.472***
			(0.095)	(0.094)
Both Mixed			11.281***	10.069***
			(2.106)	(2.024)
Religion: H&W				
Both Jewish	1.629	1.737	2.132**	2.368**
	(0.554)	(0.586)	(0.756)	(0.861)
Both Other Christian denoms	2.001***	1.963***	1.847***	1.872***
	(0.238)	(0.238)	(0.267)	(0.292)
Both Other religions (Hindu, Muslims)	1.396	1.556	2.235**	2.713**
	(0.528)	(0.609)	(0.825)	(1.072)
Both Mixed	16.389***	15.130***	7.315***	7.479***
	(4.276)	(3.900)	(2.012)	(2.171)
Boom		0.235		0.108
		(0.281)		(0.150)
Interactions:				
Boom*Age: H >W (5-10 yrs)		1.096		1.428
		(0.310)		(0.464)
Boom*Age: H >W (11+yrs)		1.239		1.555
		(0.818)		(1.283)
Boom*Age: H <W (2-6 yrs)		0.815		1.130
		(0.295)		(0.462)
Boom*Age: H <W (7+ yrs)		0.000		0.000
		(0.000)		(0.000)
Boom*Both HS+		1.204		1.364
		(0.700)		(1.144)
Boom*Both SC		1.099		1.032
		(0.670)		(0.902)
Boom*Both C+		0.445		0.558
		(0.306)		(0.506)
Boom*H>W		1.278		1.054
		(0.739)		(0.880)
Boom*W>H		1.097		1.088
		(0.621)		(0.894)
Boom*Both Other Nat. orig.				1.445
				(0.630)
Boom*Both racial				1.749
				(0.947)
Boom*Both mixed				3.933***
				(1.920)
Boom*Both Catholics		1.985		2.346
		(2.186)		(2.638)
Boom*Both Jewish		0.000		0.000
		(0.000)		(0.000)
Boom*Both other Christians		2.209		2.324
		(2.363)		(2.497)
Boom*Both mixed		3.055		3.534
		(3.517)		(4.231)
Year of Marriage:				
1980-89	4.045***	4.129***	2.743***	3.032***
	(0.541)	(0.553)	(0.372)	(0.431)
1990-99	7.688***	8.251***	9.241***	11.638***
	(1.189)	(1.293)	(1.434)	(2.017)
2000-11	8.198***	10.982***	14.713***	24.158***
	(1.377)	(1.925)	(2.704)	(5.041)
Baseline parameters	y	y	y	y
State FE's	y	y	y	y
Couple-years: N	70,114	70,114	43,764	43,764
Number of id	5,658	5,658	3,520	3,520
Log likelihood	-4963	-4935	-2696	-2663

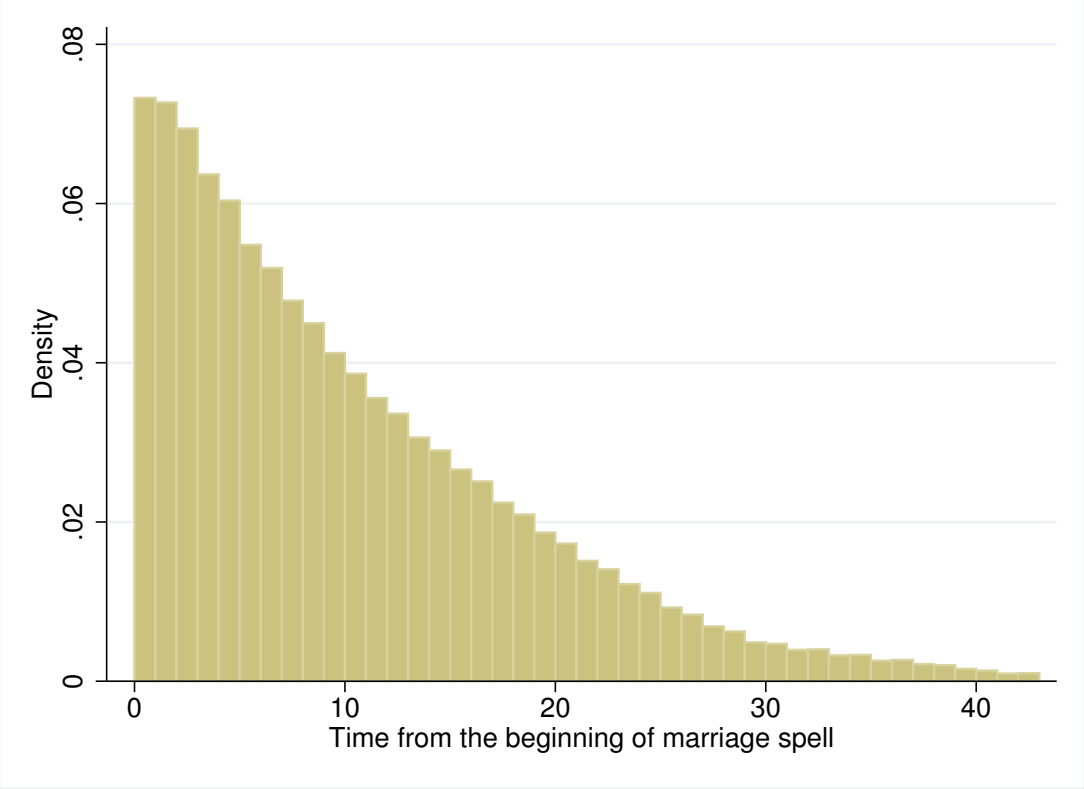
Coefficients to be interpreted as hazard ratios. Standard errors Eform in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix A.2

Figure 2.2 shows the probability density function for the elapsed time from the beginning of the marriage spell, this is censored at *t=43*.

Figure 2.3 is the kernel density estimate of the total length of marriage in years. The probability mass function indicates that most couples have marriages lasting approximately 18 years.

Fig. 2.2 Probability Density Function



US Regions
1=North East: Division 1: New England- Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
Division 2: Mid-Atlantic- New Jersey, New York, Pennsylvania
2=MidWest: Division 3: East North Central- Illinois, Indiana, Michigan, Ohio, Wisconsin
Division 4: West North Central- Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
3=South: Division 5: South Atlantic- Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, Washington D.C, West Virginia
Division 6: East South Central- Alabama, Kentucky, Mississippi, Tennessee
Division 7: West South Central- Arkansas, Louisiana, Oklahoma, Texas
4=West: Division 8: Mountain- Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
Division 9: Pacific- Alaska, California, Hawaii, Oregon, Washington

Fig. 2.3 Kernel Density Estimate of Length of Marriage

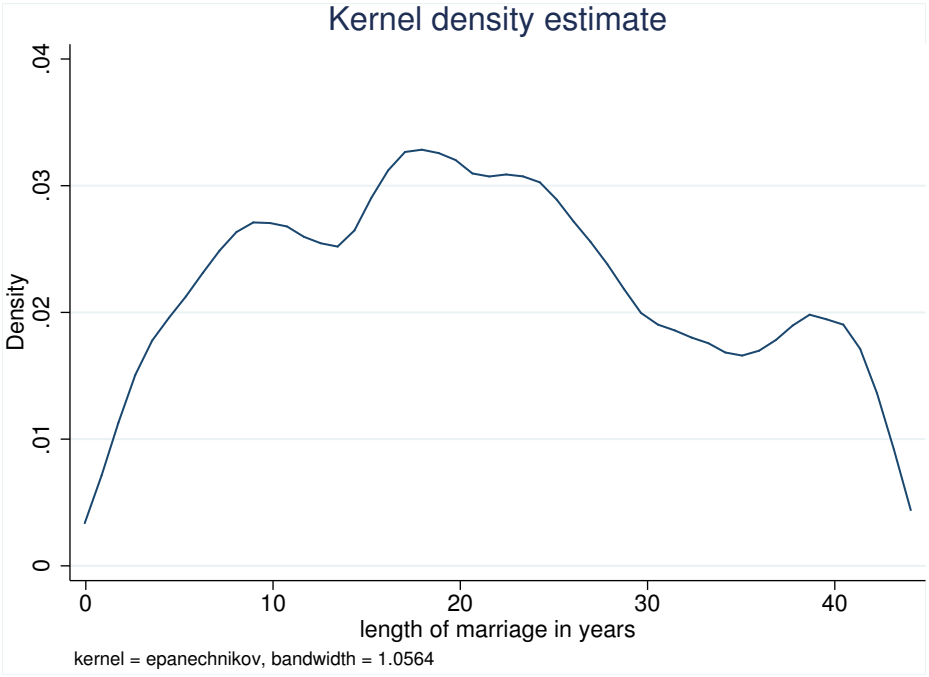
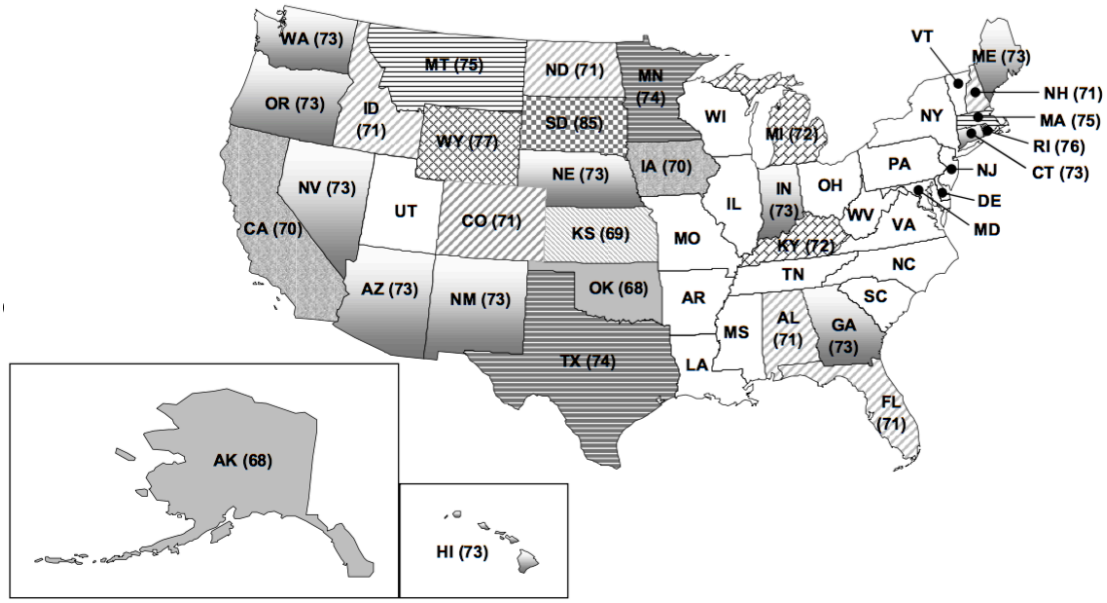


Fig. 2.4 Unilateral Divorce Law adoption by State
taken from Rasul (2005)



Notes: Years in parentheses correspond to the year of adoption of unilateral divorce law. Coding for year of adoption taken from Friedberg (1998).

Table 2.8 Weighted Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Year of marriage	1980.936	9.897	1968	2011	24961
Year of marriage end	2006.994	8.136	1970	2011	24961
Survival time of marriage	11.594	9.597	0	43	24961
Marriage duration	26.043	11.608	1	43	24961
Age:					
H $\geq$ W (-1/4)	0.785	0.411	0	1	22605
H > W (5+)	0.134	0.34	0	1	22605
W > H (2+)	0.081	0.273	0	1	22605
Education:					
Both HS^{-}	0.037	0.188	0	1	22335
Both HS^{+}	0.168	0.374	0	1	22335
Both SC	0.078	0.269	0	1	22335
Both C^{+}	0.296	0.456	0	1	22335
H > W	0.205	0.404	0	1	22335
W > H	0.216	0.412	0	1	22335
Ethnicity:					
Both American+	0.087	0.282	0	1	20743
Both Other national orig.+	0.659	0.474	0	1	20743
Both Racial etc.	0.203	0.402	0	1	20743
Mixed Ethnicity	0.051	0.22	0	1	20743
Religion:					
Both Catholics	0.285	0.451	0	1	22460
Both Jewish	0.029	0.169	0	1	22460
Both Other Christian denoms	0.668	0.471	0	1	22460
Both Other religions	0.006	0.077	0	1	22460
Mixed Religion	0.012	0.108	0	1	22460
Year of marriage:					
1968-79	0.516	0.5	0	1	24961
1980-89	0.275	0.447	0	1	24961
1990-99	0.152	0.359	0	1	24961
2000-11	0.056	0.231	0	1	24961
Economy:					
Severe	0.106	0.308	0	1	24961
Mild	0.101	0.302	0	1	24961
Boom	0.180	0.384	0	1	24961
Region:					
North-East	0.224	0.417	0	1	22009
Mid-West	0.289	0.453	0	1	22009
South	0.28	0.449	0	1	22009
West	0.207	0.405	0	1	22009

Chapter 3

Parental Education and Child Development: Long and Short term Outcomes

3.1 Introduction

Parents and the family environment play a key role in the behaviour and decisions taken by adolescents. Evidence from the effect of childhood socio-economic circumstances on later life chances of children, suggests that family attributes matter much more than neighbourhoods or schools. Interventions in early childhood can be very effective than later in the life cycle of any individual.[1]

One aspect of parental input that has not been studied in depth is educational homogamy of spouses. For most individuals, educational attainment is their first major socio-economic status that is defined separately from the resources of their parents and has a major impact on subsequent life outcomes which affects the well-being of their children. Educational similarity has been cited as one of the most important components of social capital shaping economic mobility in contemporary America (Butler et al., 2008). Increased labour force participation of women and the

[1]Carneiro and Heckman (2003);Mayer (1997); Brooks-Gunn et al. (1997); Currie and Thomas (2012);Karoly et al. (2005)

steady improvement in educational attainment for women has revolutionized the mate selection process. This would suggest that men and women will increasingly select those compatible with their own educational attainment levels, that is, educational homogamy as a trend has increased over the period 1970-90s as a result of rise in women's educational attainment (Qian, 1998).

This paper is motivated by the idea that educational similarity of parents has positive consequences for their children by fostering cooperation between parents and the adoption of more effective investment strategies that can be classified as a form of within-family social capital (Beck and Sancho, 2009). This homogeneity of the parental generation is likely to generate social returns on the offsprings' generation if the intergenerational educational link is causal, due to parental nurture than just reflecting a parental selection effect.

This paper, for the first time, examines the effect of educational homogamy on college enrolment and graduation outcomes in the United States of America. In doing so, it provides new evidence using the Panel Study of Income Dynamics (PSID) dataset, a longitudinal survey from 1968–2013. In establishing a causal impact of educational homogamy, the identification strategy makes use of two divorce laws, namely the Unilateral divorce law and the Joint child custody law, which swept the United States in the seventies and the eighties. Within the first stage itself, this paper examines the effect of these reforms on homogamy, thereby it opens up a novel research path. Thus, adding to previous research by Voena (2015), Wolfers (2006), Stevenson (2007), Rasul (2003), 2005, Genadek et al. (2007), Böheim et al. (2012) which have studied the impact of divorce laws on family behaviour, marriage and divorce rates, marriage-specific capital and labour supply of women. Having said that, the outcome of interest in this study is educational homogamy, this is also new and deserves attention. On the one hand is the agenda that is analysed in the current paper, that individuals who are matching are more alike and this certainly has implications for their kids. On the other hand (beyond the scope of this paper), these more alike parents might also have

implications on a series of other dimensions, for example, they might be moving in an environment that is more unequal because more equal parents might have equal resources which may have repercussions for their kids. Since these children grow up in an environment different from other kids, the prevailing inequality in the society may affect these kids in a negative way. This follows from the recent works of Eika et al. (2014) and Greenwood et al. (2014).

Findings presented in this paper show that parental education leads to an increase in the likelihood of college enrolment of young adults, but there are no effects on college graduation. The results identify the effect of parental education for a group of parents who at the time of their own marriage or before, must have been potentially affected by the passing of these laws and may have experienced the changing nature of family life in America.

This begs the question: How does educational homogamy affect kids' outcomes? The expectation is that it affects child outcomes due to the role of common objectives, views, lifestyle and agreements that parents are able to achieve over intra-household investments or allocation of resources. Therefore, it affects children positively through the series of investments that are made consensually by both parents in line with their decisions. Another possibility is that, perhaps fathers in homogamous couples contribute more to household chores or spend more time with children in various daily activities, than fathers in heterogamous marriages. As a result, their views are more in line with their wives and consequently, children benefit from investments made by their parents.

3.2 Literature Review

Human Capital

Human capital accumulation is a dynamic process wherein the skills acquired in one stage of the life cycle affect both the initial conditions and the technology of learning at the next stage. Human capital is produced over an individual's life cycle, by families, schools and firms and a major determinant of successful schools are successful families (Carneiro and Heckman, 2003). Shonkoff and Phillips (2000) emphasize that different stages of the life cycle are critical to the formation of different types of abilities. Carneiro and Heckman (2003) argue human capital is synergistic, since early investments raise the productivity (lower the costs) of later investments as they are harvested over a longer horizon than those made later in a child's life. Thus, later learning is facilitated by skills (cognitive and non-cognitive) acquired early in life.

Cunha and Heckman (2007); Knudsen et al. (2006) have demonstrated the importance of early environmental conditions on the evolution of adolescent and adult cognitive and non-cognitive skills. These skills are vital determinants of educational attainment, crime, earnings and participation in risky behaviours (Heckman et al., 2006). The emerging developmental literature considers environmental influences on development over the entire life cycle of the child and into adulthood. The recent literature on personality and preference formation by Borghans et al. (2007), Cunha and Heckman (2007) and Cunha et al. (2010) establishes causal impacts of parental inputs and other environmental factors on cognitive and non-cognitive skills. Using the British Household Panel Survey, Ermisch and Francesconi (2001) examine the impact of family background on the educational attainments of British youth born during 1974-81. They find that young adults who are brought up in single-parent households and belong to families in the bottom income quartile have significantly lower educational attainments, while those whose parents are homeowners have higher educational attainments.

Child development literature has documented the importance of early childhood conditions, parental investments in terms of time, parenting standards and practices on child skill formation and health, labour market and behavioural outcomes of children(Fiorini and Keane 2014, Del Bono et al. 2012, Bono et al. 2014, Cunha and Heckman 2007,Knudsen et al. 2006, Coleman et al. 1966, Heckman 2007). A lot of evidence has focused on income as a major determinant of college outcomes of individuals. However, Carneiro and Heckman (2003) suggest that factors operating during the early childhood years and culminating in adolescence in the form of crystallized cognitive abilities, attitudes, and social skills play far more important roles than tuition or family credit constraints during the college years.

Parental Education

There is a substantial literature which shows that individuals form partnerships with other individuals having similar levels of education (Kalmijn and Flap 2001; Laumann et al. 1994; Mare 1991; Nielsen and Svarer 2006). There could be many reasons for this phenomenon, one of these, could be due to low search frictions in marriage markets such as educational institutions (Goldin 1992; Lewis and Oppenheimer 2001; Gautier et al. 2005; Nielsen and Svarer 2006). Therefore, educational homogamy is a result of individuals who prefer to be with those of a similar level, or same type of education than with a different level of education. Another is that, preference-based partnership choice could occur due to the interdependence between risk sharing and marriage (Nielsen and Svarer, 2006). Rosenzweig and Stark (1989), Micevska (2002), Chen et al. (2003) and Hess (2004), among others, have studied partnership formation and dissolution with the presence of idiosyncratic income risk. Risk averse agents can benefit from forming marriage with others to insure against unforeseen changes in income. Furthermore, individuals may view educational attainment of spouses are complements in the household production function.

In recent years, there has been evidence of increased assortative mating of couples in various dimensions but most importantly in education. Educational homogamy of spouses would imply that human capital becomes concentrated within families. Educationally homogamous couples also tend to have similar preferences for time allocation; and, perhaps, are more likely to experience less specialization as their marginal productivities from home or market work would converge. Since education can also embody other attributes that may or may not be related directly to human capital, such as concern for child's future (Sayer et al., 2004), it would mean that child quality would be an important aspect of parenting. Consequently, it may well be that educationally homogamous parents would have less frictions over aspects of parenting and quality of life of their children.

Andersen and Bonke (2007) use Danish Time Use Surveys for 2001 to examine parental time investment in children, focusing on educational background, marital homogamy, and spouses' relative bargaining power. They find that developmental care time is correlated with parents' education, and that marital homogamy reduces couple specialization, but only among the highly educated. Their findings suggest the persistence of important inequalities which emerge through behavioural differences across the educational distribution among households. Over the years, there has been a surge in higher educational attainment among women which is associated with low levels of hypergamy (women marrying up) and more marital homogamy (equal levels) at the top (Rose, 2004). At the same time, one can observe the concentration of low education in couples (Fernández et al. 2005; Schwartz and Mare 2005). Homogamy, as suggested by Oppenheimer (1997), is likely to produce greater similarity in terms of partners' tastes and preferences for time-allocation and in terms of their abilities in household production and child care as found by Nielsen and Svarer (2006).

Homogamous couples are expected to have fewer gains from specialization in home production and child care than heterogamous couples. Consequently, child care among homogamous couples would be more gender symmetric. In addition, homogamous

couples are more likely to pool their resources compared to hypergamous couples (Bonke and Poulsen, 2007). According to Lundberg and Rose (2002) this would imply that fathers are likely to increase, and mothers decrease, their time dedicated to home production; most likely at the expense or to the benefit of market work, respectively. If homogamous couples specialize less in child care then there should be greater similarity in spousal time use and their relative dedication to child development activities (Bonke and Poulsen, 2007).

Beck and Sancho (2009) using data from the Fragile Families and Child Wellbeing Study, show a positive association between parental educational homogamy and children's school readiness. Their results confirm that educationally homogamous couples are more likely to report high levels of mutual support and cooperation in childrearing, suggesting less friction in the organization of family life. In regard to developmental activities of children, they found that intra-couple differences in the amount of time each parent spent with the child are less pronounced in homogamous couples.

Parental care increases by level of education (Leibowitz 1974; 1977; Hill and Stafford 1974, 1980; Bianchi et al. 2004; Sayer et al. 2004; Lausten and Deding 2006). Although this may seem puzzling since highly educated parents could face time opportunity costs (Andersen and Bonke, 2007), but education embodies attributes that are not necessarily directly related to human capital, such as greater concern for child's life chances (Sayer et al., 2004). Therefore, child quality would be given particular priority in parenting which could be achieved by decreasing time dedicated to other activities such as leisure or housework by making use of purchased household help if their income allowed it (Andersen and Bonke, 2007).

As mentioned earlier, one of the consequences of educational assortative mating is that it increases disparities between families, in their capacity to invest in the well-being and human capital of their children. This suggests that the total resources available for investment in children would reflect each partner's economic, cultural

and social contributions or even the lack of it. On the contrary, educational sorting is an indicator of similarity in partners' preferences and so it would be plausible to expect that couples where both spouses have similar levels of schooling would suffer less frictions as investors in their childrens' human capital. Their relative compatibility may interact positively with the level of available household resources and may lead to more efficient investments in their offspring (Beck and Sancho, 2009). On the whole, both arguments may hold true and be relevant for the organization of family life and investments in children. In this paper, the interest centers on relative parental similarity.

3.3 Data and Methods

The analysis is divided into two parts and uses different subsets of the Panel Study of Income Dynamics (PSID) of the United States from 1968-2013. The long time span of this dataset and the subsets of data within it, allow for the study of long term and short term outcomes of a child's educational path. The main dataset provides information on various aspects of a household for every household member contained as part of the family or individual datafile. Along with these main files are the Marriage history files (1985-2013), Parent identification file, and Child development supplement (1997-2007) which are used in this paper. The marriage history file of the PSID provides records for individuals of marriageable age which contain all known cumulative data about the timing and circumstances of his or her marriages up to and including 2013. This file contains details about marriage events of eligible people living in a PSID family at the time of the interview in any wave between 1985-2013. It also includes marriages prior to 1985 as provided through retrospective reports. Data obtained on variables such as number of marriages, beginning and end dates for the first and most recent marriages, marital status of the individual at the time of the most recent interview.

I have made use of the Marriage History files (1985-2013) along with the main data files to match married individuals and then matched them with the Parent

Identification datafile to obtain the child-parent datafile. To examine college outcomes of children, I have restricted the sample to children who are between the age of 18-28, which corresponds to 5,932 observations. This is the timeline which I allow for a child to enrol in college and complete college graduation because majority of children enrol in college and/or complete graduation during this age. For college enrolment, those between 18-25 years are chosen and for college graduation are those between 22-28 years.

Descriptive Statistics

Table 3.1 displays summary statistics for the sample which consists of 5,932 person-years. The average age of young adults in this analysis is 23 years and 47% are males. On average, these individuals have approximately 14 years of education which indicates that they are going through college. Parents, on average, report being married in the year 1962, which is before the survey started. Men are reported to be married by age 27 while women at 24, giving birth almost a year later. The sample consists of biological mothers and fathers. It does not include adoptive or foster parents, for simplicity.

College Enrolment and College Graduation: The PSID does not directly ask for college outcomes, but only asks for completed years of schooling. I classify those who have attained less than 12 years of completed schooling as high school dropouts; those who have attained 12 years of education are said to be high school graduates; those with 13 to 15 years of education are defined as as having achieved some college education. Lastly, individuals with 16 or more years of schooling are college graduates. I measure college enrolment as having completed more than 12 years of schooling. College graduation is measured as having completed 16 or more years of education.[2] For college enrolment, every individual is observed from the age of 18 to 25, during this time period if they are enrolled in college then it is equal to 1

[2]Using years of education will contain measurement error as individuals in the US report enrollment in college but a lot of them take time (over the required four years) to graduate which could lead to the variable on college graduation being inaccurately measured.

Table 3.1 Summary statistics

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Childs age	22.823	3.151	18	28	5932
Childs gender	0.477	0.5	0	1	5932
Childs race:Latina	0.028	0.166	0	1	5345
Childs race:White	0.828	0.378	0	1	5345
Childs race:Black	0.144	0.351	0	1	5345
Birth year of child	1967.192	10.565	1940	1993	5932
Education	13.817	1.961	7	17	5661
College Enroll	0.362	0.481	0	1	4047
College Grad	0.13	0.336	0	1	1597
HH Size	3.006	1.346	1	18	5376
Own home	1.124	0.39	0	2	5493
Income	10.477	0.875	0.693	14.509	3983
Mothers education	12.116	2.264	2	17	5881
Fathers education	12.29	2.876	2	17	5892
Mother HS–	0.248	0.432	0	1	5881
Mother HS+	0.47	0.499	0	1	5881
Mother SC	0.161	0.368	0	1	5881
Mother C+	0.121	0.326	0	1	5881
Father HS–	0.252	0.434	0	1	5892
Father HS+	0.379	0.485	0	1	5892
Father SC	0.16	0.366	0	1	5892
Father C+	0.21	0.407	0	1	5892
Husband&Wife: Similar education	0.536	0.499	0	1	5880
Husband&Wife: Wife>Husb	0.183	0.387	0	1	5880
Husband&Wife: Husb>Wife	0.282	0.45	0	1	5880
Mothers age at childbirth	25.279	5.011	14	48	5912
Fathers age at childbirth	27.84	5.849	14	65	5921
Marriage Year	1962.533	11.872	1932	1995	4546
Marriage/Response Year	1964.04	10.767	1932	1995	5932
Fathers age at marriage	27.262	9.465	11	75	5891
Mothers age at marriage	24.683	9.317	13	78	5891
Order of marriage:Father	1.283	0.587	1	5	5926
Order of marriage:Mother	1.269	0.579	1	5	5908
Joint Child Custody	0.04	0.195	0	1	5932
Unilateral Divorce Law	0.217	0.412	0	1	5932

and 0 if they are not in college. Similarly, for college graduation, every individual is observed from the age of 22 to 28, if they have successfully graduated from college then they receive 1 and 0 if they are still enrolled in college and have not graduated.[3] Therefore, the sample consists of 5,932 person-years. Out of these, 36% are reported to be enrolled in college (4,047 person-years), while 13% (1,597 person-years) are reported to have graduated, respectively.

Educational Homogamy and Other Covariates Parental education is also categorized as high school dropouts (HS–), high school graduates (HS+), some college level education (SC) and college graduates (C+). The number of women reported to be high school graduates is 47% which is 10% points greater than that of men. There is no difference reported in the number of men and women who went to college, both equivalent to 16%. Although the number of women who graduated from college is 12%, much lower than men (21%). The primary variable of interest in this study is educational homogamy. This variable is a binary indicator equals 1 if both, mother and father are high school dropouts or both are high school graduates or both have some college education or both are college graduates and/or higher. It is equal to 0 if either of them falls into a different educational category. Also, as generated from the process of parental education is educational hypogamy, which is also a binary indicator, equal to 1 if the mother's education belongs to a higher category than the father.

Other covariates included in the analysis are divided as household characteristics which include household size, household income measured in dollars (in logs) and whether the house is owned, rented or neither. Child characteristics such as age, gender, year of birth and race, if child is latino, white or black. Parental characteristics are parental education, their age at marriage, age at childbirth, order of marriage and year of marriage.

[3]There are data issues encountered here in following these individuals, if some do and others do not live at home. Please see Appendix A.3 for details

3.3.1 Identification Strategy

The key empirical issue in this paper is controlling for the endogeneity of educational homogamy. This problem could arise due to a number of reasons. First, omitted variable bias could arise because parents' decision to invest in their own education is affected by their own observable and unobservable characteristics. Some of these characteristics may be correlated with parental skills and others are genetically transmitted from parents to children, leading to a correlation between parents' and children's education. These factors could include individual personalities, parental ability, attributes that maybe indirectly related to human capital, such as greater concern for child's life chances and any other perceptions regarding child development and welfare. Second, measurement error due to the inability to fully observe all the variables all the time can lead to endogeneity of the primary variable of interest. The inner ability or personal traits that causes a person to achieve a certain level of education can also affect or influence his or her choice of spouse. To correct for endogeneity, I exploit the variation in the timing of two laws that affected marriages and child welfare in the United States.

3.3.2 Institutional Framework

There are two laws used in this paper: the Unilateral Divorce law which was implemented between 1935-1985 and the Joint Custody law between 1973-2003 throughout the United States.

Unilateral Divorce Law: The new no-fault unilateral divorce laws allowed people to seek a divorce without the consent of their spouse. The most significant part of this reform that swept the United States took place during the 1970s, although the process of removing fault grounds for spouses to ask for divorce had already began before the 1950s (Gruber, 2004). The first state to pass this law was Alaska in 1935. Between 1968 and 1988, 29 states changed their legal systems from mutual consent divorce to a unilateral system (Wolfers, 2006). Unilateral divorce may affects a child's

well-being through different channels.

One of the possible ways is through a change in the bargaining position between husband and wife as argued by Chiappori et al. (2002). If unilateral divorce weakens the bargaining position of women within marriage, then children maybe negatively affected, irrespective of the occurrence of divorce. It is plausible to assume that if both the husband and wife are educationally homogamous, then there may not be a shift in the bargaining position as either party would be having an equal bargaining power, more egalitarian relations in the household. If the couple is educationally hypogamous (wife has more education than husband) or even hypergamous (husband has more education than wife) then it would be plausible to assume that bargaining power might shift to the parent who is more educated, has better employment and perhaps has more resources to provide for the needs of the child.

Several authors have analysed marriage as a commitment device that fosters cooperation and promotes them to make relationship-specific investments, such as investments in children, in terms of number of children and quality of children (Brinig and Crafton 1994; Matouschek and Rasul 2008; Stevenson 2007). Since unilateral divorce is a threat to marriage, it would also affect couples incentives to invest in their marriage.[4] However, if the couple is educationally homogamous and, therefore, is likely to have similar preferences regarding investments in children, then presumably the reform would not undermine their incentives to invest in their children to a considerable extent. Nonetheless, if it was the case that the wife has more education than her husband or vice versa, then perhaps their incentives to invest in marriage-specific capital are not aligned with each other and, the threat to marriage is higher.

Another consequence of the divorce law reform is that it affects the selection into marriage. It can lead to either positive or negative selection into marriage. Since this reform decreases the cost of marriage, couples of low match quality would now be willing to try out marriage because the reduction in divorce costs alleviates the cost

[4]See Delpiano and Giolito (2008)

of marriage without affecting its benefits, thereby increasing marriage and divorce propensity (Alesina and Giuliano, 2007a). On the other hand, Matouschek and Rasul (2008) argue that couples with low match quality may not marry, thus, decreasing marriage and divorce propensity. The two authors along with (Wolfers, 2006) have empirically shown positive selection into marriage. Either way, negative or positive selection into marriage could play a crucial role in the early stages of those children born after the unilateral divorce law took place (Delpiano and Giolito, 2008)

Joint Child Custody Law: The joint custody laws were enacted to improve the well-being of children whose parents divorce. Figure 3.1 in Appendix A.3 shows the timing of the implementation of joint custody laws in the US. A joint custody provision allows courts to handle those disputes which cannot be settled privately. If the child custody decision must be made in the court, judges have the discretion to rule in favour of joint custody if it conforms to the best interests of the child (Buehler and Gerard, 1995). Depending on family specific circumstances, joint custody can fall under the protocol of (i) joint legal custody in which parents share in the decisions of child upbringing but the child's residence is with one of the parents or (ii) joint physical custody in which both parents share in child rearing decisions and also share physical custody of the child. Under either joint-custody settlement, courts expect divorced parents to maintain a cooperative relationship while raising their children (Brinig and Buckley, 1998; Nunley and Seals, 2011).

If the distribution of the marital surplus after divorce occurs is altered by child custody reforms, then cooperative bargaining models of family behaviour predict changes in married couples' investment in children. There is ample empirical evidence that changes in family laws and government programs that provide transfers to one spouse shape the bargaining process over the course of marriage (Chiappori et al. 2002; Attanasio and Lechene 2002; Genadek et al. 2007; Gitter and Barham 2008; Gray 1998; Lundberg et al. 1997; Stevenson 2007; 2008; Ward-Batts 2008). States that change the default custodial allocation from maternal preference to shared custody

decrease (increase) the expected post-divorce time mother (fathers) spend with their children.

According to Brinig and Allen (2000), women are more likely to file for divorce based on the expectation of sole child custody. This would indicate that joint custody reforms raised the cost of divorce form mothers and, consequently, places mothers in an inferior bargaining position within marriage (Nunley and Seals, 2011). It is well known in the empirical literature on intra-household resource allocation, that there is a higher rate of investment or spending on children when mothers have greater bargaining power in the household (Attanasio and Lechene 2002; Bobonis 2009; Lundberg et al. 1997; Maitra 2004; Thomas 1990; Ward-Batts 2008). Child investment may decline if the reform shifts bargaining power away from mother, who value child quality more on average as predicted by Rasul (2006) model. However, it could provide fathers an additional incentive to invest in their children because they could then reap a greater proportion of the post-divorce benefits from child investment through increased visitation rights.

Nunley and Seals (2011) argue that if spouses have homogeneous preferences for child quality, joint custody is the optimal post-divorce custody allocation because it maximizes investment in the public good, which is children, during marriage. Their findings show that if spouses have an equally high valuation of child quality then a rise in probability that a child attends private school would be observed when a state adopts joint custody. Böheim et al. (2012) examine the effects of the introduction of joint custody after divorce on family behaviour within and outside marriage using Austrian data. Their results show that the reform significantly reduced divorce and female employment rates and significantly increased marriage and marital birth rates.

3.3.3 Model Specification: College Outcomes

To examine the causal relationship between college outcomes of young adults and educational homogamy and hypogamy, I estimate the following equation, where H_{jk}^{g} with

superscript g equal to 1 indicates educational homogamy and g equal to 2 represents hypogamy.

$$CollegeOutcomes_{it} = \beta_1 H^1_{jk} + \beta_2 H^2_{jk} + \beta_3 X_i + Yearofbirth_i + States_s + \zeta_{it} \quad (3.1)$$

where H^1_{jk} is a binary indicator, equal to 1 if couple j, where husband and wife, both are either high school dropouts, high school graduates, have some college education or are college graduates or higher, at time k, where k is the year of marriage or the year they were first observed in the sample. H^2_{jk} is a binary indicator for hypogamy, it is equal to 1 if, for couple j, if the wife has more education than the husband. The base group is where the husband has more education than his wife.

X_i is the vector of household characteristics such as family's total disposable income (in logs) measured in dollars, household size; house ownership - if owned, rented or neither, with neither as the reference category. Also included in X_i are child characteristics such as child's sex; race - whether white, black or latina, with latina as the base category; parental controls which are mother's education- if mother is high school dropout, high school graduate, has some college education or is a college graduate, with high school dropout as the base group. It also includes parents age at childbirth which are divided as follows: 17 or below, between 18-29, 30-39 and over 40 years of age for mother and father respectively. Women would postpone motherhood if they face steep opportunity costs (Hotz et al., 1997) or if they want to educate themselves further. Mothers education and age at childbirth should help capture the mother's career dedication. Also included are dummy variables for birth cohorts and states where the individual grew up. Birth cohorts are dummy variables for those born in the 1950s, 1960s, 1970s and between 1980-93 where the base group comprises of those born in the 1940s. ζ_{it} are the unobservable factors that affect college enrolment and graduation outcomes. Additionally, controls for trends in reported education is included, by controlling for the year the survey was conducted.

There are two types of college outcomes in consideration: College enrolment, denoted by $Enroll_{it}$ and College graduation, $Grad_{it}$. So, equation (3.1) is estimated with $Enroll_{it}$ as the first dependent variable and then with $Grad_{it}$ as the second dependent variable. Subscript i stands for individual i=1, 2, 3,....., n and t denotes the age-group for enrolment (18-25) and age-group for graduation (22-28) over which they are observed. This leads to N=5,932 or person-years since every individual is observed from 18 years of age to 25 to be enrolled in college and from 22 years of age to 28 to have graduated from college. Assuming that H^g_{jk} is independent of ζ_{it} leads to biased estimates of the effect of educational homogamy and hypogamy on the educational choices of young adults. To instrument for educational homogamy and hypogamy, I rely on the couples' year of marriage or year they were first observed together (in case the former is missing), to determine whether the unilateral divorce and joint child custody laws were in place before their marriage. For each couple I estimate the following first stage equation.

$$H^g_{jk} = \alpha_1 UD_{ks} + \alpha_2 JCC_{ks} + \alpha_3 X_j + States_s + \epsilon_{jk} \tag{3.2}$$

Educational homogamy and hypogamy is regressed on the two instruments, Unilateral divorce (UD_{ks}) and Joint Child Custody law (JCC_{ks}); and vector X_j, which includes mother's education, couple's ages at marriage, order of the current marriage and their year of marriage. UD_{ks} is a binary indicator equal to 1, if unilateral divorce law was passed in state s before the year of marriage k of couple j. Similarly, JCC_{ks} is also a binary variable, equal to 1, if joint custody law was passed in state s before the time of marriage k of couple j. The two equations, for $g = 1, 2$ are estimated simultaneously and the predicted educational homogamy and hypogamy of each couple is then used to estimate equation (3.1). Standard errors are obtained by a 500-replication bootstrap of the two-step procedure. The following IV equation is estimated:

$$CollegeOutcomes_{it} = \beta_1 \hat{H^1_{jk}} + \beta_2 \hat{H^2_{jk}} + \beta_3 X_i + Yearofbirth_i + States_s + \zeta_{it} \tag{3.3}$$

where $\hat{H^1_{jk}}$ and $\hat{H^2_{jk}}$ are the fitted values on educational homogamy and hypogamy, obtained from the first stage equation (3.2). By theory, the instruments, UD_{ks} and

Table 3.2 First Stage Results: Multinomial Logit Marginal Effects

Variables	Educational Homogamy (H=W)	Educational Hypogamy (W>H)
Joint Child Custody Law	0.1723*	0.0178
	(0.0902)	(0.0395)
Unilateral Divorce Law	-0.1252**	0.0622**
	(0.0627)	(0.0290)
Age at marriage: Husband	-0.0003	-0.0008
	(0.0031)	(0.0015)
Age at marriage: Wife	-0.0002	0.0021*
	(0.0032)	(0.0013)
Order of Marriage: Husband	-0.0461	0.0342
	(0.0511)	(0.0220)
Order of Marriage: Wife	-0.0342	-0.0126
	(0.0480)	(0.0218)
Year of Marriage	0.0006	-0.0027**
	(0.0024)	(0.0011)
Wife's education	-0.0016	0.0322***
	(0.0087)	(0.0033)
State dummies	x	x
Wald Test (chi2) Statistic	10.4140	10.4140
Pseudo-Loglikelihood	-614.3482	-614.3482
Observations	706	706

Standard errors clustered at mother level in parentheses

JCC_{ks} must be correlated with educational homogamy and hypogamy, but must not have an independent effect on college outcomes except through homogamy and hypogamy. Table 3.2 presents marginal effects of the multinomial logit model. It shows the effect of unilateral divorce and joint custody laws on educational homogamy and hypogamy. Unilateral divorce and joint custody laws are important determinants of homogamy and hypogamy. The instruments are jointly and individually significant at the 5% and 10% level and the first stage Wald statistic is 10.414 indicating that the instruments perform fairly well. The sample in the first stage results consists of one observation per couple so a cross-section of 706 couples. In all regressions state fixed effects have been controlled for because local variables often matter for college decisions of individuals; although individuals might move to different locations for their studies, perhaps to avoid high tuition fees. However, moving can be costly and Currie and Moretti (2003) report evidence that the majority of students do not move to a different state to go to college (see also Hoxby (1997).

If the law has passed before marriage, then the binary variable indicating joint custody laws and unilateral divorce is equal to 1, otherwise it is equal to 0. This identifies

selection into marriage. Those who want to get married will get married either way but those who don't want to get married may not. However, the unilateral divorce by making it easier to end a marriage can prompt even low matches to now try out marriage. Once married, the laws do influence the risk of marital dissolution since the laws make it easier for any married couple to divorce and seek custody for their children.

More and more individuals in recent decades are married to those who are similar to their own educational attainment levels, among other factors. If one believes that educational homogeneity of spouses represents a better match or a high match type couple and hypogamy implies a low match, then it is certainly plausible that with the introduction of unilateral divorce laws which made divorce easier, a high match quality couple might wait to choose selection into marriage, while many low match type couples would be willing to try marriage, because now the cost of exiting the marriage is low. So, the passing of the unilateral divorce law may delay the incidence of marriage for a high match couple leading to a decrease in marriage of homogamous couples. On the other hand, unilateral divorce may increase the probability of a low match type couple to be married, thus showing a positive effect on hypogamy.

The change in attitudes towards marriage and the behaviour of married couples requires time and does not happen immediately resulting in a delayed impact of joint custody reforms as shown by Halla (2013). The passing of joint custody reform has a positive effect on homogamy as shown in Table 3.2. A reason for this could be that joint custody positively affects those couples who have homogenous preferences for child quality because it maximizes investment in children during marriage, as argued by Nunley and Seals (2011).

These sets of laws affect family formation or dissolution in one dimension, and in another dimension, they affect the allocation of resources of these parents upon dissolution, with their children. These set of laws affect family behaviour regardless of whether it is during marriage or after marriage. The expectation is that any change

in the default law on divorces will change the behaviour within marriages, and will change the way resources are allocated to children after divorce. Therefore, these laws will have an impact on how people select into marriage.

3.4 Results

Results in Table 3.3 show OLS estimates in columns (1)-(2) and Probit marginal effects in columns (3)-(4). Both sets of estimates show a negative effect of educational homogamy (H=W)and hypogamy (W>H) on college enrollment and graduation, compared to the case where husband is more educated than the wife. These effect sizes are higher for Probit estimates than for OLS. Keeping the focus on OLS estimates, educationally homogamous couples decrease the probability of college enrollment and graduation by 7.5% points and 11.2% points, respectively. Educational hypogamy also decreases enrollment and graduation by 10.4% points and 13% points. A negative effect is an unexpected result because conventional reasoning suggests that homogenous preferences especially in terms of education, would increase the likelihood of children attaining higher education. This may be driven by the pooling of couples where the spouses are both low educated with those where both are high educated. Therefore, in Table 3.11 I present OLS estimates where in columns (1)-(4) this restriction has been relaxed.

In estimates displayed in columns (1)-(4) of Table 3.11, I include all the interaction terms on mothers and fathers educational homogamy levels such as: both are high school dropouts, both are high school graduates, both have some college education and both are college graduates or higher. Columns (1-2) control for mothers education while columns (3-4) do not. Results show no effect of parental educational homogamy at any level, on college enrollment of their children, when mothers education is controlled (column 1). The probability of college graduation decreases by 14% points for couples who are high school graduates, 12% points for those with some college education and by 14% points for couples who are college graduates or higher. Without controlling for mothers

education, estimates show a decrease of 17% points in college enrollment of children whose parents are high school dropouts. However, the probability of enrollment rises by almost 12% points for children whose parents are themselves college graduates or higher. College graduation decreases by 14% points for children whose parents are high school graduates. Overall, a negative effect of educational homogamy can be observed on college graduation rates of young adults in this study. While enrollment of young people is positively affected by couples who were themselves college graduates.

One of the reasons for decline in college graduation could be due to the fact that in the 1960's and 1970's the federal government and some states had taken an initiative to increase access to college, in order to provide opportunities to people from less advantaged backgrounds since education is linked to economic mobility (Scott et al., 2006). Therefore, public colleges played an important role to achieve this need, so by the end of the 20th century 78% of college students were enrolled in state schools (Mortenson, 2000). Around the same time, college graduation rates started to decline and public support for financing higher education had declined. Five-year graduation rates in 1980's and 1990's dropped from 58% to 52% (Mortenson, 1998).

Table 3.4 shows IV-2SLS results, where the fitted values obtained from the first stage regression estimates in Table 3.2 have been plugged into the second stage to obtain IV estimates of β_1 and β_2 from equation (3.1). Bootstrapped standard errors have been calculated using 500 replications. The sample is restricted to young adults who are 18-28 years of age. The sample in the first stage consists of 706 couples and this is different from the sample of children (5,932 person-years), in the second stage. Due to this the usual *ivregress* command in stata cannot be used and estimation is done by manually adding the fitted values from the first stage into the second stage. Effects are presented in terms of coefficient estimates and their bootstrapped standard errors. Columns (1)-(2) of Table 3.4, present estimates for all the young individuals in the sample and columns (3)-(4) are estimates for those individuals whose parents are reported to be in the same marriage since the start of the survey. For the

analysis, I examine young adults whose biological parents are intact and exclude those from blended families because child investment decisions and other decisions within marriage would likely be taken by biological parents. 80% of young adults come from parents who are reportedly in the same marriage since the survey date and out of these, 85% of the couples are in their first marriages.

The main variable of interest is educational homogamy and results indicate that there are strong and significant effects of educational homogamy of couples (in comparison to the base group), positively affecting college enrolment, under *ceteris paribus* conditions, leading to an increase of 12% points in enrolment outcomes of their children, based on the whole sample. Moreover, if the mother is more educated than the father, it leads to an increase of 4% points in the likelihood of college enrolment of the child, controlling for everything else. These results are similar to those in column (3) for the sample of couples who reported to be in the same marriage since the start of the survey. Educational homogamy and hypogamy, increase the propensity to enrol in college by 10% points and 6% points respectively. However, there are no effects on college graduation outcomes. This could be due to the lack of enough observations on college graduation. Educational hypogamy, where the education of the wife is higher than the husband, is also instrumented using the fitted values from the first stage regressions, but that too, does not affect college graduation.

Compared to the OLS estimates, which are presented in Table 3.3, it can be noted that the IV estimates are very different.[5] First, the signs are negative which indicate a decrease in the probability of college enrolment and college graduation. This could be due to the pooling of low educated and high educated couples. Second, the magnitude of the OLS estimates is different from the IV results shown Table 3.4. The effect sizes of the IV estimates are much higher than those of OLS mainly since the latter are negative. Measurement error in the college graduation variable, which arises due to using years of education, could be a reason why no effects are observed on

[5]Same as before, columns (1) and (2) for the whole sample and, columns (3) and (4) for the sample of couples in the same marriage.

graduation in the IV results. With regards to other estimates, results show that males are less likely to enrol in college and complete graduation, as compared to females. Increases in household size can negatively affect the probability of college enrollment and graduation. Mothers age at childbirth increases the chances of enrolment and graduation of children (columns (3)-(4)), while fathers age at childbirth decreases the likelihood of enrolment.

The change in divorce and child welfare laws are most likely to have affected the marriage or divorce decisions of couples at the margin of forming their families. Therefore, it will also affect the parenting behaviour of these couples. Any change in divorce laws has the effect of changing the selection into marriage. Findings from Rasul (2003) indicate that unilateral divorce caused better selection into marriage, in particular, the duration of marriages under unilateral divorce than mutual consent, increased significantly. Figure 3.2 shows that marriage rates of adopting states declined, this seems to suggests better selection into marriage. Thus, the composition of those marrying under unilateral divorce differed from earlier marriage cohorts.

Moreover, Halla (2013) has shown a delayed and growing impact of joint custody reforms. He cites two main reasons for this to happen: First, the process of behavioural change requires a significant amount of time and cannot take an immediate effect. Second, the development of joint custody awards follows the years after the reform, since there is a slow diffusion of information about the law. Once the potential benefits of the law on life after divorce have become evident, can there be any expected effect of the law on the incidence of marriage. So, individuals take time to adapt to new information, update their beliefs and then decide whether to marry or not. Consistent with this, Böheim et al. (2012) has also shown significantly reduced divorce rates and increased marriage rates. All of these suggests that couples are choosing better selection into marriage.

These laws affect those marginal couples who may think that a different allocation of resources to children, once divorced, would give a good reason for them to divorce and thus they may end up terminating their marriage. For example, if the wife perceives that she will not have joint custody but sole custody upon divorce, then the husband may not want to give her as much money to support their child. However, if they were to have joint custody, then he would be willing to take part of the responsibility in case of divorce. These kind of situations might happen in particular couples and perhaps not in the case of those couples who would have opted for divorce, regardless of whether the husband is bearing partial responsibility for children, or even couples who would never divorce in anyway. Clearly, there are unobservable factors influencing these different groups of couples, which prompt them to behave in a certain way. These unobservables could be certain values that men and women attach to their marriage or partnership, unobserved health condition of the child, attractive outside marriage options. So there is a Local Average Treatment Effect[6] here, stronger these motivations are the stronger the likelihood of divorce for any couple at the margin.

Heterogeneous Effects

This subsection explores whether there is evidence that estimates for college enrollment or graduation are different for various subgroups of the population sample.

By Cohorts: Assortative mating, especially along the lines of education, has emerged to be stronger in recent decades than in earlier decades, so it may be possible that the results are driven by cohort effects. Therefore, children from younger cohorts are presumably more likely to have parents where both mother and father have similar levels of education. Table 3.5 shows the results by cohorts, where the following IV equation has been estimated and dummy variables for birth cohorts have been interacted with the fitted values of educational homogamy and hypogamy.

[6](Angrist and Imbens, 1994)

$$\begin{aligned} CollegeOutcomes_{it} &= \gamma_1 \hat{H}^1_{jk} + \gamma_2 \hat{H}^2_{jk} + \gamma_3 X_i + \gamma_4 \hat{H}^1_{jk} * \text{1970-79} + \\ &+ \gamma_5 \hat{H}^2_{jk} * \text{1980-93} + \gamma_6 \hat{H}^1_{jk} * \text{1970-79} + \\ &\gamma_7 \hat{H}^2_{jk} * \text{1980-93} + Yearofbirth_i + States_s + \iota_{it} \end{aligned} \tag{3.4}$$

Columns (1) and (2) include interaction terms for those born in the 1970s, columns (3) and (4) include interaction terms for those born between 1980-1993 and columns (5) and (6) include interaction terms for both youngest birth cohorts, that is, 1970-1979 and 1980-1993. Educational homogamy and hypogamy increase the probability of enrolling in college, everything else being equal as can be seen from columns (1)-(4) of Table 3.5, although the interaction terms themselves are not significant. Column (5) includes interaction terms where the effect of educational homogamy now varies with the birth cohort. The partial effect of college educational homogamy on college enrollment increases by 7.4% points on average, if the individual belongs to the youngest birth cohort 1980-93. Those individuals born in the 1980s are more likely to enrol in college if their parents have similar educational levels. Furthermore, findings show that the college enrolment decreases for those born in the 1970s and 1980s if mothers have more education than fathers. This is slightly puzzling since education of mothers should in fact increase the educational progress of children as evidence shows that mothers care relatively more about their children than fathers.

By Gender: An interesting issue is whether boys and girls are affected differently by the presence of educationally homogamous or hypogamous parents. For the results in Table 3.6, equation (3.3) is estimated for sons and daughters. Results indicate that, for daughters, educational homogamy of parents strongly increases the possibility of college enrolments by 27% points, whilst for sons the effect of educational hypogamy (mother more educated than the father) has a considerable effect (22% points) in increasing the chances of college enrolment. Black et al. (2003) on the contrary estimate a positive effect of mother's education only on their sons. Table 3.6 shows that

daughters benefit more from educational similarity of their parents while progression of sons into college is affected by the mothers who are more educated than the fathers.

By Race: Results shown in Table 3.7 are obtained by estimating equation (3.3) for latinos, whites and blacks separately. The effect of educational homogamy on college enrolment is positive for latinos and whites but homogamy decreases the probability of college enrolment for blacks by 55% points. However, if the mother is more educated than the father then likelihood of college enrolment increases for blacks by almost 40% points. Therefore, these results show that mothers education plays a crucial role in children's higher educational progress and from this analysis it shows that this result especially holds for black children.

By Mothers education: In Table 3.8, I distinguished two groups of children based on their mothers education. Columns (1) and (2) present coefficient estimates for or less, while columns (3) and (4) for mothers who achieved some college education or more. Individuals from the former group, have a higher likelihood of college enrolment if their parents have similar educational levels, *ceteris paribus* and their chances of enrolment also increase if mother has more education than the father.

By Income: Table 3.9 presents results by household income. Columns (1) and (2) show estimates for households where income is less than or equal to median income, while columns (3) and (4) for households with higher than median income, the median income being $39,000. Findings indicate that propensity for college enrolment increases if mother is more educated, in both sets of households. However, it is interesting to note that this propensity is higher for households with less than median income as compared to those families with higher than median income.

Possible Mechanisms

The results presented in this analysis can be interpreted using the modelling framework posited by Rasul (2006) which suggests that marriage investment in child quality

is driven by parental preferences for child investment and their relative bargaining position within marriage. Fiorini and Keane (2014), Del Bono et al. (2012), Boca et al. (2014) are studies that bring parental time into the research agenda on child outcomes, and show that parental time and parenting styles are important determinants of early child development. In relation to this, relative symmetry in parental behaviours may also drive the effect of homogamy on child outcomes. Fathers may spend more time in developmental care with children than their heterogamous counterparts. In what follows, I provide some evidence of this mechanism.

Using the three waves of Child Development Sample (CDS) from 1997–2007, with a sample of 2,512 children aged 3 to 15, Table 3.10 provides descriptive statistics (Mean and the standard deviation in parentheses) for fathers involvement in developmental care of children. The first column consists of responses from fathers in homogamous unions ($H \cong W$) while the second and third columns is for fathers in heterogamous marriages, $W > H$ and $H > W$ respectively.

Evidence shows that fathers from homogamous unions, on average, are more likely to be involved with children through various activities such as outdoor activities or playing sports, any indoor games as well as educational activities such as reading books with them. In terms of household chores, again fathers from homogamous marriages are slightly more engaged with their children in terms of doing simple activities like repairing things, cleaning the house or preparing food and doing dishes together. They also tend to be more emotionally attached and would be inclined to talk about their past or family life with their children. This provides suggestive evidence that spouses in homogamous marriages tend to behave similar due to which fathers are perhaps, more equally involved in child rearing with mothers, and this could potentially drive the impact of homogamy on child outcomes to be positive.

3.5 Conclusion

This study examines the role of parental education on college outcomes of young individuals in the United States using the PSID data for 1968-2013. It offers new evidence which shows that similarity in parental education leads to an increase in the probability of college enrolment of young adults. To estimate the causal impact of educational homogamy on college outcomes, the paper exploits the variation in the timing of unilateral divorce and joint child custody laws across the United States. The findings indicate that parental educational homogamy ($H \cong W$) increases the likelihood of college enrolment of their children, and so does educational hypogamy ($W > H$), as compared to the situation where fathers are more educated than mothers ($H > W$).

There is a fair amount of heterogeneity in the estimates along birth cohorts, gender, race, mothers education and income. For example, the positive effect of educational homogamy is observed among individuals born in the eighties. For females, educational homogamy significantly increases the chances of college enrolment, while for males, it is educational hypogamy that promotes their likelihood of enrolment. There are also racial differences, for latinos and whites the effects of educational homogamy on enrolment is positive and significant. On the contrary, for blacks, educational homogamy decreases their propensity to enrol. Educational hypogamy, on the other hand, positively affects the propensity of enrolment for blacks. Children of mothers who have less than college education are more likely to enrol in college while no major effect of family income is observed for educational homogamy. Suggestive evidence also shows fathers from homogamous marriages tend to be more involved with their children in household and developmental activities and this is perhaps, one of the consequences of relative symmetry in parental behaviours which positively affects children. However, relative bargaining position within marriages could also be a possible factor, and currently this paper cannot say much on this, but, it can be one of the few desirable extensions of this study and would require some more data mining and further research to understand these effects.

Table 3.3 Baseline Estimates I

	OLS		Probit	
	(1)	(2)	(3)	(4)
Variables	College Enrolment	College Graduation	College Enrolment	College Graduation
Educational Homogamy ($H \cong W$)	-0.075*	-0.112***	-0.232**	-0.5093***
	(0.039)	(0.031)	(0.116)	(0.148)
Educational Hypogamy (W>H)	-0.104**	-0.129***	-0.307**	-0.7153***
	(0.047)	(0.038)	(0.142)	(0.187)
Mothers educ: HS+	0.104**	-0.007	0.345**	-0.0686
	(0.041)	(0.036)	(0.138)	(0.210)
Mothers educ: SC	0.235***	0.055	0.711***	0.3083
	(0.052)	(0.048)	(0.165)	(0.238)
Mothers educ: C+	0.287***	0.194***	0.855***	0.9017***
	(0.058)	(0.049)	(0.185)	(0.265)
Mothers age at childbirth:18-29	0.271***	0.103	1.049***	0.3642
	(0.074)	(0.111)	(0.340)	(0.519)
Mothers age at childbirth:30-39	0.392***	0.091	1.398***	0.2410
	(0.092)	(0.116)	(0.376)	(0.544)
Mothers age at childbirth:40+	0.219*	0.352***	0.821*	1.1002*
	(0.115)	(0.126)	(0.464)	(0.585)
Fathers age at childbirth:18-29	-0.328***	0.194***	-4.418***	4.0933***
	(0.073)	(0.061)	(0.370)	(0.453)
Fathers age at childbirth:30-39	-0.399***	0.226***	-4.637***	4.2528***
	(0.083)	(0.069)	(0.391)	(0.470)
Fathers age at childbirth:40+	-0.228*	0.123	-4.111***	3.5368***
	(0.128)	(0.089)	(0.477)	(0.557)
Child gender:male	-0.049	-0.088***	-0.153	-0.4091***
	(0.032)	(0.023)	(0.096)	(0.118)
HH income(logs)	0.035*	-0.012	0.120*	-0.0604
	(0.019)	(0.020)	(0.065)	(0.088)
Race: White	0.035	0.086	0.104	0.5150
	(0.084)	(0.062)	(0.292)	(0.415)
Race:Blacks	0.163*	0.144**	0.493	0.7643*
	(0.096)	(0.069)	(0.324)	(0.452)
Birth year:1950-59	-0.396***	-0.043	-1.214***	-0.3556
	(0.129)	(0.076)	(0.373)	(0.334)
Birth year:1960-69	-0.616***	-0.034	-1.906***	-0.2488
	(0.141)	(0.088)	(0.416)	(0.395)
Birth year:1970-79	-0.879***	-0.047	-2.712***	-0.2547
	(0.158)	(0.105)	(0.474)	(0.498)
Birth year:1980-93	-1.022***	-0.004	-3.185***	-0.0906
	(0.181)	(0.126)	(0.546)	(0.587)
Household size	-0.039***	-0.037***	-0.124***	-0.1867***
	(0.010)	(0.010)	(0.033)	(0.054)
Own House	0.104	0.029	0.375	0.0805
	(0.111)	(0.096)	(0.358)	(0.550)
Rented House	0.010	-0.018	0.092	-0.1209
	(0.110)	(0.100)	(0.358)	(0.566)
Year	0.027***	0.001	0.082***	0.0017
	(0.004)	(0.003)	(0.012)	(0.015)
State dummies	x	x	x	x
Observations	2,669	1,117	2,646	1,057

Robust standard errors clustered at child-level in parentheses.
Columns (1-2) show OLS estimates and
columns (3-4) show Probit marginal effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.4 IV 2SLS Results

VARIABLES	(1) College Enrolment	(2) College Graduation	(3) College Enrolment	(4) College Graduation
$Educ.\widehat{Homog_j}H \cong W$	0.1198***	0.0216	0.0995**	-0.0002
	(0.034)	(0.041)	(0.046)	(0.070)
$Educ.\widehat{Hypog_j}W > H$	0.0380*	-0.0225	0.0591**	0.0021
	(0.022)	(0.030)	(0.027)	(0.039)
Mothers educ: HS+	0.0138	-0.0266	-0.0002	-0.0504
	(0.039)	(0.045)	(0.041)	(0.049)
Mothers educ: SC	0.0756	0.0430	0.0320	-0.0052
	(0.061)	(0.070)	(0.068)	(0.083)
Mothers educ: C+	0.0362	0.1727*	-0.0219	0.1464
	(0.083)	(0.096)	(0.088)	(0.110)
Mothers age at childbirth:18-29	0.2508***	0.0844	0.3084***	0.5667*
	(0.044)	(0.106)	(0.041)	(0.299)
Mothers age at childbirth:30-39	0.3661***	0.0788	0.4341***	0.5506*
	(0.054)	(0.107)	(0.053)	(0.296)
Mothers age at childbirth:40+	0.1924	0.4389	0.2722*	0.9586*
	(0.169)	(0.404)	(0.150)	(0.525)
Fathers age at childbirth:18-29	-0.2610***	0.2168***	-0.0669	0.0485
	(0.057)	(0.072)	(0.057)	(0.072)
Fathers age at childbirth:30-39	-0.3230***	0.2542***	-0.1404**	0.0610
	(0.064)	(0.080)	(0.057)	(0.060)
Fathers age at childbirth:40+	-0.1316	0.1394	—	—
	(0.089)	(0.101)		
Child gender:male	-0.0501***	-0.0770***	-0.0504**	-0.0890***
	(0.019)	(0.022)	(0.020)	(0.026)
HH income(logs)	0.0439***	-0.0043	0.0470***	-0.0261
	(0.013)	(0.021)	(0.015)	(0.024)
Race: White	0.0329	0.0368	0.0230	-0.0242
	(0.059)	(0.072)	(0.072)	(0.087)
Race:Blacks	0.1421**	0.0620	0.1424*	-0.0126
	(0.064)	(0.083)	(0.076)	(0.094)
Birth year:1950-59	-0.3873***	-0.0361	-0.3871***	-0.0348
	(0.080)	(0.081)	(0.082)	(0.084)
Birth year:1960-69	-0.5572***	-0.0227	-0.5146***	-0.0092
	(0.087)	(0.100)	(0.093)	(0.107)
Birth year:1970-79	-0.8011***	-0.0249	-0.7519***	-0.0147
	(0.100)	(0.120)	(0.110)	(0.130)
Birth year:1980-93	-0.9586***	0.0269	-0.8835***	0.0618
	(0.115)	(0.143)	(0.130)	(0.156)
Household size	-0.0384***	-0.0384***	-0.0385***	-0.0379***
	(0.008)	(0.010)	(0.009)	(0.011)
Own House	0.0911	0.0131	0.0962	-0.0391
	(0.074)	(0.090)	(0.089)	(0.155)
Rented House	0.0111	-0.0149	-0.0287	-0.0034
	(0.080)	(0.099)	(0.100)	(0.163)
Year	0.0262***	0.0000	0.0238***	0.0020
	(0.002)	(0.003)	(0.003)	(0.004)
State dummies	x	x	x	x
Observations	2,643	1,109	2,104	855

Bootstrapped Standard errors in parentheses
Columns (1-2) for all marriages
Columns (3-4) for couples in first marriages.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.5 Heterogenous Effects I: By Cohort

VARIABLES	(1) College Enrolment	(2) College Graduation	(3) College Enrolment	(4) College Graduation	(5) College Enrolment	(6) College Graduation
$Educ.\widehat{Homog_j}H \cong W$	0.0964*	0.0151	0.0885**	-0.0141	0.0583	0.0307
	(0.052)	(0.066)	(0.042)	(0.067)	(0.048)	(0.071)
$Educ.\widehat{Hypog_j}W > H$	0.0613**	-0.0090	0.0580**	-0.0073	0.0663**	-0.0122
	(0.027)	(0.045)	(0.025)	(0.045)	(0.027)	(0.045)
Mothers educ: HS+	0.0002	-0.0456	-0.0004	-0.0404	-0.0028	-0.0449
	(0.038)	(0.056)	(0.040)	(0.057)	(0.041)	(0.055)
Mothers educ: SC	0.0359	0.0173	0.0349	0.0173	0.0323	0.0196
	(0.060)	(0.096)	(0.061)	(0.097)	(0.071)	(0.098)
Mothers educ: C+	-0.0167	0.1798	-0.0116	0.1835	-0.0138	0.1797
	(0.081)	(0.135)	(0.081)	(0.133)	(0.092)	(0.130)
Mothers age at childbirth:18-29	0.3059***	0.5272	0.3127***	0.5675*	0.3220***	0.5065*
	(0.043)	(0.337)	(0.044)	(0.337)	(0.044)	(0.299)
Mothers age at childbirth:30-39	0.4332***	0.5233	0.4465***	0.5600	0.4578***	0.5025*
	(0.056)	(0.337)	(0.061)	(0.341)	(0.064)	(0.301)
Mothers age at childbirth:40+	0.2731	0.9278*	0.2836*	0.9701*	0.2993**	0.9070*
	(0.169)	(0.513)	(0.172)	(0.514)	(0.143)	(0.494)
Fathers age at childbirth:18-29	-0.0648	0.0533	-0.0568	0.0564	-0.0440	0.0481
	(0.060)	(0.081)	(0.067)	(0.078)	(0.065)	(0.075)
Fathers age at childbirth:30-39	-0.1384**	0.0654	-0.1314**	0.0697	-0.1203**	0.0609
	(0.057)	(0.072)	(0.062)	(0.070)	(0.057)	(0.069)
Child gender: Males	-0.0487**	-0.0888***	-0.0521**	-0.0881***	-0.0517**	-0.0868***
	(0.021)	(0.030)	(0.022)	(0.027)	(0.023)	(0.029)
HH income(logs)	0.0472***	-0.0254	0.0457***	-0.0260	0.0454***	-0.0244
	(0.015)	(0.027)	(0.017)	(0.027)	(0.016)	(0.027)
Race: White	0.0215	-0.0264	0.0212	-0.0238	0.0232	-0.0257
	(0.066)	(0.102)	(0.065)	(0.092)	(0.070)	(0.098)
Race: Blacks	0.1378**	-0.0138	0.1424**	-0.0104	0.1415*	-0.0144
	(0.068)	(0.109)	(0.069)	(0.099)	(0.077)	(0.102)
Birth year:1950-59	-0.3844***	-0.0352	-0.3872***	-0.0378	-0.3834***	-0.0351
	(0.079)	(0.087)	(0.080)	(0.083)	(0.082)	(0.089)
Birth year:1960-69	-0.5151***	-0.0191	-0.5191***	-0.0197	-0.5193***	-0.0173
	(0.088)	(0.115)	(0.094)	(0.113)	(0.095)	(0.123)
Birth year:1970-79	-0.7612***	0.0173	-0.7583***	-0.0291	-0.8235***	0.0454
	(0.106)	(0.135)	(0.116)	(0.139)	(0.122)	(0.161)
Birth year:1980-93	-0.8821***	0.0479	-0.9395***	0.0200	-0.9803***	0.0875
	(0.119)	(0.167)	(0.141)	(0.182)	(0.143)	(0.192)
Household size	-0.0376***	-0.0386***	-0.0393***	-0.0383***	-0.0384***	-0.0379***
	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)
Own House	0.1016	-0.0442	0.0975	-0.0419	0.1077	-0.0452
	(0.079)	(0.158)	(0.088)	(0.159)	(0.083)	(0.187)
Rented House	-0.0243	-0.0090	-0.0277	-0.0088	-0.0186	-0.0112
	(0.090)	(0.165)	(0.096)	(0.155)	(0.090)	(0.192)
Year	0.0239***	0.0022	0.0242***	0.0022	0.0243***	0.0019
	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)
Birth 1970-79*$Educ.\widehat{Homog_j}H \cong W$	-0.0019	-0.0427	—	—	0.0474	-0.0644
	(0.021)	(0.032)			(0.030)	(0.055)
Birth 1970-79*$Educ.\widehat{Hypog_j}W > H$	-0.0090	0.0014	—	—	-0.0157**	0.0062
	(0.006)	(0.007)			(0.008)	(0.009)
Birth 1980-93*$Educ.\widehat{Homog_j}H \cong W$	—	—	0.0394	0.0325	0.0742**	-0.0276
			(0.026)	(0.044)	(0.036)	(0.059)
Birth 1980-93*$Educ.\widehat{Hypog_j}W > H$	—	—	-0.0078	0.0033	-0.0160*	0.0087
			(0.008)	(0.009)	(0.009)	(0.012)
State dummies	x	x	x	x	x	x
Observations	2,104	855	2,104	855	2,104	855

Bootstrapped Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.6 Heterogenous Effects II: By Gender

	– Females –		– Males –	
	(1)	(2)	(3)	(4)
VARIABLES	College Enrollment	College Graduation	College Enrollment	College Graduation
$Educ.\widehat{Homog_j}H \cong W$	0.2722***	-0.0315	-0.0373	0.0477
	(0.076)	(0.117)	(0.078)	(0.101)
$Educ.\widehat{Hypog_j}W > H$	-0.0638	0.0673	0.2209***	-0.0656
	(0.048)	(0.082)	(0.043)	(0.070)
Mothers educ: HS+	0.1432**	-0.2014	-0.1633**	0.0320
	(0.072)	(0.127)	(0.066)	(0.089)
Mothers educ: SC	0.1909*	-0.2333	-0.1752*	0.1058
	(0.111)	(0.210)	(0.104)	(0.130)
Mothers educ: C+	0.2631*	-0.0508	-0.4298***	0.2871
	(0.147)	(0.260)	(0.150)	(0.195)
Mothers age at childbirth:18-29	0.3924***	0.1075	0.2393**	-0.0788
	(0.060)	(0.148)	(0.109)	(0.078)
Mothers age at childbirth:30-39	0.4760***	0.0703	0.3845***	—
	(0.078)	(0.164)	(0.128)	
Mothers age at childbirth:40+	0.3835	0.5713	0.2832	—
	(0.248)	(0.410)	(0.176)	
Fathers age at childbirth:18-29	-0.1399*	0.0761	-0.1571	0.2312**
	(0.078)	(0.140)	(0.108)	(0.115)
Fathers age at childbirth:30-39	-0.1695**	0.0452	-0.2148**	0.1873**
	(0.075)	(0.121)	(0.093)	(0.095)
HH income(logs)	0.1011***	-0.0071	-0.0212	-0.0360
	(0.022)	(0.040)	(0.022)	(0.043)
Race: White	-0.1562	-0.0943	0.1853**	0.0299
	(0.096)	(0.144)	(0.073)	(0.091)
Race: Blacks	0.0021	-0.1234	0.2376***	0.0285
	(0.112)	(0.157)	(0.084)	(0.100)
Birth year:1950-59	-0.3481***	-0.0775	-0.6447***	-0.1755
	(0.088)	(0.117)	(0.196)	(0.183)
Birth year:1960-69	-0.5506***	-0.0500	-0.6543***	-0.2369
	(0.110)	(0.161)	(0.213)	(0.223)
Birth year:1970-79	-0.7943***	-0.1863	-0.9073***	-0.2096
	(0.134)	(0.201)	(0.225)	(0.254)
Birth year:1980-93	-0.9635***	-0.1119	-1.0523***	-0.2403
	(0.160)	(0.247)	(0.253)	(0.298)
Household size	-0.0462***	-0.0365**	-0.0468***	-0.0445***
	(0.011)	(0.017)	(0.013)	(0.014)
Own House	0.2520*	-0.3182	-0.0040	0.1149
	(0.137)	(0.424)	(0.095)	(0.098)
Rented House	0.1138	-0.1264	-0.0683	0.0616
	(0.157)	(0.444)	(0.106)	(0.101)
Year	0.0272***	0.0092	0.0235***	0.0040
	(0.004)	(0.006)	(0.004)	(0.006)
State dummies	x	x	x	x
Observations	1,115	452	989	403

Bootstrapped Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.7 Heterogenous Effects III: By Race

	– Latinos –		– Whites –		– Blacks –	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	College Enrollment	College Graduation	College Enrollment	College Graduation	College Enrollment	College Graduation
$Educ.\widehat{Homog_j}H \cong W$	1.936***	-1.470	0.119**	-0.042	-0.549**	0.096
	(0.664)	(24.459)	(0.055)	(0.084)	(0.218)	(0.353)
$Educ.\widehat{Hypog_j}W > H$	-0.236	0.126	0.037	-0.001	0.391***	0.059
	(0.369)	(0.654)	(0.032)	(0.042)	(0.104)	(0.281)
Mothers educ: HS	0.428	1.517	0.043	-0.069	-0.080	0.000
	(0.373)	(5.735)	(0.045)	(0.068)	(0.113)	(0.305)
Mothers educ: SC	-1.680	3.008	0.069	-0.038	0.069	0.107
	(1.097)	(40.229)	(0.071)	(0.100)	(0.178)	(0.591)
Mothers educ: C+	3.499	2.134	0.055	0.140	-0.593	0.136
	(2.130)	(29.062)	(0.097)	(0.135)	(0.367)	(0.977)
Mothers age at childbirth:18-29	2.093***	0.813	0.323***	0.640**	0.085	-0.148
	(0.632)	(7.965)	(0.058)	(0.304)	(0.119)	(0.259)
Mothers age at childbirth:30-39	4.892**	—	0.430***	0.642**	0.636***	—
	(2.322)		(0.074)	(0.302)	(0.188)	
Mothers age at childbirth:40+	5.582*	—	0.346	1.068**	—	—
	(3.369)		(0.225)	(0.509)		
Fathers age at childbirth:18-29	3.466	—	-0.072	0.046	0.255	-0.083
	(2.836)		(0.061)	(0.081)	(0.252)	(0.442)
Fathers age at childbirth:30-39	—	—	-0.117**	0.056	0.069	-0.124
			(0.054)	(0.076)	(0.236)	(0.350)
Child gender:male	-1.740***	—	-0.029	-0.088***	-0.364***	-0.143
	(0.571)		(0.022)	(0.032)	(0.095)	(0.147)
HH income(logs)	0.011	-1.572	0.036**	-0.008	0.074	-0.177*
	(0.200)	(4.872)	(0.017)	(0.031)	(0.050)	(0.095)
Birth year:1950-59	3.438*	—	-0.395***	-0.066	0.760***	0.400
	(1.756)		(0.087)	(0.093)	(0.278)	(0.560)
Birth year:1960-69	2.045**	—	-0.553***	-0.017	0.399	0.389
	(0.983)		(0.099)	(0.117)	(0.298)	(0.319)
Birth year:1970-79	0.738***	—	-0.759***	-0.070	-0.393	0.299*
	(0.123)		(0.117)	(0.148)	(0.327)	(0.156)
Birth year:1980-93	—	—	-0.900***	0.009	-0.769*	—
			(0.141)	(0.175)	(0.406)	
Household size	-0.072	-0.444	-0.031***	-0.028**	-0.058**	-0.089***
	(0.086)	(0.328)	(0.009)	(0.013)	(0.026)	(0.028)
Own House	—	—	0.230***	0.192	-0.453***	0.038
			(0.087)	(0.119)	(0.166)	(0.620)
Rented House	0.509**	—	0.123	0.279**	-0.569***	-0.166
	(0.255)		(0.091)	(0.137)	(0.194)	(0.653)
Year	0.071	0.020	0.025***	0.004	0.055***	0.032*
	(0.062)	(0.491)	(0.003)	(0.005)	(0.009)	(0.017)
State dummies	x	x	x	x	x	x
Observations	54	14	1,757	711	293	130

Bootstrapped Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.8 Heterogenous Effects IV: By Mothers Education

	–Mother: HS+ or less–		–Mother: SC or more–	
	(1)	(2)	(3)	(4)
VARIABLES	College Enrolment	College Graduation	College Enrolment	College Graduation
$Educ.\widehat{Homog_j}H \cong W$	0.096*	-0.042	0.043	0.078
	(0.054)	(0.083)	(0.115)	(0.228)
$Educ.\widehat{Hypog_j}W > H$	0.070***	-0.014	0.072	0.026
	(0.021)	(0.038)	(0.045)	(0.068)
Mothers age at childbirth:18-29	0.248***	0.749**	1.070***	0.022
	(0.052)	(0.373)	(0.129)	(0.134)
Mothers age at childbirth:30-39	0.506***	0.788**	0.926***	—
	(0.067)	(0.387)	(0.142)	
Mothers age at childbirth:40+	0.294	1.280**	—	—
	(0.183)	(0.545)		
Fathers age at childbirth:18-29	0.018	0.119*	-0.359**	-0.228
	(0.079)	(0.065)	(0.144)	(0.244)
Fathers age at childbirth:30-39	-0.098	0.060	-0.365***	-0.149
	(0.075)	(0.062)	(0.132)	(0.188)
Child gender:male	-0.087***	-0.123***	0.044	-0.104*
	(0.027)	(0.036)	(0.047)	(0.063)
HH income(logs)	0.055***	-0.051	0.008	-0.032
	(0.021)	(0.034)	(0.031)	(0.050)
Race: White	-0.080	0.043	0.251**	-0.163
	(0.095)	(0.089)	(0.107)	(0.210)
Race:Blacks	-0.021	-0.009	0.428***	-0.069
	(0.104)	(0.089)	(0.130)	(0.243)
Birth year:1950-59	-0.334***	-0.046	-0.820***	-0.261
	(0.102)	(0.102)	(0.122)	(0.216)
Birth year:1960-69	-0.497***	-0.023	-1.193***	-0.251
	(0.123)	(0.131)	(0.155)	(0.289)
Birth year:1970-79	-0.734***	-0.115	-1.574***	-0.243
	(0.150)	(0.157)	(0.191)	(0.344)
Birth year:1980-93	-0.881***	-0.047	-1.957***	-0.198
	(0.179)	(0.212)	(0.231)	(0.461)
Household size	-0.025**	-0.023	-0.068***	-0.068***
	(0.012)	(0.015)	(0.017)	(0.024)
Own House	0.085	-0.140	0.163	0.177
	(0.097)	(0.229)	(0.152)	(0.276)
Rented House	0.021	-0.057	-0.206	0.013
	(0.105)	(0.235)	(0.174)	(0.215)
Year	0.025***	0.003	0.044***	0.008
	(0.004)	(0.005)	(0.006)	(0.011)
State dummies	x	x	x	x
Observations	1,421	533	603	291

Bootstrapped Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.9 Heterogenous Effects V: By Income

	Less/equal to median income		Greater than median income	
	(1)	(2)	(3)	(4)
VARIABLES	College Enrolment	College Graduation	College Enrolment	College Graduation
$Educ.\widehat{Homog_j}H \cong W$	0.113	0.065	-0.002	-0.025
	(0.080)	(0.101)	(0.048)	(0.074)
$Educ.\widehat{Hypog_j}W > H$	0.095**	0.021	0.039*	-0.006
	(0.038)	(0.078)	(0.023)	(0.040)
Mothers educ: HS	-0.030	-0.116	0.085*	-0.046
	(0.053)	(0.084)	(0.045)	(0.068)
Mothers educ: SC	-0.093	-0.163	0.212***	0.035
	(0.102)	(0.196)	(0.064)	(0.099)
Mothers educ: C+	-0.182	-0.022	0.209**	0.130
	(0.126)	(0.239)	(0.089)	(0.130)
Mothers age at childbirth:18-29	0.197***	-0.413	0.202***	0.146
	(0.056)	(0.429)	(0.071)	(0.168)
Mothers age at childbirth:30-39	0.400***	-0.375	0.207**	0.162
	(0.080)	(0.419)	(0.081)	(0.167)
Mothers age at childbirth:40+	0.272	—	-0.020	0.450
	(0.207)		(0.122)	(0.413)
Fathers age at childbirth:18-29	0.043	0.201*	0.248*	0.204
	(0.075)	(0.107)	(0.138)	(0.127)
Fathers age at childbirth:30-39	-0.075	0.182*	0.220	0.232*
	(0.073)	(0.109)	(0.141)	(0.134)
Child gender:male	-0.027	-0.087	-0.094***	-0.093***
	(0.032)	(0.059)	(0.024)	(0.032)
Race: White	-0.087	-0.240	0.089	-0.011
	(0.121)	(0.368)	(0.062)	(0.069)
Race:Blacks	0.047	-0.241	0.184***	0.017
	(0.129)	(0.367)	(0.070)	(0.077)
Birth year:1950-59	-0.376***	0.001	-0.449***	0.130*
	(0.089)	(0.130)	(0.071)	(0.067)
Birth year:1960-69	-0.560***	0.023	-0.637***	0.185*
	(0.109)	(0.190)	(0.082)	(0.103)
Birth year:1970-79	-0.722***	0.169	-0.868***	0.125
	(0.136)	(0.248)	(0.099)	(0.127)
Birth year:1980-93	-0.875***	0.187	-1.036***	0.197
	(0.191)	(0.314)	(0.119)	(0.159)
Household size	-0.026**	-0.033*	-0.046***	-0.037***
	(0.010)	(0.019)	(0.009)	(0.011)
Own House	0.117	-0.046	0.074	0.243***
	(0.092)	(0.186)	(0.109)	(0.077)
Rented House	0.003	-0.026	-0.090	0.296***
	(0.105)	(0.203)	(0.111)	(0.082)
Year	0.024***	-0.008	0.026***	0.003
	(0.004)	(0.007)	(0.003)	(0.004)
State dummies	x	x	x	x
Observations	1,030	347	1,755	753

Bootstrapped Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.10 CDS sample 1997-2007: Fathers involvement in activities

Activities	(1) $H \cong W$	(2) $W > H$	(3) $H > W$
N	1,284	568	476
Plays sports/outdoor activities	0.571	0.521	0.529
	(0.495)	(0.5)	(0.499)
Helps with Homework	0.564	0.501	0.573
	(0.495)	(0.5)	(0.494)
Reads books	0.571	0.458	0.507
	(0.495)	(0.498)	(0.5)
Plays video games	0.371	0.338	0.353
	(0.483)	(0.473)	(0.478)
Plays board games	0.311	0.245	0.269
	(0.463)	(0.43)	(0.444)
Did arts/crafts	0.188	0.155	0.168
	(0.391)	(0.362)	(0.374)
Built/Repaired something	0.185	0.181	0.17
	(0.389)	(0.385)	(0.376)
Went shopping	0.617	0.629	0.626
	(0.486)	(0.483)	(0.484)
Cleans house together	0.428	0.399	0.388
	(0.495)	(0.49)	(0.487)
Do dishes together	0.222	0.186	0.208
	(0.415)	(0.389)	(0.406)
Talks about family	0.769	0.72	0.749
	(0.421)	(0.449)	(0.433)
Prepared food together	0.443	0.392	0.414
	(0.496)	(0.488)	(0.492)

Appendix A.3

Data issues in college enrollment and graduation:

For those children aged 18-28 who do not live at home, if the survey shows them to have enrolled in college after completing high school, i.e the year of education is 13, 14 or 15 it would mean they are enrolled. Then they are coded as enrolled and not graduated.

If the survey shows missing values after 12 years of education and then shows 16/17 years of education after 4-5 years, it means that the individual enrolled and graduated from college, so the missing values have been imputed to account for enrollment.

For those children, where years of education are missing after 12 years and remains missing uptil they are aged 28, no imputations have been done and no information on enrollment or graduation is recorded for them.

Fig. 3.1 Joint Custody Laws by State, taken from Halla (2013)

State	Joint custody	State	Joint custody
Alabama		Montana	1981
Alaska	1982	Nebraska	1983
Arizona	1991	Nevada	1981
Arkansas		New Hampshire	1974
California	1979	New Jersey	1981
Colorado	1983	New Mexico	1982
Connecticut	1981	New York	1981
Delaware	1981	North Carolina	1979
Florida	1979	North Dakota	1993
Georgia	1990	Ohio	1981
Hawaii	1980	Oklahoma	1990
Idaho	1982	Oregon	1987
Illinois	1986	Pennsylvania	1981
Indiana	1973	Rhode Island	1992
Iowa	1977	South Carolina	
Kansas	1979	South Dakota	1989
Kentucky	1979	Tennessee	1986
Louisiana	1981	Texas	1987
Maine	1981	Utah	1988
Maryland	1984	Vermont	1992
Massachusetts	1983	Virginia	1987
Michigan	1981	Washington	
Minnesota	1981	West Virginia	
Mississippi	1983	Wisconsin	1979
Missouri	1983	Wyoming	1993

Notes: The timing of the child-custody reforms are from Brinig and Buckley (1998).

Fig. 3.2 Marriage and Divorce rates, source: Rasul (2005)

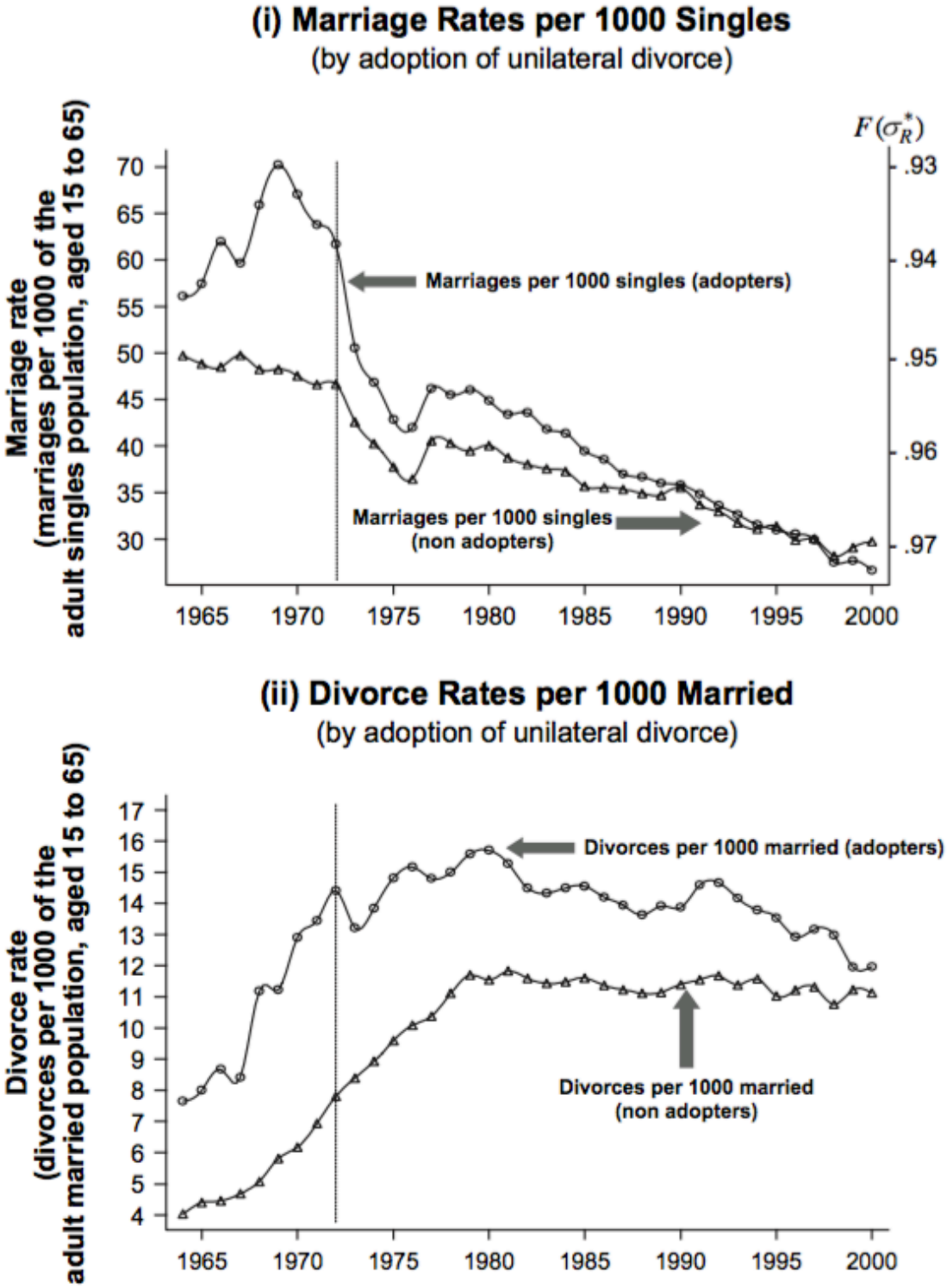


Table 3.11 Baseline Estimates II, OLS

	(1)	(2)	(3)	(4)
Variables	College Enrollment	College Graduation	College Enrollment	College Graduation
Educ. Homogamy: Both HS–	-0.111	-0.026	-0.169***	-0.059
	(0.068)	(0.061)	(0.052)	(0.054)
Educ. Homogamy: Both HS+	-0.062	-0.143***	-0.058	-0.140***
	(0.053)	(0.038)	(0.045)	(0.031)
Educ. Homogamy: Both SC	-0.060	-0.119*	0.063	-0.071
	(0.085)	(0.067)	(0.075)	(0.058)
Educ. Homogamy: Both C+	-0.043	-0.143*	0.118**	0.066
	(0.098)	(0.076)	(0.058)	(0.044)
Educ. Hypogamy (W>H)	-0.091*	-0.145***	-0.014	-0.066*
	(0.051)	(0.041)	(0.045)	(0.034)
Mothers educ: HS+	0.074	0.050		
	(0.066)	(0.050)		
Mothers educ: SC	0.206***	0.099		
	(0.073)	(0.061)		
Mothers educ: C+	0.240**	0.259***		
	(0.100)	(0.078)		
Mothers age at childbirth:18-29	0.272***	0.097	0.280***	0.122
	(0.075)	(0.109)	(0.073)	(0.111)
Mothers age at childbirth:30-39	0.394***	0.082	0.411***	0.117
	(0.092)	(0.115)	(0.091)	(0.116)
Mothers age at childbirth:40+	0.229**	0.334***	0.225**	0.347***
	(0.116)	(0.126)	(0.111)	(0.128)
Fathers age at childbirth:18-29	-0.326***	0.187***	-0.370***	0.214***
	(0.075)	(0.064)	(0.068)	(0.059)
Fathers age at childbirth:30-39	-0.395***	0.216***	-0.431***	0.246***
	(0.085)	(0.071)	(0.080)	(0.067)
Fathers age at childbirth:40+	-0.226*	0.115	-0.281**	0.119
	(0.128)	(0.090)	(0.126)	(0.087)
Child gender:male	-0.051	-0.086***	-0.061*	-0.083***
	(0.033)	(0.023)	(0.033)	(0.023)
HH income(logs)	0.034*	-0.011	0.046**	-0.000
	(0.019)	(0.021)	(0.019)	(0.020)
Race: White	0.033	0.086	0.036	0.084
	(0.085)	(0.061)	(0.085)	(0.061)
Race:Blacks	0.162*	0.142**	0.153	0.129*
	(0.097)	(0.069)	(0.098)	(0.068)
Birth year:1950-59	-0.392***	-0.039	-0.386***	-0.045
	(0.130)	(0.074)	(0.127)	(0.074)
Birth year:1960-69	-0.610***	-0.036	-0.591***	-0.023
	(0.142)	(0.087)	(0.140)	(0.086)
Birth year:1970-79	-0.873***	-0.045	-0.840***	-0.022
	(0.159)	(0.104)	(0.158)	(0.104)
Birth year:1980-93	-1.017***	-0.002	-0.995***	0.021
	(0.182)	(0.125)	(0.181)	(0.126)
Household size	-0.039***	-0.038***	-0.042***	-0.040***
	(0.010)	(0.010)	(0.010)	(0.010)
Own House	0.107	0.027	0.109	0.028
	(0.110)	(0.098)	(0.117)	(0.098)
Rented House	0.011	-0.015	0.011	-0.009
	(0.111)	(0.102)	(0.116)	(0.101)
Year	0.026***	0.001	0.026***	-0.000
	(0.004)	(0.003)	(0.004)	(0.003)
State dummies	x	x	x	x
Observations	2,669	1,117	2,669	1,117

This is Table3.3 with restriction on homogamy indicator relaxed. Robust standard errors clustered at child-level in parentheses. Columns (3-4) are without controlling for mothers education.

Table 3.12 Reduced Form OLS Estimates

	(1)	(2)
Variables	College Enrollment	College Graduation
Joint Custody Law	-0.095	0.036
	(0.065)	(0.063)
Unilateral Divorce Law	-0.105**	0.027
	(0.045)	(0.039)
Mothers educ: HS+	0.084**	-0.049
	(0.039)	(0.032)
Mothers educ: SC	0.213***	0.005
	(0.048)	(0.042)
Mothers educ: C+	0.228***	0.112***
	(0.053)	(0.043)
Mothers age at childbirth:18-29	0.284***	0.076
	(0.070)	(0.106)
Mothers age at childbirth:30-39	0.407***	0.067
	(0.087)	(0.112)
Mothers age at childbirth:40+	0.283**	0.423***
	(0.116)	(0.122)
Fathers age at childbirth:18-29	-0.255***	0.214***
	(0.066)	(0.057)
Fathers age at childbirth:30-39	-0.325***	0.257***
	(0.074)	(0.067)
Fathers age at childbirth:40+	-0.158	0.143*
	(0.116)	(0.083)
Child gender:male	-0.058*	-0.077***
	(0.032)	(0.023)
HH income(logs)	0.043**	-0.000
	(0.018)	(0.020)
Race: White	0.034	0.073
	(0.082)	(0.063)
Race:Blacks	0.152	0.094
	(0.093)	(0.071)
Birth year:1950-59	-0.410***	-0.025
	(0.131)	(0.078)
Birth year:1960-69	-0.625***	-0.001
	(0.144)	(0.090)
Birth year:1970-79	-0.877***	0.004
	(0.161)	(0.107)
Birth year:1980-93	-0.969***	0.034
	(0.183)	(0.129)
Household size	-0.039***	-0.038***
	(0.010)	(0.011)
Own House	0.096	0.014
	(0.109)	(0.098)
Rented House	-0.000	-0.013
	(0.109)	(0.102)
Year	0.028***	-0.001
	(0.004)	(0.003)
State FE's	x	x
Observations	2,669	1,117

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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