TESIS DE LA UNIVERSIDAD DE ZARAGOZA

2014

37

Héctor Bellido Bellón

# Fertility Decisions: The Role of Divorce Laws, Culture and Its Impact on Marital Status

Departamento
Análisis Económico

Director/es
Molina Chueca, José Alberto
Marcén Pérez, Miriam



ISSN 2254-7606

Prensas de la Universidad
Universidad Zaragoza

Universidad Zaragoza
1542

Tesis Doctoral

# FERTILITY DECISIONS: THE ROLE OF DIVORCE LAWS, CULTURE AND ITS IMPACT ON MARITAL STATUS


Autor

Héctor Bellido Bellón

Director/es

Molina Chueca, José Alberto
Marcén Pérez, Miriam

**UNIVERSIDAD DE ZARAGOZA**

Análisis Económico


2014

# Fertility Decisions:
# The Role of Divorce Laws, Culture and Its Impact on Marital Status

A Thesis presented by

Héctor Bellido Bellón

Licenciado en Administración y Dirección de Empresas, 2008, Universidad de Zaragoza
Máster en Economía, 2009, Universidad de Zaragoza

Thesis directed by

Miriam Marcén Pérez
Profesor Ayudante Doctor de la Universidad de Zaragoza

and

José Alberto Molina Chueca
Catedrático de la Universidad de Zaragoza

February, 2014

# Abstract

This doctoral dissertation follows an economic analysis to study the fertility decisions of the couples, an important research field within the Family Economics, by developing three different lines of research. First, we analyze the effect of divorce law reforms in Europe on fertility decisions, for which we exploit the legislative history of divorce liberalization across Europe, finding that divorce law reforms have a negative and permanent effect on fertility. Second, we use data on second-and-higher generation immigrants living in the United States to study the impact of culture on the fertility decisions of adolescent women, exploiting the variations in fertility rates of teen women by ancestor's home country. Our results show that culture has quantitatively important impacts on the fertility decisions of adolescent women. Finally, we study the effect of the number of children conceived during first marriage on the risk of marital dissolution using an instrumental variable approach. Our findings confirm the deterrent effect of children on the probability of divorce of the couple. By developing this thesis integrated within Family Economics, we try to shed light on the causes and consequences of fertility decisions made by the couples, complementing and contributing to the existing literature on fertility.



# Resumen

Esta tesis doctoral sigue un análisis económico para estudiar las decisiones de la pareja relativas a la fertilidad, un importante campo de estudio dentro de la Economía de la Familia, mediante el desarrollo de tres líneas de investigación. En primer lugar, analizamos el efecto de las reformas en las leyes de divorcio que se produjeron en Europa sobre las decisiones de fertilidad, para lo que explotamos la historia legislativa de la liberalización del divorcio en Europa, encontrando que las reformas de las leyes de divorcio tienen un efecto negativo y permanente sobre la fertilidad. En segundo lugar, usamos datos de inmigrantes de segunda y superior generación que viven en los Estados Unidos para estudiar el impacto de la cultura en las decisiones de fertilidad de las mujeres adolescentes, para lo que explotamos las variaciones en las tasas de fertilidad de las mujeres adolescentes por país de origen de sus antepasados. Los resultados muestran que la cultura tiene un impacto cuantitativamente significativo sobre las decisiones de fertilidad de las mujeres adolescentes. Finalmente, estudiamos el efecto del número de hijos concebidos durante el primer matrimonio sobre el riesgo de ruptura matrimonial usando un enfoque de variables instrumentales. Los resultados confirman el efecto disuasorio de los hijos en la probabilidad de divorcio de la pareja. Mediante esta tesis integrada dentro de la Economía de la Familia, pretendemos mejorar el conocimiento de las causas y las consecuencias de las decisiones de fertilidad de las parejas, complementando y contribuyendo a la literatura existente sobre fertilidad.

# Contents

# Preface

This author is grateful to thesis supervisor José Alberto Molina, for his guidance and advice. I also want to express my unconditional gratitude to thesis supervisor Miriam Marcén, for her patience, support and close collaboration. I also want to recognize the support provided by the Departamento de Análisis Económico of the Universidad de Zaragoza (Spain), by the Institut National d´Études Démographiques in Paris (France) and by the Maison des Sciences Économiques of the Université Paris 1 Panthéon-Sorbonne in Paris (France). Finally, I want to gratefully acknowledge the financial support provided by the Science, Technology and University Department from the Government of Aragon (grant reference number B094/09).

I wish specially thank to Professor Anne Solaz and to Professor Elena Stancanelli, with whom I worked during my research stay in Paris (France), and whose academic support and unselfish advices have been of great importance for the development of this thesis. I also want to express my gratitude to Professor José Ignacio Giménez-Nadal for his support in the development of this thesis. Finally, I thank Professor Shoshana Grossbard for her always useful comments and the time spent by her to discuss theoretical aspects of this thesis during her stays in Zaragoza.

My main motivation to develop this project has been to study fertility decisions of the couple, an important field of research within the Economics of the Family, whose incorporation to the economics profession´s research agenda we must thank to Professor Gary Becker. With this intention, I developed the following three lines of research, expressed through the three chapters of this thesis.

The first chapter, entitled "Divorce Laws and Fertility", is an improved version of the research presented at the European Society of Population Economics (Essen, Germany, 2010). It was also presented at the XIII Encuentro de Economía Aplicada (Sevilla, Spain, 2010); at the XXXV Simposio de la Asociación Española de Economía (Madrid, Spain, 2010); at the IX Jornadas de Economía Laboral (Santiago de Compostela, Spain, 2011); at the European Economic Association (Oslo, Norway, 2011); and at the European Association of Labor Economists (Paphos, Cyprus, 2011). I want to express my gratitude for all the useful comments received during these presentations.

The second chapter, entitled “Teen Mothers and Culture”, is an extended revision of the research first presented at the European Society of Population Economics (Aarhus, Denmark, 2013). It was also presented at the European Association of Labor Economists (Torino, Italy, 2013). Again, I would like to thank for all the comments received during these conferences.

The third chapter, entitled "Which Children Stabilize Marriage? New Evidence from the NLSY", was developed during my research stay at the Institut National d´Études Démographiques in Paris (France). I would like to reiterate my gratitute to this institution, as well as to Professors Elena Stancanelli and Anne Solaz. I also want to acknowledge the valuable comments received by peers of this institution during informal meetings.

Finally, I want to express my gratitude to all the colleagues with whom I have spent many hours of work over the past four years (Juan Antonio, Miguel, Lorena, Ana, Nacho, Cristina Sarasa, Sara, Fran, Cristina Pérez, Fernando, Ruth, Cristina Martínez, Mercedes, María and Ángela). We have shared hopes, dreams, disappointments and joys, and almost without being conscious, we stopped being colleagues for becoming good friends. I also want to thank my parents and my sister for their patience and understanding during these years. You are my role model, and the best support that anyone could wish. And of course Sandra, the most important person in my life, thanks for your love and support. Cause if I walk with you by my side, no matter how hard is the road. You make it just wonderful.

None of the institutions or individuals mentioned above have any responsibility for the analysis and conclusions presented in this thesis.

# Introduction

The Economy of the Family became part of the field of study of the economy as a result of the researches conducted by Professor Gary Becker, whose influence on subsequent studies is clearly perceptible even today. This thesis employs an economic analysis to study fertility decisions of couples, an important field of research within the Economics of the Family.

Throughout the following chapters, we show empirical evidence on the decision-making process associated with fertility. Specifically, we analyze the effect of changes in divorce laws on fertility decisions, the influence of culture on fertility decisions of adolescent women and the relationship between the number of children and the probability of marriage disruption.

The low levels of fertility rates, below the replacement rate of 2.1, are an ongoing concern for policy-makers and researchers in Europe. Previous studies have analyzed the role of different variables on the decline of the fertility rate in Europe (the incorporation of women to the labor market, the decline in infant mortality, the family policies implemented by each European country, the increase in earnings that increased the opportunity cost of women's time...). In chapter one, we analyze the effect that the liberalization of divorce laws that occurred in Europe since the early seventies has had on the decline of fertility rates. Results suggest that divorce law reforms have a negative and permanent effect on fertility. These findings are robust to alternative specifications and controls for observed (such as the liberalization of abortion and the availability of the birth-control pill, among others) and unobserved country-specific factors, and time-varying factors at the country level. Supplemental analysis, developed to understand the mechanisms through which divorce law reforms affect fertility, shows that both marital and out-of-wedlock fertility decline, but that the impact on marital fertility varies, depending on whether couples are married prior to or after divorce law reforms.

The problem of the low fertility rate, which even puts at risk the necessary generational shift, is not the only concern that exists related to fertility. In the next chapter we analyze another major problem associated with fertility, the high fertility rates that exist among adolescent women in some countries.

In chapter 2, we analyze whether there is a cultural component that increases the probability of being a teen mother, by exploiting the variations in fertility rates of

adolescent women by ancestor's home country. For this purpose, we use data from women who were born and have lived in the United States, so that all of them have been exposed to the same institutions, legal constraints, markets and social stimuli. Thus, differences in fertility rates of adolescent women by national origin can be considered as supporting evidence of the impact of culture. Our results show that culture has quantitatively important impacts on the fertility decisions of adolescent women. This finding is robust to alternative specifications and to the introduction of several home country variables and individual characteristics measured when young women take the decision to have a child.

In the last chapter of this thesis, we analyze the effect that the number of children conceived during the first marriage has on the probability of marital disruption of the couple. Previous researches show conflicting evidence on this issue, so we examine the impact of children on marital stability. Our results show that children conceived during first marriage have a deterrent effect on the probability of marriage dissolution. In addition, we consider the potential endogeneity between children and marital status, because while children can be considered as marital specific investments and affect the marital stability, those couples with more marital problems are less likely to have children. Using an instrumental variable approach, our results still show the deterrent effect of children conceived during the first marriage on the risk of marital disruption. These results are robust to changes in the definition of our variable of interest, to changes in our sample and to the inclusion of new controls previously excluded due to endogeneity concerns.

Moreover, in this chapter we also explore whether all children have the same deterrent effect on the probability of marital disruption. Specifically, we analyze its impact on marital stability depending on the educational level of their parents. We find that the higher the educational level of the parents, the greater the negative impact of their offspring on the likelihood of marriage dissolution. This finding suggests that more educated parents make higher investments in the quality of their children, which increases more the value of their marriage, making it more difficult to break.

# Chapter 1: Divorce laws and fertility

## 1.1 Introduction

Over the past fifty years, European countries have experienced a considerable decrease in their Total Fertility Rates (TFR).[1] This rate declined from 2.84 on average in 1960, to below 1.9 in almost all European countries in 2006, with the lowest TFRs being for Greece (1.4), Spain (1.38), Portugal (1.36) and Italy (1.34), according to Eurostat. These levels, below the replacement rate of 2.1, are an ongoing concern for policy-makers and researchers alike. The search for explanations of this decline in fertility has covered much ground (see for a review Feyrer et al. 2008): the dramatic increase in female labour force participation (Ahn and Mira 2002; Michael 1985), the rise in earnings that increased the opportunity cost of women's time (Becker 1981), technological progress (Galor and Weil 1996; Greenwood and Seshadri 2002), the decline in infant mortality (Sah 1991), the law reforms that made abortion more accessible, and the availability of the birth control pill (Ananat et al. 2007; Goldin and Katz 2000, 2002), among other factors. In this chapter, we present evidence suggesting that divorce law reforms have also played an important role.

We are not the first to study empirically the effect of divorce law reforms on fertility but, to our knowledge, there is no existing literature that has examined reform's impact on European fertility rates. The majority of papers have focused on the effect of public policies that regulate the aftermath of divorce in the US, finding a positive correlation between these laws and the fertility rate (Halla 2013). Less work has been done on the analysis of the fertility effects of divorce law reforms that regulate how spouses obtain a divorce. Alesina and Giuliano (2007) and Drewianka (2008), both using US data, found that the implementation of divorce law reform has a negative effect on the fertility rate.

The introduction of more liberal divorce laws generates a permanent reduction in the costs of divorce, and so marriage become less attractive relative to divorce (Matouscheck and Rasul 2008). From a theoretical point of view, the decline in the

[1] The TFR is defined as the mean number of children that would be born alive to a woman during her lifetime if she were to pass through her childbearing years conforming to the fertility rates by age of a given year.

value of marriage is expected to negatively affect marital fertility, to the extent that children are considered as marriage-specific capital (Becker et al. 1977; Stevenson 2007). This is not the only expected impact of divorce laws on fertility. An opposite effect is also suggested if couples who are already married utilize investment in marriage-specific capital strategically over-investing in children to increase the value of their marriage (Stevenson 2007). Additionally, divorce law reforms can have an effect on the costs of entering into a bad marriage, which after the reforms are also reduced. In this setting, the decision to marry may be easier to take, especially if there are individuals who want to have children in a marital setting, which negatively affects out-of-wedlock fertility and positively affects marital fertility (Alesina and Giuliano 2007; Drewianka 2008). All these contrary forces, operating through marital and non-marital fertility, make the effect of divorce laws on fertility unclear. Thus, whether divorce law reforms have an impact on fertility appears to be an empirical issue.

In our analysis, we construct a panel of 18 European countries spanning the period from 1960 to 2006, using data from Eurostat, to analyze the effect of changes in divorce laws on fertility rates. We identify the relationship by exploiting the legislative history of divorce liberalization across European countries. Our results suggest that the introduction of divorce law reforms decreases fertility rates, and that the effect appears to be permanent. These results are consistent with the use of different measures of fertility rates and with the use of fertility rates by age of the mother. We find that fertility falls in all age groups, with the decline being greater for women between 20 and 34 years old.

These findings contribute to the growing literature on the impact of changes in divorce laws on socio-economic outcomes. Using methodologies very similar to ours, much of the recent literature has focused on the impact of divorce law reforms on divorce rates, generally finding a positive relationship between the permissiveness of the laws and the probability of divorce (Friedberg 1998; González-Val and Marcén 2012b; Gray 1998; Peters 1986, 1992; Wolfers 2006, for the US; and González and Viitanen 2009; González-Val and Marcén 2012a, for Europe). Other researchers have studied the effect of changes in divorce laws on suicide, domestic violence and spousal homicides (Stevenson and Wolfers 2006), marriage rates (Drewianka 2008), marriage-specific investments (Stevenson 2007), labour supply (Gray 1998; Peters 1986), and child outcomes (Gruber 2004). Not only do we add to this literature by examining the effect of divorce law reforms on fertility, but we provide additional evidence suggesting

that our results are not driven by unobserved country-specific factors, time-varying factors at the country level, the liberalization of abortion, reforms of cohabitation laws, or the availability of the birth-control pill.

We introduce controls for fixed and trending unobserved factors at the country level that may be correlated with fertility. In addition, we include in our main specification a host of country level variables that appear to be related to fertility rates. For instance, given that fertility rates are lower among women who participate in the labour market (Kalwij 2000) and among those who are more educated (Bloemen and Kalwij 2001; Breierova and Duflo 2004; Leon 2004), the large rise in labour force participation since the 1970s may be driving our results. After including all these controls, the coefficients that capture the effect of divorce law reforms change very little. Another potential concern with our analysis is that it omits reforms that introduced changes in the abortion and cohabitation laws, the introduction of the oral contraceptive pill, and other family policies that may also be driving the evolution of the TFR. To examine this issue, we add to our main specification controls for legislative variations across countries in the timing of these reforms. Results are robust to the introduction of these controls.

In the final section, we examine how divorce law reforms operate by analysing the effect on out-of-wedlock fertility and on marital fertility, separately. We find that the marital fertility rate decreases as a consequence of the liberalization of divorce laws, but that the effect is transitory; after a decade, no effect can be discerned. On the contrary, the impact on out-of-wedlock fertility is negative and permanent. Thus, our results suggest that the decrease in the TFR might be driven by two forces: first, after the adoption of reforms, the TFR may fall due to the reaction of both marital and non-marital fertility, and after 7 to 8 years it may be driven by the reaction of out-of-wedlock fertility. We also explore whether the timing of marital births is influenced by divorce law reforms. Results suggest that divorce law reforms have a selection effect on the composition of marriages, since we observe that those reforms may have different effects on fertility, depending on whether couples were married before, or after, the divorce law reforms.

The remainder of the chapter is organized as follows. Section 1.2 presents the empirical strategy. Section 1.3 describes the data. Baseline results and robustness checks are discussed in Section 1.4. In Section 1.5, we analyse the mechanisms through which divorce law reforms operate, and Section 1.6 sets out our main conclusions.

# 1.2 Empirical strategy

Our empirical approach makes use of the variations in the timing of divorce law liberalization across European countries, in order to identify the effects of these reforms on fertility rates. The reforms, known as no-fault unilateral divorce reforms, consist of any change in divorce laws that liberalizes divorce and of those changes that introduce unilateral divorce either implicitly (at least after a required separation period) or explicitly (divorce can be granted at the request of either spouse). As shown in González-Val and Marcén (2013a,b), the date of the no-fault unilateral reforms coincides with the timing of structural breaks located in the divorce rates series of European countries and of the US. These authors explain that those policy shocks had a permanent impact on the divorce rate, suggesting that the reforms of divorce laws permanently reduce the value of marriage relative to divorce. These permanent shocks should also affect the fertility decisions of those individuals who are already married, or those expecting to get married, since children are considered as marriage-specific capital (Becker et al. 1977; Stevenson 2007). For this reason, and following the economic literature that has found an important role of divorce law reforms in explaining changes in divorce rates (see, for example, Friedberg 1998; González and Viitanen 2009; Wolfers 2006), we study the impact of these reforms on fertility. Initially, to capture the effect of divorce law reforms, we estimate the following expression:

$$Fertility\ rate_{ct} = \beta NoFault_{ct} + u_{ct} \tag{1.1}$$

where $NoFault_{ct}$ is a dummy variable that takes a value of "1" when country $c$ has a no-fault unilateral divorce law regime in year $t$, and "0" otherwise. The parameter $\beta$ is interpreted as the average change in the TFR that can be assigned to the change in the legal system of divorce. From a theoretical point of view, as mentioned above, the sign of this parameter is not clear, since these new divorce regimes can have both positive and negative effects on fertility. In this regression, we also include country fixed effects and year fixed effects, in addition to the interaction between the country fixed effects and the calendar time, and the quadratic calendar time, to control for evolving

unobserved country attributes. Regressions are estimated by population-weighted least squares.[2]

This methodology only identifies a discrete series break (static model). However, it is conceivable that the impact of divorce law liberalization has very different short-run and long-run effects, which may induce a gradual change in fertility rates. To tackle this issue, we also estimate the dynamic response of fertility rates to divorce law reforms (dynamic model), as in Wolfers (2006):

$$Fertility\ rate_{ct} = \Sigma_s\ \beta_s NoFault_{cts} + u_{ct} \qquad (1.2)$$

with the variable $NoFault_{cts}$ being a dummy set equal to "1" when country *c* has implemented a no-fault unilateral divorce law regime in year *t* for *s* periods, and "0" otherwise. These dummy variables are supposed to capture the entire dynamic response of fertility to the new legal regime, while the country-specific time trends identify pre-existing trends. A negative sign of the $\beta$ parameter indicates that the fertility rate in country *c* has fallen after *s* periods since the change in divorce law. The interpretation of a positive sign would be just the opposite. Again, we also add country fixed effects, year fixed effects, in addition to the interaction between the country fixed effects and the calendar time, and the quadratic calendar time as in Eq. (1.1).

# 1.3 Data

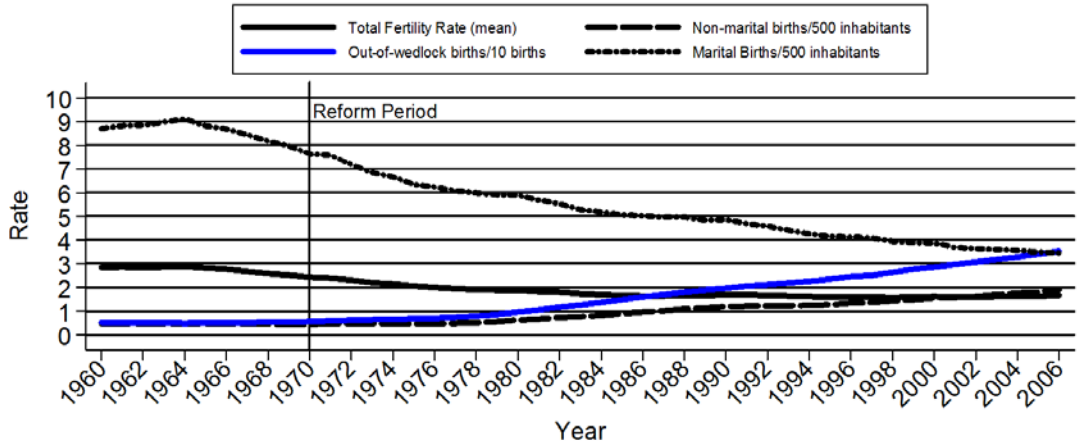
For the main analysis, we use the TFR for the period 1960 - 2006.[3] The data for the fertility rate are publicly available from Eurostat. Figure 1.1 shows the temporal evolution of the TFR in Europe. From 1960 to 1964, the average TFR slightly increases, reaching a level of 2.88. Subsequently, there is a clearly observed decline in the average TFR until 1994, with this average rate being lower than the replacement level since 1975. That was followed by a period of relative stability, around an average rate of 1.60. This stable rate was interrupted by an acceleration since 2003 that continues until the end of our sample in 2006. This behaviour is not limited to the TFR. Other common

[2] We also repeat the analysis by introducing clusters at the country level. Results do not substantially change.

[3] To fill in the gaps, we use data from several issues of the UN Demographic Yearbooks, and the available data points, plus a linear trend, a quadratic trend, and mid-points. We also run regressions with the unbalanced and shorter versions of the panel (considering fewer years in the sample and dropping each country in turn). Results are quite robust to those presented here.

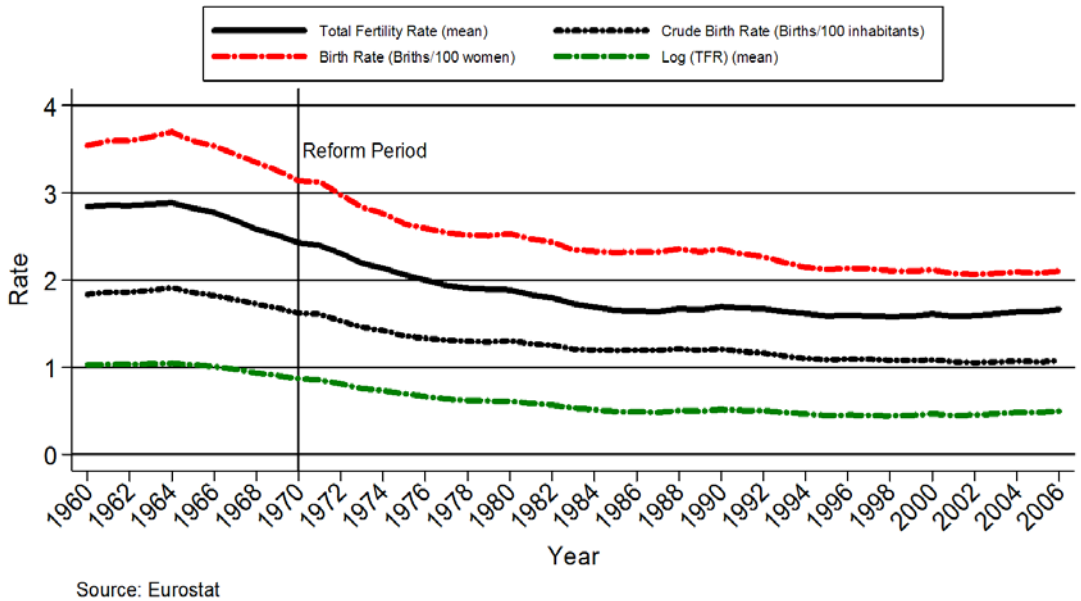
measures of fertility represented in Figure 1.2, such as the Crude Birth Rate (measured as the annual number of births per 100 inhabitants) and the Birth Rate (annual number of births per 100 women) for Europe, have a similar pattern to that of the average TFR.

Figure 1.1:
TFR, Marital Births, and Out-of-Wedlock Births
Europe 1960-2006




Source: Eurostat
The countries considered in the analysis are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Figure 1.2:
Birth Rates, Europe 1960-2006




Source: Eurostat

This quick glance at fertility rates does not appear to reveal the presence of a causal link to the reforms of divorce laws. However, given that the drop in the TFR continued while European countries introduced their reforms, it is possible to argue that those reforms impacted the TFR. The timing of the main reforms in no-fault and unilateral divorce laws is summarized by Gonzalez and Viitanen (2009) (see Table 1.1). The period of reforms began in 1970, when Denmark implemented a divorce law reform that allowed unilateral divorce after a period of separation. After 1970, four European countries allowed divorce (Italy, Portugal, Spain and Ireland); two passed only no-fault divorce (Ireland and Italy); eleven countries permitted divorce when a couple had lived apart for a specified period of time, allowing unilateral divorce after separation in the 1970s and 1980s (Austria, Belgium, France, Germany, Greece, Luxembourg, The Netherlands and the UK); two allowed this regime in the 1990s (Iceland and Norway), and another in 2000 (Switzerland). Only two countries (Finland and Sweden) recognized unilateral divorce, the right to divorce at the request of either spouse.[4] As described previously in our empirical analysis, we categorize all these legal changes as *no-fault unilateral divorce*, because all reduce the value of marriage, regardless of the regime, and because the empirical literature does not distinguish between these types of reform, as in the case of US divorce law reforms.[5]

[4] See Table 1 for a complete compilation of countries and years of introduction of divorce law reforms.
[5] As a robustness check, we re-run the baseline analysis by including a dummy variable that controls for those countries introducing divorce for the first time during the period considered. Results for our variables of interest do not vary.

**Table 1.1- Data on the Year of Divorce Law Reforms, Year of Introduction of Cohabitation and Abortion laws, and the Pill**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Country | Year Divorce Allowed | No-Fault Unilateral | Cohabitation Law Changes | Abortion Law Changes (for cause) | Abortion Law Changes (on demand) | Pill Introduction |
| Austria | Pre-1950 | 1978 | - | - | 1974 | 1962 |
| Belgium | Pre-1950 | 1975 | 1998 | 1990 | - | 1961 |
| Denmark | Pre-1950 | 1970 | | 1970 | 1973 | 1966 |
| Finland | Pre-1950 | 1988 | | 1970 | - | 1962 |
| France | Pre-1950 | 1976 | 1999 | - | 1975 | 1967 |
| Germany | Pre-1950 | 1977 | | 1975 | 1995 | 1961 |
| Greece | Pre-1950 | 1979 | - | 1978 | 1986 | 1980 |
| Iceland | Pre-1950 | 1993 | 1990 | 1975 | - | 1962 |
| Ireland | 1997 | 1997 | - | - | - | 1976 |
| Italy | 1971 | 1975 | - | - | 1981 | 1968 |
| Luxembourg | Pre-1950 | 1976 | 2004 | 1978 | - | 1967 |
| The Netherlands | Pre-1950 | 1971 | 1998 | - | 1981 | 1962 |
| Norway | Pre-1950 | 1993 | | 1964 | 1978 | 1966 |
| Portugal | 1976 | 1976 | 1999 | 1984 | - | 1963 |
| Spain | 1981 | 1981 | 1987 | 1985 | - | 1964 |
| Sweden | Pre-1950 | 1974 | 1987 | - | 1974 | 1964 |
| Switzerland | Pre-1950 | 2000 | - | 1985 | - | 1961 |
| United Kingdom | Pre-1950 | 1971 | - | 1967 | - | 1970 |

Note: Column (1) shows the year in which divorce was first allowed in each country included in our analysis, and Column (2) shows the year of the first no-fault unilateral reform in divorce laws in those countries during the period under analysis (1960-2006). Column (3) shows the year of the introduction of cohabitation laws in each country during the period analysed. Column (4) shows the year of the introduction of abortion laws for cause in each country during the period analysed (1960-2006). Column (5) shows the year of the introduction of abortion-on-demand laws in each country during the period analysed (1960-2006). Column (6) shows the year of the introduction of the oral contraceptive pill in each country during the period analysed (1960-2006).

# 1.4 Results

## *1.4.1. Baseline Regression and Robustness Checks*

Table 1.2 reports the estimates for Equation (1.1). As can be seen in the first column, which includes country and year fixed effects, a change in divorce law is associated with a decline in the fertility rate. This is maintained even after adding country-specific linear and quadratic time trends in Columns (3) and (5), although the estimated coefficient on the divorce law reform increases (decreases in absolute value) by around 14% after including those controls in the specifications. This is presumably because, in these specifications, not only are we removing country fixed characteristics but also time-variant unobservable factors that could bias the results presented in Column (1).

To examine the impact of the liberalization of divorce laws, we also use an alternative strategy proposed by Wolfers (2006), which allows us to analyse the dynamic response of the fertility rate to the implementation of divorce law reforms. Table 1.2 also shows regressions for Equation (1.2) in Columns (2), (4) and (6). In all

these specifications, the dynamic estimates show a negative response of fertility following the adoption of no-fault unilateral divorce, and this effect does not fade over subsequent years. As in the previous case, the magnitude of the impact of divorce law reforms decreases in absolute value when quadratic trends are added.[6]

**Table 1.2- Baseline Regression: Static and Dynamic Effects of Divorce Law Reforms**
*(Dependent Variable: Total Fertility Rate)*

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| No Fault Unilateral | -0.262*** | | -0.236*** | | -0.225*** | |
| | (0.036) | | (0.028) | | (0.028) | |
| No Fault Unilateral 1-2 | | -0.179*** | | -0.167*** | | -0.166*** |
| | | (0.045) | | (0.034) | | (0.032) |
| No Fault Unilateral 3-4 | | -0.266*** | | -0.255*** | | -0.242*** |
| | | (0.048) | | (0.036) | | (0.036) |
| No Fault Unilateral 5-6 | | -0.332*** | | -0.325*** | | -0.297*** |
| | | (0.051) | | (0.039) | | (0.041) |
| No Fault Unilateral 7-8 | | -0.407*** | | -0.406*** | | -0.356*** |
| | | (0.056) | | (0.043) | | (0.048) |
| No Fault Unilateral 9-10 | | -0.403*** | | -0.411*** | | -0.331*** |
| | | (0.059) | | (0.047) | | (0.054) |
| No Fault Unilateral 11-12 | | -0.409*** | | -0.438*** | | -0.329*** |
| | | (0.063) | | (0.051) | | (0.060) |
| No Fault Unilateral 13-14 | | -0.406*** | | -0.447*** | | -0.311*** |
| | | (0.066) | | (0.054) | | (0.065) |
| No Fault Unilateral >15 | | -0.359*** | | -0.444*** | | -0.225*** |
| | | (0.067) | | (0.059) | | (0.075) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*time | No | No | Yes | Yes | Yes | Yes |
| Country*time$^2$ | No | No | No | No | Yes | Yes |
| Observations | 846 | 846 | 846 | 846 | 846 | 846 |
| R-squared | 0.865 | 0.869 | 0.925 | 0.929 | 0.943 | 0.946 |

Note: Sample: 1960–2006 (balanced panel). Estimated using country population weights. The countries considered in the analysis are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. Standard errors in parentheses. ***Statistical significance at 1%. **Statistical significance at 5%.* Statistical significance at 10% level.

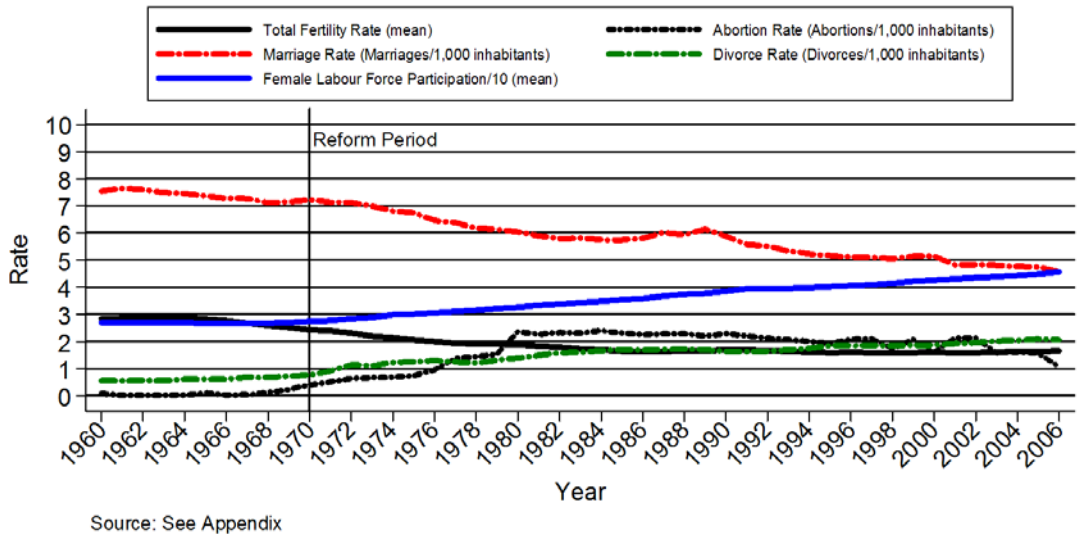
To reinforce the consistency of previous results, we run several robustness checks. We study whether our findings are driven by omitted economic and demographic variables. The impact of these variables correlated with the outcome of interest, if omitted, would be captured by the coefficients measuring the effect of divorce law reforms. To tackle this issue, we add controls to our baseline regression for several standard determinants of TFR that could explain the drop in our outcome of interest (see Tables 1.3 and 1.4).

The first variable considered is Female Labour Force Participation (FLFP), with data from the OECD (see Appendix). The relationship between the FLFP and the TFR has been extensively analyzed in the economic literature, establishing a negative

[6] From this point, all the estimates presented include country-specific linear and quadratic time trends. Results not including trends, or including only the linear trend, are similar to those presented in the article.

relationship between them (Mishra and Smyth 2010). Then, it is arguable that the increase in FLFP that occurred since the mid-1960s (see Figure 1.3) could cause the decline in the TFR, although other papers suggest that it was the drop in the TFR that instigated the rise in FLFP (Bloom et al. 2009). Despite the endogeneity concerns that the introduction of this variable may generate, its inclusion in Column (2) of Table 1.3 does not change the estimated coefficients of the impact of divorce law reforms. The striking feature is that the coefficient picking up the FLFP effect is not significant. This could be due to the fact that this coefficient may not be fully capturing the relationship between both variables. Ahn and Mira (2002) suggested that the relationship between FLFP and the Fertility Rate is not linear, but U-shaped.[7] To examine this issue, we have also included a quadratic term for FLFP in Column (2) of Table 1.4. In this case, the coefficients picking up the effect of FLFP on the TFR are significant, pointing to a quadratic relationship between them. With respect to the effect of divorce reforms, results do not change.

Figure 1.3:
Births, Abortions, Marriages, FLFP, and Divorces
Europe 1960-2006




Source: See Appendix

[7] Other papers, such as Kogel (2004), do not find a positive correlation between fertility and female employment. They simply present evidence of a reduction in the negative association between them since the mid-1980s.

**Table 1.3- Robustness Check: Static and Dynamic Effects of Divorce Law Reforms**

*(Dependent Variable: Total Fertility Rate)*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| No Fault Unilateral 1-2 | -0.166*** | -0.165*** | -0.200*** | -0.192*** | -0.170*** | -0.166*** | -0.170*** | -0.137*** | -0.163*** | -0.172*** |
| | (0.032) | (0.032) | (0.031) | (0.030) | (0.032) | (0.032) | (0.032) | (0.030) | (0.032) | (0.031) |
| No Fault Unilateral 3-4 | -0.242*** | -0.243*** | -0.289*** | -0.251*** | -0.249*** | -0.242*** | -0.250*** | -0.214*** | -0.253*** | -0.248*** |
| | (0.036) | (0.036) | (0.035) | (0.034) | (0.036) | (0.036) | (0.036) | (0.034) | (0.036) | (0.034) |
| No Fault Unilateral 5-6 | -0.297*** | -0.298*** | -0.355*** | -0.303*** | -0.304*** | -0.297*** | -0.305*** | -0.254*** | -0.308*** | -0.305*** |
| | (0.041) | (0.042) | (0.040) | (0.039) | (0.042) | (0.042) | (0.042) | (0.039) | (0.041) | (0.039) |
| No Fault Unilateral 7-8 | -0.356*** | -0.358*** | -0.416*** | -0.359*** | -0.369*** | -0.356*** | -0.371*** | -0.331*** | -0.372*** | -0.378*** |
| | (0.048) | (0.048) | (0.045) | (0.045) | (0.048) | (0.048) | (0.048) | (0.044) | (0.048) | (0.045) |
| No Fault Unilateral 9-10 | -0.331*** | -0.335*** | -0.378*** | -0.340*** | -0.344*** | -0.332*** | -0.347*** | -0.324*** | -0.346*** | -0.361*** |
| | (0.054) | (0.054) | (0.051) | (0.050) | (0.054) | (0.054) | (0.055) | (0.050) | (0.054) | (0.051) |
| No Fault Unilateral 11-12 | -0.329*** | -0.333*** | -0.364*** | -0.345*** | -0.341*** | -0.329*** | -0.344*** | -0.303*** | -0.341*** | -0.353*** |
| | (0.060) | (0.060) | (0.057) | (0.056) | (0.060) | (0.060) | (0.061) | (0.056) | (0.060) | (0.057) |
| No Fault Unilateral 13-14 | -0.311*** | -0.317*** | -0.335*** | -0.329*** | -0.331*** | -0.312*** | -0.334*** | -0.257*** | -0.317*** | -0.333*** |
| | (0.065) | (0.066) | (0.062) | (0.061) | (0.066) | (0.065) | (0.067) | (0.061) | (0.065) | (0.062) |
| No Fault Unilateral >15 | -0.225*** | -0.238*** | -0.218*** | -0.270*** | -0.254*** | -0.226*** | -0.260*** | -0.208*** | -0.224*** | -0.260*** |
| | (0.075) | (0.076) | (0.070) | (0.070) | (0.077) | (0.075) | (0.077) | (0.069) | (0.074) | (0.071) |
| Control 1 | | 0.003 | 0.009*** | -0.046*** | 0.021 | -0.0004 | 0.024* | -0.035*** | 0.091*** | 0.092*** |
| | | (0.004) | (0.001) | (0.005) | (0.013) | (0.003) | (0.014) | (0.003) | (0.031) | (0.010) |
| Control 2 | | | | | | | -0.002 | | | |
| | | | | | | | (0.003) | | | |
| Observations | 846 | 846 | 846 | 846 | 846 | 846 | 846 | 846 | 846 | 846 |
| R-squared | 0.946 | 0.946 | 0.952 | 0.952 | 0.946 | 0.946 | 0.946 | 0.953 | 0.946 | 0.951 |

Note: Sample: 1960–2006 (balanced panel). Column (1) shows our baseline estimate. Column (2) includes a control for the Female Labour Force Participation. Column (3) includes a control for the Female Gross Enrolment Ratio. Column (4) includes a control for the infant mortality. Column (5) includes a control for the per Capita GDP in thousands. Column (6) includes a control for the percentage of women in each national Parliament. Column (7) includes a control for both the per Capita GDP (Control 1) and the percentage of women in Parliament (Control 2), simultaneously. Column (8) includes a control for the unemployment rate, as percentage of the civilian labour force. Column (9) includes a control for the crude divorce rate. Column (10) includes a control for the crude marriage rate. Estimated using country population weights. Standard errors in parentheses. ***Statistical significance at 1%. **Statistical significance at 5%. * Statistical significance at 10% level. In all specifications are included: Year FE, Country FE, Country*Time and Country*Time2.

**Table 1.3- Robustness Check: Static and Dynamic Effects of Divorce Law Reforms Including Variables of Family Policies**

*(Dependent Variable: Total Fertility Rate)*

| | (1) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) |
|---|---|---|---|---|---|---|---|---|---|---|
| No Fault Unilateral 1-2 | -0.166*** | -0.166*** | -0.171*** | -0.128*** | -0.177*** | -0.166*** | -0.164*** | -0.234*** | -0.063*** | -0.062*** |
| | (0.033) | (0.033) | (0.034) | (0.034) | (0.033) | (0.033) | (0.033) | (0.032) | (0.023) | (0.023) |
| No Fault Unilateral 3-4 | -0.242*** | -0.241*** | -0.247*** | -0.198*** | -0.251*** | -0.238*** | -0.239*** | -0.336*** | -0.130*** | -0.130*** |
| | (0.037) | (0.037) | (0.038) | (0.038) | (0.037) | (0.037) | (0.037) | (0.037) | (0.029) | (0.029) |
| No Fault Unilateral 5-6 | -0.296*** | -0.292*** | -0.299*** | -0.257*** | -0.303*** | -0.293*** | -0.291*** | -0.410*** | -0.191*** | -0.191*** |
| | (0.043) | (0.043) | (0.043) | (0.043) | (0.042) | (0.043) | (0.043) | (0.043) | (0.034) | (0.034) |
| No Fault Unilateral 7-8 | -0.356*** | -0.350*** | -0.359*** | -0.321*** | -0.361*** | -0.350*** | -0.348*** | -0.495*** | -0.264*** | -0.265*** |
| | (0.049) | (0.049) | (0.049) | (0.049) | (0.049) | (0.049) | (0.049) | (0.050) | (0.041) | (0.041) |
| No Fault Unilateral 9-10 | -0.330*** | -0.320*** | -0.335*** | -0.294*** | -0.343*** | -0.318*** | -0.318*** | -0.483*** | -0.269*** | -0.273*** |
| | (0.056) | (0.055) | (0.056) | (0.055) | (0.055) | (0.055) | (0.055) | (0.056) | (0.046) | (0.046) |
| No Fault Unilateral 11-12 | -0.328*** | -0.315*** | -0.334*** | -0.290*** | -0.345*** | -0.314*** | -0.314*** | -0.491*** | -0.299*** | -0.302*** |
| | (0.062) | (0.062) | (0.062) | (0.061) | (0.061) | (0.062) | (0.062) | (0.063) | (0.051) | (0.051) |
| No Fault Unilateral 13-14 | -0.310*** | -0.295*** | -0.317*** | -0.266*** | -0.325*** | -0.293*** | -0.293*** | -0.478*** | -0.314*** | -0.319*** |
| | (0.068) | (0.067) | (0.068) | (0.067) | (0.067) | (0.068) | (0.067) | (0.069) | (0.056) | (0.056) |
| No Fault Unilateral >15 | -0.223*** | -0.206*** | -0.232*** | -0.180** | -0.232*** | -0.200*** | -0.201*** | -0.422*** | -0.323*** | -0.330*** |
| | (0.077) | (0.077) | (0.078) | (0.076) | (0.076) | (0.077) | (0.077) | (0.079) | (0.063) | (0.063) |
| Control 1 | | -0.008*** | -0.001 | -0.001*** | 0.003*** | 0.002*** | 0.005*** | 0.003 | 0.0001 | 0.003 |
| | | (0.003) | (0.001) | (0.0003) | (0.001) | (0.001) | (0.002) | (0.002) | (0.0001) | (0.002) |
| Control 2 | | | | | | | | -0.005* | | |
| | | | | | | | | (0.003) | | |
| Control 3 | | | | | | | | 0.0003** | | |
| | | | | | | | | (0.001) | | |
| Observations | 799 | 799 | 799 | 799 | 799 | 799 | 799 | 759 | 587 | 587 |
| R-squared | 0.946 | 0.946 | 0.946 | 0.948 | 0.947 | 0.946 | 0.946 | 0.953 | 0.961 | 0.961 |

Notes: Each monetary value in this table is expressed in constant euros of 2005. Column (1) shows our baseline estimate. Column (11) includes a control for the total number of weeks of maternity leave. Column (12) includes a control for the cash benefits paid during maternity leave, as percentage of female wages in manufacture. Column (13) includes a control for the total number of weeks of parental leave. Column (14) includes a control for the cash benefits paid during parental leave, as percentage of female wages in manufacture. Column (15) includes a control for the total number of weeks of childcare leave. Column (16) includes a control for the cash benefits paid during childcare leave, as percentage of female wages in manufacture. Column (17) includes monthly family allowances for the first (Control 1), second (Control 2) and third child (Control 3, assuming a three-child family). Column (18) includes a control for the value of tax and benefit transfers of one-earner-two-parent two-child families (value calculated by subtracting the disposable income, after taxes and transfers, of a one-earner-two-parent-two-child family from that of a comparable childless single earner). Column (19) includes a control for the previous variable, but divided by the average gross earnings of a production worker. Estimated using country population weights. Standard errors in parentheses. ***Statistical significance at 1%. **Statistical significance at 5%. * Statistical significance at 10% level. In all specifications are included: Year FE, Country FE, Country*Time and Country*Time$^2$.

**Table 1.4- Robustness Check: Static and Dynamic Effects of Divorce Law Reforms**

*(Dependent Variable: Total Fertility Rate)*

| Controls: | (1) | (2) FLFP | (3) Education: GER | (4) % Infant Mortality | (5) Per Capita GDP | (6) % Women in Parliament | (7) Unemployment Rate | (8) Divorce Rate | (9) Marriage Rate |
|---|---|---|---|---|---|---|---|---|---|
| No Fault Unilateral 1-2 | -0.166*** | -0.145*** | -0.219*** | -0.180*** | -0.121*** | -0.149*** | -0.119*** | -0.108*** | -0.157*** |
| | (0.032) | (0.032) | (0.030) | (0.030) | (0.032) | (0.032) | (0.030) | (0.031) | (0.030) |
| No Fault Unilateral 3-4 | -0.242*** | -0.205*** | -0.315*** | -0.237*** | -0.181*** | -0.214*** | -0.174*** | -0.138*** | -0.247*** |
| | (0.036) | (0.036) | (0.035) | (0.033) | (0.036) | (0.036) | (0.034) | (0.036) | (0.034) |
| No Fault Unilateral 5-6 | -0.297*** | -0.244*** | -0.385*** | -0.284*** | -0.218*** | -0.256*** | -0.213*** | -0.203*** | -0.312*** |
| | (0.041) | (0.042) | (0.040) | (0.038) | (0.042) | (0.042) | (0.039) | (0.040) | (0.039) |
| No Fault Unilateral 7-8 | -0.356*** | -0.289*** | -0.452*** | -0.338*** | -0.269*** | -0.304*** | -0.287*** | -0.272*** | -0.395*** |
| | (0.048) | (0.049) | (0.046) | (0.044) | (0.048) | (0.048) | (0.045) | (0.046) | (0.045) |
| No Fault Unilateral 9-10 | -0.331*** | -0.255*** | -0.423*** | -0.315*** | -0.229*** | -0.272*** | -0.288*** | -0.248*** | -0.381*** |
| | (0.054) | (0.055) | (0.051) | (0.050) | (0.054) | (0.054) | (0.050) | (0.052) | (0.051) |
| No Fault Unilateral 11-12 | -0.329*** | -0.240*** | -0.415*** | -0.317*** | -0.219*** | -0.265*** | -0.270*** | -0.257*** | -0.378*** |
| | (0.060) | (0.062) | (0.057) | (0.055) | (0.060) | (0.061) | (0.055) | (0.057) | (0.056) |
| No Fault Unilateral 13-14 | -0.311*** | -0.221*** | -0.392*** | -0.300*** | -0.200*** | -0.240*** | -0.198*** | -0.216*** | -0.364*** |
| | (0.065) | (0.067) | (0.062) | (0.060) | (0.066) | (0.066) | (0.061) | (0.062) | (0.061) |
| No Fault Unilateral >15 | -0.225*** | -0.164** | -0.286*** | -0.236*** | -0.122 | -0.161** | -0.172** | -0.139** | -0.303*** |
| | (0.075) | (0.076) | (0.071) | (0.069) | (0.076) | (0.075) | (0.069) | (0.070) | (0.070) |
| Control | | -0.072*** | 0.016*** | -0.022*** | 0.228*** | -0.021*** | 0.003 | -0.609*** | 0.381*** |
| | | (0.015) | (0.002) | (0.006) | (0.030) | (0.005) | (0.008) | (0.077) | (0.057) |
| Control Square/100 | | 0.118*** | -0.006*** | -0.044*** | -0.533*** | 0.063*** | -0.153*** | 18.926*** | -1.958*** |
| | | (0.023) | (0.001) | (0.008) | (0.069) | (0.013) | (0.030) | (1.921) | (0.382) |
| Observations | 846 | 846 | 846 | 846 | 846 | 846 | 846 | 846 | 846 |
| R-squared | 0.946 | 0.948 | 0.953 | 0.954 | 0.950 | 0.948 | 0.955 | 0.953 | 0.953 |

Note: Sample: 1960–2006 (balanced panel). Estimated using country population weights. Standard errors in parentheses. ***Statistical significance at 1%. **Statistical significance at 5%. * Statistical significance at 10% level. In all specifications are included: Year FE, Country FE, Country*Time and Country*Time2.

The fall in the TFR can also be attributed to the rise of female schooling in the European countries considered (Leon 2004). Female education can lower fertility by way of an increase in the opportunity cost of women's time (Barro and Becker 1988; Willis 1973), or by increasing the age at marriage (Breierova and Duflo 2004), which can delay births and so lower the level of completed fertility (Kalwij 2000). To capture the impact of female education, we introduce the Female Gross Enrolment Ratio constructed by UNESCO (see Appendix) in Column (3) of Table 1.3. Results on the effect of divorce law reforms do not change, even after the inclusion of a quadratic term for female education in Column (3) of Table 1.4.[8]

The decline in the infant mortality rate could also contribute to the decline of the TFR. The lower the infant mortality, the fewer children need to be replaced. On the other hand, falling mortality rates lower the cost of having a surviving child, and for this reason fertility should increase as mortality declines (Sah 1991). We incorporate in our analysis the ratio of the number of deaths of children under 1 year old during the year, to the number of live births in that year, using data from Eurostat. After adding this variable, the dynamic response of the TFR to the introduction of the new divorce regimes is quite similar (Column (4) in Tables 1.3, linear relationship, and 1.4, quadratic relationship).

Per capita GDP has also been included as a control in Column (5) of Table 1.3 and Table 1.4 (with a quadratic term), since several studies have found that fertility has fallen in economic expansions and risen during contractions (Hazan and Berdugo 2002).[9] Results are unchanged to the introduction of per capita GDP. Unstable employment and unemployment may also influence the variation in the TFR by increasing uncertainty about future wages, which may encourage women to postpone (or even abandon) childbearing (Ahn and Mira 2001; Doiron and Mendolia 2011).[10] Column (8) of Table 1.3 and Column (7) of Table 1.4 (adding the quadratic term) show the estimated effect of the unemployment rate on the TFR, with the expected negative sign. Our coefficients of interest are not sensitive to its inclusion in the model.[11]

[8] Results are also quite robust to the use of other measures of female education provided by UNESCO, which allow us to consider separately the Gross Enrolment Ratio by level of education (secondary and tertiary) and the introduction of the Total Gross Enrolment Ratio (male and female education).

[9] Per capita GDP can also be considered as a proxy of the increase in female and male earnings, which are also expected to affect fertility (Galor and Weil 1996; Ward and Butz 1980).

[10] Although we have not included a control for male employment, which is another potential determinant of fertility (Ahn and Mira 2001), the introduction of the unemployment rate may be partly capturing the importance of both female and male employment.

[11] The youth unemployment rate and the large number of temporary contracts may also have an important effect on the drop in the fertility rate by increasing uncertainty regarding future careers and earnings, as well as by lowering

Other public policies can account for a sizable fraction of the fluctuation in the TFR (see, for example, Acs 1996; Dickert-Conlin and Chandra 1999; Lalive and Zweimüller 2009; Manuelli and Seshadri 2009; Milligan 2005; Whittington et al. 1990). This is relevant to our analysis, since improvements in family policies may raise the level of fertility (Björklund 2006), compensating for the impact of divorce law reforms. Thus, we include a wide range of controls for family policies in columns (11) to (19) of Table 1.3, including the total number of weeks of maternity, parental and childcare leave; cash benefits during leave; the monthly family allowances for the first, second and third child; the value of transfers to a family type; and an index of direct and indirect cash benefits (variables properly defined in the Appendix). We observe that the negative and statistically significant effect of divorce law reforms on fertility is maintained in all cases. In addition, and recognizing the importance of these family policies as fertility determinants, we include two different proxies for the effect of public policies. First, we use per capita GDP, since the greater the GDP, the more family policies may be implemented. As shown before, this does not affect our estimates. Another possibility is the use of data on women in parliament, since female legislators are more likely to place priority on women's, children's and family issues (Chattopadhyay and Duflo 2004). We then introduce the percentage of women in each national parliament on the total of seats in the parliament, using data from the Inter- Parliamentary Union, in Columns (6) and (7) (adding the per capita GDP) of Table 1.3 and in Column (6) of Table 1.4 (with the quadratic term). Our results are robust to the inclusion of all these controls.

The marriage rate is another variable considered to be one of the principal determinants of fertility (Bongaarts 1978). The lower the marriage rate, the lower the marital fertility. Since children are a marital-specific investment (Becker et al. 1977; Stevenson 2007), we would expect that the decline in the marriage rate, which can be seen in Figure 1.3, leads to a drop in the TFR. Following this argument, we can justify the introduction of the divorce rate, since the greater the divorce rate, the lower the marital fertility. Again, our results do not vary substantially, even after adding quadratic terms for all these regressors (see Tables 1.3 and 1.4). Similarly, changes in cohabitation decisions can also affect the fertility behaviour of women. To examine this issue, we incorporate in our analysis changes in cohabitation laws that were approved

current income for young men and women. But, because of the scarcity of the data, which are only available since the 1980s, we cannot add these as regressors. We have a similar problem with the fluctuations of the price of housing. We would expect that these effects can be captured by the controls for fixed and trending unobserved factors at the country level, incorporated in the analysis.

during recent decades in several European countries to increase protections for cohabiting couples (see column (3) of Table 1.1). The introduction of these laws took place several years (in certain cases, decades) after the introduction of divorce law reforms. Then, the permanent impact of divorce law reforms on fertility observed in our baseline estimates may be capturing the effect of both cohabitation laws and divorce law reforms. Results are presented in Column (2) of Table 1.5. Column (1) shows our baseline regression to facilitate the comparison. Our findings do not change.

**Table 1.5-Total Fertility Rate: Dynamic Effects of Divorce Law Reforms including Cohabitation Laws, Abortion Law Reforms and Oral Contraception**
*(Dependent Variable: Total Fertility Rate)*

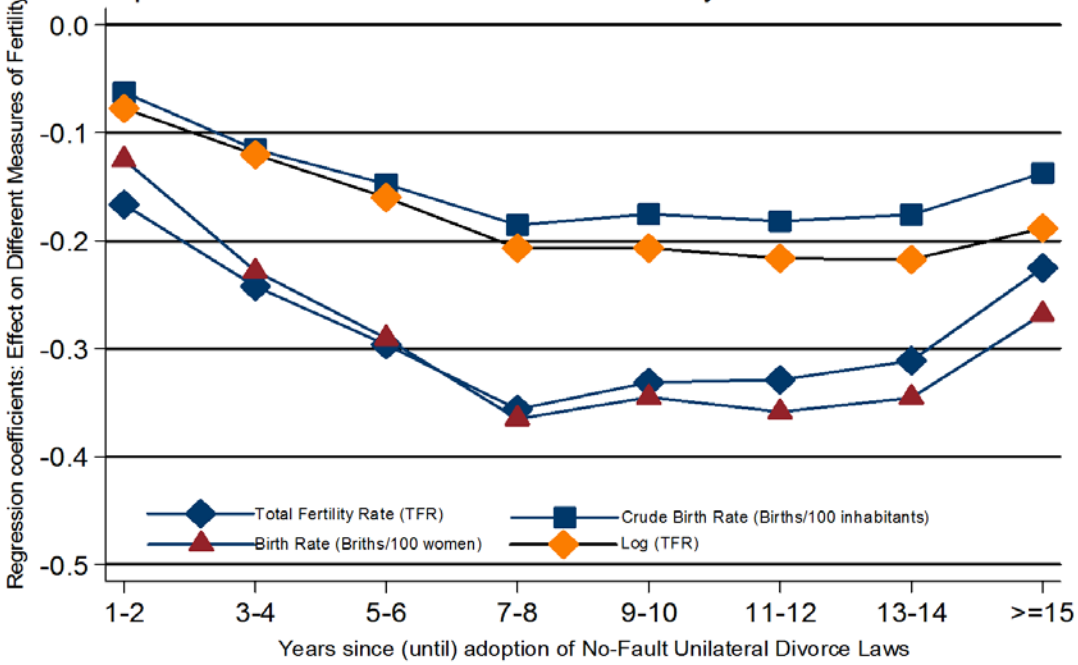
| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| No Fault Unilateral 1-2 | -0.166*** | -0.144*** | -0.160*** | -0.204*** |
| | (0.032) | (0.032) | (0.031) | (0.032) |
| No Fault Unilateral 3-4 | -0.242*** | -0.211*** | -0.265*** | -0.305*** |
| | (0.036) | (0.036) | (0.035) | (0.036) |
| No Fault Unilateral 5-6 | -0.297*** | -0.255*** | -0.334*** | -0.377*** |
| | (0.041) | (0.041) | (0.041) | (0.042) |
| No Fault Unilateral 7-8 | -0.356*** | -0.307*** | -0.377*** | -0.447*** |
| | (0.048) | (0.048) | (0.048) | (0.048) |
| No Fault Unilateral 9-10 | -0.331*** | -0.280*** | -0.394*** | -0.424*** |
| | (0.054) | (0.054) | (0.054) | (0.054) |
| No Fault Unilateral 11-12 | -0.329*** | -0.271*** | -0.474*** | -0.414*** |
| | (0.060) | (0.060) | (0.060) | (0.060) |
| No Fault Unilateral 13-14 | -0.311*** | -0.244*** | -0.504*** | -0.386*** |
| | (0.065) | (0.065) | (0.065) | (0.065) |
| No Fault Unilateral >15 | -0.225*** | -0.167** | -0.438*** | -0.289*** |
| | (0.075) | (0.075) | (0.072) | (0.073) |
| Year FE | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes |
| Country*time | Yes | Yes | Yes | Yes |
| Country*time$^2$ | Yes | Yes | Yes | Yes |
| Observations | 846 | 846 | 846 | 846 |
| R-squared | 0.943 | 0.949 | 0.958 | 0.950 |

Note: Sample: 1960–2006 (balanced panel). Estimated using country population weights. Column (1) shows our baseline estimates. Columns (2), (3) and (4) show results after including the dynamic effect of the introduction of cohabitation laws, the liberalization of abortion laws on demand and for cause, and the introduction of the pill, respectively. Standard errors in parentheses. ***Statistical significance at 1%. **Statistical significance at 5%.* Statistical significance at 10% level.

To check whether our results are sensitive to the measure of fertility used in the previous analysis, we run simple robustness checks. We use four additional common measures of fertility as dependent variables: the Crude Birth Rate, defined as the annual number of births per 100 inhabitants; the Birth Rate, measured as the annual number of births per 100 women; the Log(TFR), which is the TFR in logarithm; and the Completed Fertility Rate, which is the average number of children born to a cohort of women up to the end of their childbearing age, from the cohort´s beginning of exposure to risk (at age 15) until the age when all members of the cohort have reached the end of

the reproductive period (at age 49).[12] Results for the first three dependent variables are presented in Figure 1.4, which shows that, although the magnitude of the impact varies a little, the behaviour of the impact is quite similar. The growing negative impact of the reforms stabilizes after 7-8 years of the adoption of no-fault unilateral divorce laws, and 13-14 years after the reforms, the negative and significant effect is smoothed. Meanwhile, in order to use the Completed Fertility Rate as dependent variable, we must re-define our variables of interest, which in this case are defined as the number of years that each cohort of women lives under the new divorce laws. Data on the Completed Fertility Rate was obtained from two different sources.[13] As expected, results show that the cohorts of women who spend more years under the new divorce laws experience greater declines in their completed fertility rate (see Table 1.6). This result is in line with previous results using the TFR as dependent variable. This is not surprising, since certain papers have pointed to the close relationship between the TFR and the Completed Fertility Rate (Bongaarts 2002).

Figure 1.4:
Response of Different Measures of Fertility to Divorce Law Reforms




[12] Since women are mainly the ones who decide to have children, we also use the Birth Rate, whose denominator is the total number of women.

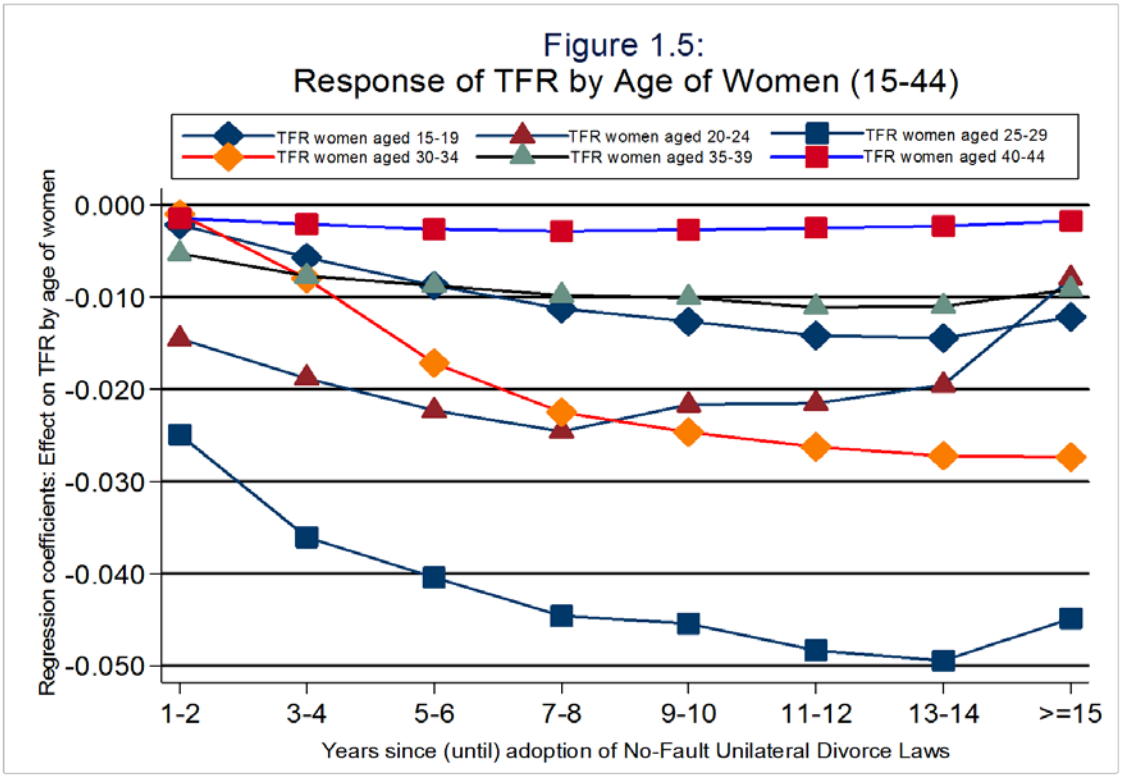
[13] Data come from the Council of Europe (1940 to 1944 and 1961 to 1970), and are computed by the author using data from Eurostat and from the UN Demographic Yearbooks (several issues) for years 1945 to 1960. Then, we have the Completed Fertility Rate of those women who were born from 1940 to 1970.

**Table 1.6- Static and Dynamic Effects of Divorce Law Reforms**
*(Dependent Variable: Completed Fertility Rate)*

| | (1) | (2) |
|---|---|---|
| No Fault Unilateral | -0.156** | |
| | (0.072) | |
| No Fault Unilateral 1-2 | | -0.204** |
| | | (0.082) |
| No Fault Unilateral 3-4 | | -0.239*** |
| | | (0.092) |
| No Fault Unilateral 5-6 | | -0.324*** |
| | | (0.103) |
| No Fault Unilateral 7-8 | | -0.395*** |
| | | (0.115) |
| No Fault Unilateral 9-10 | | -0.417*** |
| | | (0.126) |
| No Fault Unilateral 11-12 | | -0.491*** |
| | | (0.142) |
| No Fault Unilateral 13-14 | | -0.513*** |
| | | (0.152) |
| No Fault Unilateral >15 | | -0.574*** |
| | | (0.160) |
| Year FE | Yes | Yes |
| Country FE | Yes | Yes |
| Country*time | Yes | Yes |
| Country*time$^2$ | Yes | Yes |
| Observations | 434 | 434 |
| R-squared | 0.932 | 0.934 |

Note: Sample consists of cohorts of women who were born between 1940 and 1970 (balanced panel). In this case, our variables of interest are defined as the number of years that each cohort of women lives under the new divorce laws. The sample does not include data for Germany, United Kingdom, Sweden, and Spain, due to the lack of data. For this reason, the sample is formed by the remaining fourteen countries. Data on the Completed Fertility Rate come from the Council of Europe (cohorts 1940 to 1944 and 1961 to 1970) and the Eurostat and the UN Demographic Yearbooks (data on live births and total number of women born in each cohort, cohorts 1945 to 1960). Estimated using country population weights. Standard errors in parentheses. ***Statistical significance at 1%. **Statistical significance at 5%.* Statistical significance at 10% level.

Finally, we have also used as a dependent variable the fertility rate by age of women, to test whether we are capturing the behaviour of a specific group of women. As an increase in women's education may decrease the fertility rate of younger women, one can argue that we are capturing the decrease in the TFR of those women who spend more years in education, rather than the entire response to divorce law reforms. Figure 1.5 presents the response of the TFR for women aged 15 to 19, 20 to 24, 25 to 29, 30 to 34, 35 to 39, and 40 to 44. All coefficients are negative, indicating that the TFR decreases regardless of the age of the women. However, there are slight differences; the greater impact is observed for those women aged 25 to 29, suggesting that women delayed their births, or that they do not have children at all.




### *1.4.2. Is it divorce law, or is it the liberalization of abortion laws?*

While reforms in laws of divorce were introduced throughout Europe, all but one country (Ireland) established new abortion laws that overturned prior legislation. Eight of the eighteen countries permitted only abortion for cause since the mid-1960s (see Table 1.1). Under this regime, the reasons for allowing abortion include: rape, incest, severe foetal abnormality, and physical and mental health problems of the mother. Five countries adopted abortion on demand, that is, without restrictions, although gestation limits (i.e. first trimester, or until viability) were established in most countries. The remaining four countries passed both regimes during the period analysed. Abortion laws were classified using Brooks (1992), Henshaw and Morrow (1990), and information from the United Nations Population Division (2003).

These reforms lowered the cost of abortion, which of course could have an effect on fertility (Ananat et al. 2007). Women could now abort pregnancies that would have resulted in unwanted births. Another concern is that the effect of abortion reforms may be confounded with the impact of divorce law reforms. To tackle this issue, we use the variation in the timing of abortion reforms to capture their effect on the TFR (see a similar strategy in, for example, Ananat et al. 2007; Donohue and Levitt 2001). We

introduce as explanatory variables dummies to control for the years since abortion laws by grounds (on demand or by cause) were adopted.[14]

Results are shown in Table 1.5. Column (1) includes the estimates of the main specification, and Column (3) shows the response of the TFR to the divorce law reforms, after adding controls for abortion law reform. As can be seen, even after adding controls for abortion, divorce law reforms negatively impact the TFR.

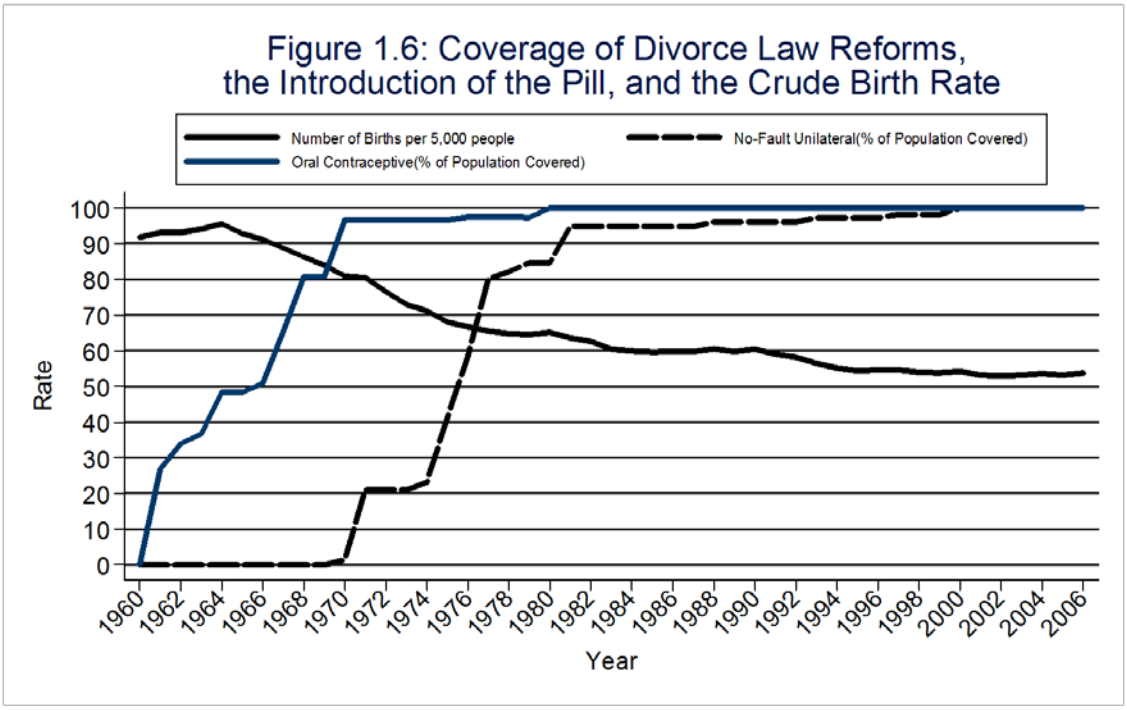
### *1.4.3. Is it divorce law, or is it the Pill?*

Another important phenomenon that began in the 1960s was the emergence of the oral contraceptive, better known as *The Pill*. It gave women the opportunity to safely decide when to have children and allowed the separation between sexual activity and procreation (Goldin and Katz 2000, 2002). This is important in our analysis, since one may surmise that it was the use of the pill that caused the drop in the number of births in Europe. Several papers have pointed to the access to the Pill as an important determinant of the decline in post-1960 US fertility (Bailey 2006, 2009, 2010).

In the case of Europe, as can be seen in Figure 1.6, when the population with access to the Pill reached almost 50%, the Crude Birth Rate began to decrease. Note that, in Figure 1.6, we use information on the year in which the pill was first authorised but, in some countries (such as Spain and Ireland), it was not prescribed as a contraceptive until the late 1970s; its use was restricted to regulation of the menses.[15] The information on the year in which the Pill was available was compiled by the author from each National Agency for the Regulation of Medicines, and from the International Planned Parenthood Federation (IPPF) (see Table 1.1). To our knowledge, there is no prior research using this kind of information for all the European countries considered in this analysis.

[14] We have not incorporated in our analysis other methods that offer women a safe and effective alternative to the surgical abortion, such as mifepristone or RU-486, licensed in most European countries since the late 1980s, inasmuch as, despite the widespread introduction of this drug, women's access to and the use of this technology remains limited by the abortion legislation (see Entre Nous 2005).

[15] We have also run the analysis using information on the year in which the Pill was allowed as a contraceptive. Results are quite similar.




To capture the effect of the Pill, we use a similar methodology to that utilized for the case of divorce law reforms, and for the abortion laws.[16] In our work, we add to the main specification dummies to control for the years since the Pill was available. Table 1.5 reports the results. Column (1) includes the baseline and Column (4) shows the dynamic response of the TFR to divorce law reforms, after controlling for the access to the Pill. Once again, our results on the TFR's reaction to divorce law reforms are not significantly affected.

Finally, Table 1.7 presents the results of the main specification in Column (1), and the estimates after adding all controls that are available for the 18 countries in our analysis in Column (2).[17] Although the magnitude of the negative effect diminishes after adding all controls, we still find that divorce law reforms had a negative and significant effect on the TFR, and that this effect is lasting. After this analysis, we are confident that we are capturing the effect of divorce law reforms, rather than other observed or unobserved factors, or other reforms that directly affect family planning.[18]

[16] An alternative strategy could be the use of data on the use or sales of the Pill, but this is not possible since this information is quite scarce.
[17] We introduce as controls economic and demographic variables, data for cohabitation and abortion laws, and data for the introduction of the pill. Data on family policies are not included since there are no data available for Iceland. However, we re-estimate this regression including also data for family policies, available from 1960 to 2006, and results are quite similar.
[18] Of course, these estimates should be treated with a certain caution, since we have included some variables that may generate endogeneity concerns.

**Table 1.7-Total Fertility Rate: Dynamic Effects of Divorce Law Reforms With All Controls**
*(Dependent Variable: Total Fertility Rate)*

| | (1) | (2) |
|---|---|---|
| No Fault Unilateral 1-2 | -0.166*** | -0.081*** |
| | (0.032) | (0.024) |
| No Fault Unilateral 3-4 | -0.242*** | -0.102*** |
| | (0.036) | (0.030) |
| No Fault Unilateral 5-6 | -0.297*** | -0.135*** |
| | (0.041) | (0.034) |
| No Fault Unilateral 7-8 | -0.356*** | -0.183*** |
| | (0.048) | (0.039) |
| No Fault Unilateral 9-10 | -0.331*** | -0.176*** |
| | (0.054) | (0.044) |
| No Fault Unilateral 11-12 | -0.329*** | -0.186*** |
| | (0.060) | (0.049) |
| No Fault Unilateral 13-14 | -0.311*** | -0.135** |
| | (0.065) | (0.055) |
| No Fault Unilateral >15 | -0.225*** | -0.102* |
| | (0.075) | (0.061) |
| Year FE | Yes | Yes |
| Country FE | Yes | Yes |
| Country*time | Yes | Yes |
| Country*time$^2$ | Yes | Yes |
| Observations | 846 | 846 |
| R-squared | 0.943 | 0.980 |

Note: Sample: 1960–2006 (balanced panel). Estimated using country population weights. Standard errors in parentheses. ***Statistical significance at 1%. **Statistical significance at 5%.* Statistical significance at 10% level. Adding all controls.

# 1.5 How do divorce laws operate through marital and non-marital fertility?

## *1.5.1 Fertility by marital status*

Up to this point, we have empirically studied the impact of divorce law reforms on the TFR. In this section, we explore the mechanisms through which these reforms affect fertility. To address this issue, we would have liked to have information on what motivates fertility behaviour, but this is not available for all countries analysed, in the period covered. Instead, we examine whether fertility's response to divorce law reforms differs depending on the marital status of individuals. This is also an interesting issue since, as explained above, it has been suggested that these legal reforms affect marital and non-marital fertility in different ways.

**Table 1.8-Marital Birth Rate, Non-Marital Birth Rate and Illegitimacy Ratio: How Does Divorce Law Reforms Operate Through Marital Status?**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| No Fault Unilateral | -0.422*** | | -0.048* | | -0.052 | |
| | (0.088) | | (0.025) | | (0.036) | |
| No Fault Unilateral 1-2 | | -0.235** | | -0.079*** | | -0.104** |
| | | (0.103) | | (0.028) | | (0.041) |
| No Fault Unilateral 3-4 | | -0.436*** | | -0.138*** | | -0.161*** |
| | | (0.116) | | (0.032) | | (0.047) |
| No Fault Unilateral 5-6 | | -0.535*** | | -0.204*** | | -0.230*** |
| | | (0.132) | | (0.036) | | (0.053) |
| No Fault Unilateral 7-8 | | -0.632*** | | -0.308*** | | -0.339*** |
| | | (0.152) | | (0.042) | | (0.061) |
| No Fault Unilateral 9-10 | | -0.479*** | | -0.408*** | | -0.471*** |
| | | (0.172) | | (0.047) | | (0.069) |
| No Fault Unilateral 11-12 | | -0.421** | | -0.495*** | | -0.584*** |
| | | (0.191) | | (0.052) | | (0.077) |
| No Fault Unilateral 13-14 | | -0.340 | | -0.549*** | | -0.656*** |
| | | (0.209) | | (0.057) | | (0.084) |
| No Fault Unilateral >15 | | -0.150 | | -0.545*** | | -0.672*** |
| | | (0.238) | | (0.065) | | (0.096) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*time | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*time$^2$ | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 846 | 846 | 846 | 846 | 846 | 846 |
| R-squared | 0.958 | 0.959 | 0.977 | 0.980 | 0.983 | 0.984 |

Note: Sample: 1960–2006 (balanced panel). Estimated using country population weights. The dependent variable in Columns (1) and (2) is the Marital Birth Rate (Marital Births/500 Inhabitants); the dependent variable in Columns (3) and (4) is the Non-Marital Birth Rate (Out of Wedlock Births/500 Inhabitants); the dependent variable in Columns (5) and (6) is the Illegitimacy Rate (Out of Wedlock Births/10 Births). Standard errors in parentheses. ***Statistical significance at 1%. **Statistical significance at 5%. * Statistical significance at 10% level.

Results on the marital fertility rate are shown in Columns (1) and (2) of Table 1.8. There, the dependent variable is defined as the number of births within marriage per 500 inhabitants (see Appendix).[19] The dynamic estimates show that the negative effect of divorce law reforms on marital fertility rates dissipates over the subsequent decade, so the effect appears to be transitory. These findings are consistent with certain theoretical predictions proposed in the economic literature. The decrease in the value of marriage because of the decline in divorce costs (Peters 1992), in addition to the rise in couple´s instability, as expected, seem to drive the behaviour of the marital fertility rate at least until 10 years after the legal shift in divorce laws. However, thenceforth, no effect is observed. This could be due to an increase in the number of marriages, since the decision to marry can be less difficult to take under the new divorce law regimes (Alesina and Giuliano 2007; Drewianka 2008). It could also be due to an increase in the number of couples already married who decide to have children to compensate for the

[19] We also re-ran the analysis using as dependent variable the number of births within marriage over the number of women, and over the number of women aged 15-49. Results are quite similar.

decrease in the value placed on the marriage institution (Stevenson 2007), although we admit that this change in the behaviour of married couples seems at odds.

Another possibility is that the reaction in marital fertility is driven by the decisions of those who married after the reform. Over time, the number of couples who married before the reform grew older, and so they were less likely to have children, but the number of marriages that took place after the adoption of the new divorce law regime increased. Since, as documented by Weiss and Willis (1997), the divorce law regime at the time of marriage is relevant in determining the likelihood of divorce, if a great number of couples who married under the new divorce law regime are those who were able to sort themselves better at marriage, then the divorce rate for them should fall (Matouschek and Rasul 2008; Weiss and Willis 1997). This is considered in the literature as the *selection effect*. As a consequence of that, we would expect the marital fertility rate to remain constant or even increase as the number of couples married under the new law grows. This potential explanation can shed light on the somewhat puzzling change in the response of marital fertility over time. A more detailed analysis of marital fertility by duration of marriage (see the following subsection) helps us to confirm this prediction.

The effect on the non-marital fertility rate, calculated as non-marital births per 500 inhabitants (see Appendix), is negative, significant, and permanent.[20] Results are reported in Columns (3) and (4) of Table 1.8. When using the illegitimacy ratio as dependent variable, defined as the number of non-marital births per 10 births, the negative and statistically significant impact of divorce law reforms is observed again (see Columns (5) and (6) of Table 1.8).[21] Our findings are in line with those of Drewianka (2008), who suggested that unilateral divorce law increases the legitimacy ratio. As proposed in the theoretical literature, the decrease in the costs of divorce can make entering marriage easier, even for those who are more likely to enter into a low-quality match (Alesina and Giuliano 2007; Drewianka 2008). This could explain the reduction in the non-marital birth rate. Additionally, since divorce law reforms increased the number of outside options, not only for those who are married, but also for those who cohabit, individuals would be less likely to bear a child until they envision a stable relationship.

[20] As in the case of the marital birth rate, we have also run this analysis changing the denominator of the dependent variable to the total number of women, and the number of women aged 15-49. Results do not vary.
[21] Results are also consistent with the inclusion of all controls.

In sum, our findings suggest that the negative effect on the TFR immediately after the adoption of the new divorce regimes, is driven by the reaction of both marital and non-marital fertility rates. But, 11-12 years later, the reduction in the TFR is maintained by the decrease in the non-marital fertility rate.

### *1.5.2. Fertility by duration of marriage*

For further evidence on the mechanisms through which divorce law reforms operate, we also examine its impact on marital fertility, considering marriages of the same duration. As described in Lillard (1993), the probability of pregnancy in a marital setting rises during the first five years of marriage, and declines thereafter, but if divorce law reforms increase the probability of marital dissolution over the marriage duration, this pattern can change. Since divorce costs are reduced with the liberalization of divorce laws, the decision to marry immediately after becoming pregnant can be easier, since a bad marriage can more easily be dissolved (Alesina and Giuliano 2007; Drewianka 2008), and it would be reasonable to expect an increase in the fertility of those married for less than a year. However, the considerable increase in the likelihood of marital dissolution over the first year of marriage (Lillard 1993), due to the new divorce regimes, can reduce the number of conceptions. Thus, the impact of divorce law reforms on marital fertility during the first year of marriage seems to be an empirical question.

As long as the marriage continues, the probability of dissolution tends to decline, because those couples who survive are more experienced in dealing with potential breakdowns (Becker et al. 1977). For instance, they may be capable of behaving strategically by over-investing in children, a marital-specific investment (Stevenson 2007), bringing about an increase in marital fertility after the changes in the divorce law. Then, the longer the duration of the marriage, the greater the hazard of another pregnancy (Lillard 1993), and the greater the probability of over-investing in children. Nevertheless, women, who have traditionally been responsible for the child after divorce, can also be less motivated to have another child if they feel more fearful of being deserted, which becomes easier under new divorce law regimes. This negative response is expected to be more pronounced after 9-10 years of marriage, which is the average duration of marriages prior to divorce (Stevenson and Wolfers 2007). Then, again, the response of marital fertility as the duration of marriage increases is ambiguous.

To explore this issue empirically, we use data from 1960 to 1998 on the number of births by total duration of married life. This dataset is available in several special issues of the UN Demographic Yearbooks.[22] The marital duration is defined as *the number of completed years elapsed between the exact dates of marriage of the wife and the exact date of birth of the child*. We recognise that this can bias our results, since it is not limited to first marriages, and the decision to become pregnant can differ if the wife has been married more than once. Another problem with this dataset is that the duration of marriage is not calculated simply by difference of years. This implies that the coefficients measuring the fertility response of couples of marital duration *r* to a divorce law reform *k* years after its adoption in year *t* are capturing the reaction of those who gave birth in year *t*, and the response of those who had a child in year *t+1* only if the time that elapsed between the exact date of marriage of the wife and the exact date of birth of the child is greater than *r* years but lower than *r+1*.[23]

Results on the dynamic response of fertility by duration of marriage are displayed in Table 1.9.[24] In all those regressions, the dependent variable is defined as the number of legitimate births of couples of marital duration *r*, over the total number of legitimate births.[25] We show results for 8 (under 1 year of duration, each two years since then until 9 years married, and the intervals 10-14, 15-19, 20 and over) of the 14 available categories in the UN Demographic Yearbooks.[26] Column (1) presents our estimates for the response of fertility to divorce law reforms, for those who have been married for less than 1 year. It is observed that the marital fertility rate decreases as a result of divorce law reforms 5-6 years after adoption. The effect is not significant immediately after the implementation of divorce law reforms. These findings suggest that the so-called "shot-gun" marriages are not driving the behaviour of the marital fertility of those married for less than 1 year. Rather, the unstable situation of couples during this first year of marriage, which increases after divorce law reforms, is more likely to be the cause of the reduction in this marital fertility rate.

[22] Since 1998, this information has been removed from the minimum list of recommended tables and no data is shown in the UN Demographic Yearbooks. For robustness, we have also checked all our results by using data until 1998 and results are unchanged.

[23] For instance, the UN classifies in the category "births after 2 years of marriage" the child of a couple who was born in October 1973 and the parents were married in December 1970, rather than placing the child in the category "births after 3 years of marriage".

[24] Results are also quite similar after adding all controls, but because of endogeneity concerns we prefer the estimates without controls.

[25] We have also run this analysis using other denominators, such as the total number of births, the total population, the total number of women, and the number of women aged 15-49. Differences with the results shown here are not discernible.

[26] Results are quite similar in those categories not included in the chapter (2 years married, 4 years married, 6 years married, and 8 years married). We excluded the category with duration of marriage "unknown".

**Table 1.9.-Marital Fertility (Varying by Duration of Marriage): Static and Dynamic Effects of Divorce Law Reforms**

*(Dependent variable: Marital Births / Total Marital Births*)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| No Fault Unilateral 1-2 | 0.003 | 0.006*** | 0.002 | -0.001 | -0.002*** | -0.009*** | -0.005*** | -0.001*** |
| | (0.005) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.001) | (0.0003) |
| No Fault Unilateral 3-4 | -0.010 | 0.011*** | 0.006*** | 0.0004 | -0.002*** | -0.010*** | -0.006*** | -0.001*** |
| | (0.006) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.001) | (0.0004) |
| No Fault Unilateral 5-6 | -0.023*** | 0.012*** | 0.010*** | 0.003** | -0.000 | -0.008*** | -0.007*** | -0.001*** |
| | (0.008) | (0.002) | (0.002) | (0.001) | (0.001) | (0.002) | (0.001) | (0.0004) |
| No Fault Unilateral 7-8 | -0.032*** | 0.011*** | 0.013*** | 0.007*** | 0.001 | -0.004 | -0.007*** | -0.001*** |
| | (0.009) | (0.002) | (0.002) | (0.002) | (0.001) | (0.003) | (0.001) | (0.0004) |
| No Fault Unilateral 9-10 | -0.038*** | 0.007*** | 0.014*** | 0.009*** | 0.002* | -0.0004 | -0.007*** | -0.001*** |
| | (0.011) | (0.002) | (0.002) | (0.002) | (0.001) | (0.003) | (0.001) | (0.0005) |
| No Fault Unilateral 11-12 | -0.039*** | 0.007** | 0.013*** | 0.010*** | 0.004*** | 0.002 | -0.006*** | -0.001** |
| | (0.012) | (0.003) | (0.002) | (0.002) | (0.001) | (0.004) | (0.001) | (0.001) |
| No Fault Unilateral 13-14 | -0.040*** | 0.007** | 0.012*** | 0.011*** | 0.005*** | 0.004 | -0.005*** | -0.001** |
| | (0.013) | (0.003) | (0.003) | (0.002) | (0.002) | (0.004) | (0.002) | (0.001) |
| No Fault Unilateral >15 | -0.035** | 0.003 | 0.011*** | 0.012*** | 0.006*** | 0.006 | -0.004** | -0.001 |
| | (0.015) | (0.003) | (0.003) | (0.003) | (0.002) | (0.005) | (0.002) | (0.001) |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*time | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country*time$^2$ | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 702 | 702 | 702 | 702 | 702 | 702 | 702 | 702 |
| R-squared | 0.887 | 0.905 | 0.905 | 0.861 | 0.874 | 0.892 | 0.949 | 0.970 |

Note: Sample: 1960–1998 (balanced panel). Estimated using country population weights. In column (1) the variable "marital births" includes live births of couples who have been married less than 1 year. In column (2) the variable "marital births" includes live births of couples who have been 3 years married. In column (3) the variable "marital births" includes live births of couples who have been 5 years married. In column (4) the variable "marital births" includes live births of couples who have been 7 years married. In column (5) the variable "marital births" includes live births of couples who have been 9 years married. In column (6) the variable "marital births" includes live births of couples who have been between 10 and 14 years married. In column (7) the variable "marital births" includes live births of couples who have been between 15 and 19 years married. In column (8) the variable "marital births" includes live births of couples who have been married 20 years or more. Standard errors in parentheses. ***Statistical significance at 1%. **Statistical significance at 5%.* Statistical significance at 10% level.

Column (2) shows results on the legitimate fertility of couples who have been married for 3 years. All but one of our estimates are positive and statistically significant, pointing to an increase in the marital fertility rate. This may indicate that couples decide to invest in children to compensate for the decrease in the value placed on the marriage after the reforms. One can also surmise that this response of the marital fertility rate is due to the fact that couples surviving three years of marriage are in a stable relationship, with a long-term perspective, and so they feel more confident having a child. Although these explanations appear to be valid, since their predictions coincide with the results obtained, they have little to do with the changes in the behaviour observed when the marital duration increases.

Focusing on Columns (3), (4) and (5) of Table 1.9 - which report the response of those married for 5, 7, and 9 years, respectively - we can clearly observe two distinct patterns. After the adoption of the new divorce regimes, the effect is either not significant, or negative and statistically significant, and some years later the impact becomes positive and significant. Note that this startling change in the behaviour of couples does not occur in the same period: the greater the duration of the marriage, the fewer the number of positive and significant coefficients. Then, it is hard to find a unique explanation for this puzzling response, unless we consider that marriages that took place before and after divorce law reforms behave in different ways.

As explained above, if divorce law reforms have a selection effect on the composition of marriages, those who were married under the new regimes would be less likely to divorce (Matouschek and Rasul 2008), changing their incentive to have children. Using data on total marital fertility, this hypothesis was hard to test, but we can probe this further through the dataset on births by duration of marriage, since this allows us to observe separately the responses of couples married under different regimes. For instance, the sample of marriages of 5 years duration contains couples married under the old and under the reformed divorce regime, but our estimates of the dynamic effect do not consider the response of those couples together. For instance, the coefficient measuring the response of the marital fertility rate of those married 5 years ago, after 1-2 years of the adoption of the reform, is unable to capture the behaviour of those married under the new regime; the reaction of those who were married the same year as the change in the law is picked up by the coefficient measuring the impact of the divorce law reforms 5-6 years after adoption. The response of couples who married two

years after the reform is captured by the coefficient measuring the effect of divorce law reforms 7-8 years after adoption, and so on.

Then, if the changing response is due to the selection effect, we would expect to observe a variation in the coefficients picking up the response of couples married under the new regime. Results presented in Columns (3) to (5) of Table 1.9 seem to confirm this, the estimates that capture the reaction of the marriages that took place under the new divorce laws are always positive and significant, but the coefficients measuring the response of those married under the old regime are either not significant, or negative and significant. It is important to note that, in some of our estimates, the response changes one year earlier than we would expect. In column (3) -those married for five years-, we would expect that the first positive and significant coefficient would be the estimate measuring the effect of divorce law reforms 5-6 years after adoption, since it is supposed to be capturing the behaviour of those married in the same year as the implementation of the divorce law reforms. However, we see that the coefficient picking up the impact of the reforms 3-4 years after implementation is also positive and significant. One can argue that this contradicts our prediction, but because of the way in which the duration of married life is calculated (see the explanation above), the coefficient measuring how divorce law reforms affect the marital fertility rate of those married for 5 years 3-4 years after the introduction of the legal reform, could be partly capturing the behaviour of those married under the new regime. A similar pattern is observed in Columns (4) and (5). Therefore, our findings suggest that the selection effect matters in determining how divorce law reforms operate through marital fertility.

When considering the fertility response to divorce law reforms on marriages of 10 years or longer duration (see Columns (6), (7), and (8)), we observe that those reforms had a negative or non-significant effect on the marital fertility rate. As before, this can be explained by the selection effect, since in those cases almost all estimates capture the performance of those married under the old regime. Then, women married before divorce law reforms are more fearful of the break-up of their marriages, and so, under the new divorce regimes, they are less likely to want a child. This decreases the marital fertility rate.

# 1.6 Conclusions

This chapter analyses the impact of the liberalization of divorce laws on fertility. Since divorce law reforms may reduce the value of marriage, and given that children are considered to be a marital-specific investment, it is expected that the implementation of these new regimes affects fertility. To examine this issue, we use data from 18 European countries for the period 1960 to 2006. Results suggest that divorce law reforms have a negative and permanent effect on fertility. This response of fertility is quite robust to the introduction of a whole array of explanations that can also be responsible for the drop in the fertility rate since the late 1960s. These findings are also consistent to alternative specifications and controls for unobserved country-specific factors, time-variant factors at the country level, and different measures of fertility.

We further explore the mechanisms that conduct the reaction of fertility to divorce law reforms by analysing the effect on out-of-wedlock fertility, as well as on marital fertility. We find that both decrease after the introduction of divorce law reforms, but the fall in marital fertility does not seem to be permanent, indicating that the negative response of the fertility rate is maintained over time by the decline in the non-marital fertility rate.

We also study the impact of divorce law reforms on legitimate fertility by duration of marriage. The clear result of this analysis is that the fertility behaviour of couples who married under the new divorce law regimes differs from those married before the reforms. Thus, we suggest that the *selection effect*, which implies improvements in marriage match quality in response to divorce law reforms (Matouschek and Rasul 2008), plays an important role in fertility behaviour.

Our findings may have economic consequences for women. Although we do not account for the possible effect on the participation of women in the labour market of a decline in fertility, the literature suggests that a decrease in fertility may instigate a rise in female labour force participation (see Bloom et al. 2009). This also has consequences for women's education, since it can encourage women to invest in education due to the increase in the returns to women's education that generate the increase in participation in the labour market. The decline in the fertility rate, jointly with the aging of European society, may also have negative consequences for the European welfare system, and specifically the pensions system, based on the maintenance of benefits to seniors by the

taxes paid by the young. Then, although the number of women contributing to the system increases as they join the labour market in greater numbers, the decrease in the number of younger, contributing individuals gives rise to a problem of large dimension, endangering the entire system.

# 1.A Appendix: Data sources and definition of variables

| Variable | Definition | Source |
|---|---|---|
| **Figure Variables** | | |
| Crude Birth Rate | Annual number of births per 100 inhabitants | Eurostat |
| Abortion Rate | Annual number of abortions per one thousand inhabitants | Eurostat |
| Marriage Rate | Annual number of marriages per one thousand inhabitants | Eurostat |
| Divorce Rate | Annual number of divorces per one thousand inhabitants | Eurostat |
| Birth Rate | Annual number of births per one hundred women | Computed by the author using data from the Eurostat |
| **Dependent Variable** | | |
| Total Fertility Rate | The mean number of children that would be born alive to a woman during her lifetime if she were to pass through her childbearing years conforming to the fertility rates by age of a given year. | Eurostat and UN Demographic Yearbook |
| Marital Birth Rate | Annual number of births within marriage per five hundred inhabitants | Computed by the author using data from the Eurostat |
| Non-Marital Birth Rate | Annual number of out of wedlock births per five hundred inhabitants | Computed by the author using data from the Eurostat |
| Ilegitimacy Ratio | Annual number of out of wedlock births per ten births | Computed by the author using data from the Eurostat |
| Completed Fertility Rate | The average number of children born to a cohort of women up to the end of their childbearing age, from the cohort´s beginning of exposure to risk (at age 15) until the age when all members of the cohort have reached the end of the reproductive period (at age 49) | Council of Europe (1940 to 1944 and 1961 to 1970), and computed by the author using data from the Eurostat and from the UN Demographic Yearbooks (several issues)(1945 to 1960) |

| | | |
|---|---|---|
| **Control Variables** | | |
| Female Labour Force Participation | Female Civilian Labour Force over number of women, in percentage | Computed by the author using data from the OECD and Eurostat |
| Gross Enrolment Ratio | Total female enrolment in education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education in given school-year | Unesco |
| Infant Mortality | The ratio of the number of deaths of children under one year of age during the year to the number of live births in that year. The value is expressed per 1,000 live births. | Eurostat |
| Per Capita GDP | Gross Domestic Product divided by the population of each country, expressed in thousands | Computed by the author using data from the United Nations |
| Women in Parliament | Percentage of women in each national parliament on the total of seats of the parliament | Computed by the author using data from the Inter Parliamentary Union |
| Unemployment Rate | Unemployment rate as percentage of the civilian labour force | OECD |
| Crude Divorce Rate | The ratio of the number of divorces during the year to the average population in that year. The value is expressed per 1,000 inhabitants. | Eurostat |
| Crude Marriage Rate | The ratio of the number of marriages during the year to the average population in that year. The value is expressed per 1,000 inhabitants | Eurostat |
| Monthly Family Allowances (First, Second and Third Child) | Monthly family allowances for the first, second and third child (assuming a three-child family), in constant euros of 2005. It is expressed in hundreds of euros. | Comparative Family Policy Database, by Anne H. Gauthier |
| Total Weeks of Maternity leave | Total number of weeks of maternity leave | Comparative Family Policy Database, by Anne H. Gauthier |

| | | |
|---|---|---|
| Cash Benefits During Maternity Leave | Cash benefits paid during maternity leave (as a percent of female wages in manufacturing) | Comparative Family Policy Database, by Anne H. Gauthier |
| Total Weeks of Parental Leave | Total number of weeks of parental leave | Comparative Family Policy Database, by Anne H. Gauthier |
| Cash Benefits During Parental Leave | Cash benefits paid during parental leave (as a percent of female wages in manufacturing) | Comparative Family Policy Database, by Anne H. Gauthier |
| Total Weeks of Childcare Leave | Total number of weeks of childcare leave | Comparative Family Policy Database, by Anne H. Gauthier |
| Cash Benefits During Childcare Leave | Cash benefits paid during childcare leave (as a percent of female wages in manufacturing) | Comparative Family Policy Database, by Anne H. Gauthier |
| Value of Transfers to Family Type | Value of tax and benefit transfers of one-earner-two-parent two-child families. The value was calculated by subtracting the disposable income (after taxes and transfers) of a one-earner-two-parent-two-child family from that of a comparable childless single earner, in constant euros of 2005 | Comparative Family Policy Database, by Anne H. Gauthier |
| Index of Direct and Indirect Cash Benefits | This indicator represents the difference between the disposable income of a two-child one-earner family and that of a single earner and is expressed as a percentage of the average earnings of a production worker, in constant euros of 2005 | Comparative Family Policy Database, by Anne H. Gauthier |

# References

Acs, G. (1996) The Impact of Welfare on Young Mothers' Subsequent Childbearing Decisions, *Journal of Human Resources*, **31**, 898–915.

Ahn, N. and Mira, P. (2001) Job Bust, Baby Bust? Evidence from Spain, *Journal of Population Economics*, **14**, 505–521.

Ahn, N. and Mira, P. (2002) A Note on the Changing Relationship Between Fertility and Female Employment Rates in Developed Countries, *Journal of Population Economics*, **15**, 667–682.

Alesina, A. and Giuliano, P. (2007) Divorce, Fertility and the Shot Gun Marriage, *IZA DP No. 2157*.

Ananat, E., Gruber, J. and Levine, P. (2007) Abortion Legalization and Lifecycle Fertility, *Journal of Human Resources*, **42**, 375-397.

Bailey, M. (2006) More Power to the Pill: The Impact of Contraceptive Freedom on Women's Life Cycle Labor Supply, *The Quarterly Journal of Economics*, **121**, 289-320.

Bailey, M. (2009) More Power to the Pill, *The Quarterly Journal of Economics*, Erratum and Addendum.

Bailey, M. (2010) Momma's Got the Pill: How Anthony Comstock and Griswold v. Connecticut Shaped U.S. Childbearing, *American Economic Review*, **100**, 98-129.

Barro, R. and Becker, G. (1988) A Reformulation of the Economic Theory of Fertility, *Quarterly Journal of Economics*, **103**, 1-25.

Becker, G. (1981) A Treatise on the Family, Cambridge, MA: Harvard University Press

Becker, G., Landes, E. and Michael, R. (1977) An Economic Analysis of Marital Instability, *The Journal of Political Economy*, **85**, 1141-1187.

Björklund, A. (2006) Does Family Policy Affect Fertility? Lessons from Sweden, *Journal of Population Economics*, **19**, 3-24.

Bloemen, H. and Kalwij, A. (2001) Female Labour Market Transitions and the Timing of Births: a Simultaneous Analysis of the Effects of Schooling, *Labour Economics*, **8**, 593–620.

Bloom, D., Canning, D., Fink, G. and Finlay, J. (2009) Fertility, Female Labor Force Participation, and the Demographic Dividend, *Journal of Economic Growth*, **14**, 79–101.

Bongaarts, J. (1978) A Framework for Analyzing the Proximate Determinants of Fertility, *Population and Development Review*, **4**, 105-132.

Bongaarts, J. (2002) The End of the Fertility Transition in the Developed World, *Population and development review*, **28**, 419-443.

Breierova, L. and Duflo, E. (2004) The Impact of Education on Fertility and Child Mortality: Do Fathers Really Matter Less Than Mothers?, NBER Working Paper 10513.

Brooks, J. (1992) Abortion Policy in Western Democracies: A Cross-National Analysis, *Governance*, **5**, 342-357.

Chattopadhyay, R. and Duflo, E. (2004) Women as Polity Makers: Evidence from a Randomized Policy Experiment in India, *Econometrica*, **72**, 1409–1443.

Dickert-Conlin, S. and Chandra, A. (1999) Taxes and the Timing of Births, *Journal of Political Economy*, **107**, 161–177.

Doiron, D. and Mendolia, S. (2011) The Impact of Job Loss on Family Dissolution, *Journal of Population Economics*, **25**, 367-398.

Donohue, J. and Levitt, S. (2001) The Impact of Legalized Abortion on Crime, *Quarterly Journal of Economics*, **116**, 379–420.

Drewianka, S. (2008) Divorce Law and Family Formation, *Journal of Population Economics*, **21**, 485-503.

Entre Nous: The European Magazine for Sexual and Reproductive Health (2005), World Health Organization, No. 45.

Feyrer, J., Sacerdote, B. and Stern, A. (2008) Will the Stork Return to Europe and Japan? Understanding Fertility within Developed Nations, *Journal of Economic Perspectives*, **22,** 3-22.

Friedberg, L. (1998) Did Unilateral Divorce Raise Divorce Rates? Evidence from Panel Data, *American Economic Review*, **88,** 608–627.

Galor, O. and Weil, D. (1996) The Gender Gap, Fertility and Growth, *American Economic Review*, **86**, 374–387.

Goldin, C. and Katz, L. (2000) Career and Marriage in the Age of the Pill, *The American Economic Review*, **90**, 461-465

Goldin, C. and Katz, L. (2002) The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions, *The Journal of Political Economic*, **110**, 730-770.

González, L. and Viitanen, T. (2009) The Effect of Divorce Laws on Divorce Rates in Europe, *European Economic Review*, **53**, 127-138.

González-Val, R. and Marcén, M. (2012a). Breaks in the Breaks: An Analysis of Divorce Rates in Europe, *International Review of Law and Economics*, 32 (2), 242-255.

González-Val, R. and Marcén, M. (2012b). Unilateral Divorce versus Child Custody and Child Support in the U.S., *Journal of Economic Behavior & Organization*, **81**, 613-643.

Gray, J. (1998) Divorce-Law Changes, Household Bargaining, and Married Women's Labour Supply, *The American Economic Review*, **88**, 628-42.

Greenwood, J. and Seshadri, A. (2002) The U.S. Demographic Transition, *The American Economic Review*, **92**, 153–159.

Gruber, J. (2004) Is Making Divorce Easier Bad for Children? The Long Run Implications of Unilateral Divorce, *Journal of Labor Economics*, **22**, 799-833.

Halla, M. (2013) The Effect of Joint Custody on Family Outcomes, *Journal of the European Economic Association*, 11, 278-315.

Hazan, M. and Berdugo, B. (2002) Child Labour, Fertility, and Economic Growth, *The Economic Journal*, **112**, 810–828.

Henshaw, S. and Morrow, E. (1990) Induced Abortion: A World Review, *Family Planning Perspectives*, **22**, 76-89.

Kalwij, A. (2000) The Effects of Female Employment Status on the Presence and Number of Children, *Journal of Population Economics*, **13**, 221–239.

Kogel, T. (2004) Did the Association Between Fertility and Female Employment Within OECD Countries Really Change its Sign?, *Journal of Population Economics*, **17**, 45–65.

Lalive, R. and Zweimüller, J. (2009) How does Parental Leave Affect Fertility and Return to Work? Evidence from Two Natural Experiments, *The Quarterly Journal of Economic*, **124**, 1363-1402.

Leon, A. (2004) The Effect of Education on Fertility: Evidence from Compulsory Schooling Laws Unpublished manuscript, University of Pittsburgh.

Lillard, L. (1993) Simultaneous Equations for Hazards Marriage Duration and Fertility Timing, *Journal of Econometrics*, **56,** 189-217.

Manuelli, R. and Seshadri, A. (2009) Explaining International Fertility Differences, *The Quarterly Journal of Economics*, **124**, 771-807.

Matouschek, N. and Rasul, I. (2008) The Economics of the Marriage Contract: Theories and Evidence, *Journal of Law and Economics*, **51**, 59-110.

Michael, R. (1985) Consequences of the Rise in Female Labor Force Participation Rates: Questions and Probes, *Journal of Labor Economics*, **3**, Part 2: Trends in Women's Work, Education, and Family Building, S117-S146.

Milligan, K. (2005) Subsidizing the Stork: New Evidence on Tax Incentive and Fertility, *Review of Economics and Statistics*, **87**, 539–555.

Mishra, V. and Smyth, R. (2010) Female Labor Force Participation and Total Fertility Rates in the OECD: New Evidence from Panel Cointegration and Granger Causality Testing, *Journal of Economics and Business*, **62**, 48-64.

Peters, H. (1986) Marriage and Divorce: Informational Constraints and Private Contracting, *American Economic Review*, **76**, 437-54.

Peters, H. (1992) Marriage and Divorce: Reply, *American Economic Review*, **82**, 687–93.

Sah, R. (1991) The Effect of Child Mortality Changes on Fertility Choice and Parental Welfare, *Journal of Political Economy*, **99**, 582-606.

Stevenson, B. (2007) The Impact of Divorce Laws on Marriage: Specific Capital, *Journal of Labor Economics*, **25**, 75-94.

Stevenson, B. and Wolfers, J. (2006) Bargaining in the Shadow of the Law: Divorce Laws and Family Distress, *Quarterly Journal of Economics*, **121**, 267–88.

Stevenson, B. and Wolfers, J. (2007) Marriage and Divorce: Changes and their Driving Forces, *Journal of Economic Perspectives*, **21**, 27–52.

United Nations Population Division, Department of Economic and Social Affairs (2003) Abortion Policies: A Global Review, www.un.org/esa/population/publications/abortion/

Ward, M. and Butz, W. (1980) Completed Fertility and Its Timing, *Journal of Political Economy*, **88**, 917-941.

Weiss, Y. and Willis, R. (1997) Match Quality, New Information, and Marital Dissolution, *Journal of Labor Economics*, **15**, S293–S329.

Whittington, L., Alm, J. and Peters, H. (1990) Fertility and the Personal Exemption: Implicit Pronatalist Policy in the United States, *American Economic Review*, **80**, 545–556.

Willis, R. (1973) A New Approach to the Economic Theory of Fertility Behaviour, *Journal of Political Economy*, **81**, 14-64.

Wolfers, J. (2006) Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results, *American Economic Review*, **96**, 1802-1820.

# Chapter 2: Teen mothers and culture

## 2.1 Introduction

During the last four decades, there has been a considerable decline in many countries in the number of young women giving birth. For example, in both Italy and Germany, the number of live births per hundred women under 20 dropped from 4.5 in 1970 to less than 1 in 2010 (UN Demographic Yearbooks). However, there are still developed countries that sustain high levels of teen motherhood rates, such as the UK, where this indicator reached the rate of 2.5 in 2010 (UN Demographic Yearbooks). This is even more remarkable in certain less developed countries, such as Mexico, where this rate was 8.5 in 2010 (UN Demographic Yearbooks). Although it constitutes a sizable percentage of total fertility, this is nevertheless a concern, due to the negative consequences for those countries. Teen motherhood can be associated with socio-economic disadvantages for women (Chevalier and Viitanen 2003) and their children (Francesconi 2008). Also, teen mothers have a higher probability of reducing schooling (Hofferth et al. 2001; Klepinger et al. 1999), of having lower market wages when older (Chevalier and Viitanen 2003; Hoffman et al. 1993; Klepinger et al. 1999) and of being overweight (Webbink et al. 2008), than those women who delay motherhood (Miller 2011). Thus, the study of the determinants of teen motherhood is an important issue.

Researchers have examined several potential determinants of teen motherhood, focusing on institutional factors, such as changes in abortion laws (Donohue et al. 2009), welfare reform (Lopoo and DeLeire 2006; Lundberg and Plotnick 1995), family planning policy (Lundberg and Plotnick 1995), public assistance payments (Blank 1995), and reforms in compulsory schooling legislation (Black et al. 2008). Research has also focused on family and socio-economic factors, such as family size and family structure (Cooksey 1990; Hofferth and Goldscheider 2010), parental education (Cooksey 1990), maternal employment (Cooksey 1990; Lopoo 2004), family income (Aassve 2003; South 1999), neighborhood socio-economic disadvantages (South 1999), peer effects (Monstad et al. 2011), marriage and cohabitation expectations (Wolfe et al. 2007), income expectations (Wolfe et al. 2007), and racial differences (South 1999),

among others. This chapter explores the importance of culture on the fertility decisions of adolescent women.

Following the definition of culture proposed by UNESCO (2001), we consider culture as *the set of distinctive spiritual, material, intellectual and emotional features of society or a social group, that encompasses, not only art and literature, but lifestyles, ways of living together, value systems, traditions and beliefs*. Although most economic researchers would agree that culture is an important determinant of human behavior, it is not always possible to measure such beliefs and values directly. As Fernández (2007) argues, the interrelation among institutions, economic conditions, and social norms is the source of this difficulty. To isolate the impact of culture from the effect of institutions and markets on the fertility decisions of adolescent women, we explore the fertility behavior of adolescent women who were born and have lived in the US and report their ethnicity or national origin. The young women considered in our analysis were all born in the US, so that they have all lived under common laws, institutions, and markets. Then, dissimilarities in fertility rates by ancestor's home country may be considered to document the significance of culture since their attitudes are probably similar to the preferences of their parents, ancestors and ethnic communities.

We base our work on an epidemiological approach (see Fernández 2011; Fernández and Fogli 2009) to estimate the probability that an adolescent woman who was born and lives in the US and reports a national origin or ancestor's home country is a teen mother using data from the National Longitudinal Survey of Youth 79 (NLSY79). Our findings point to culture being relevant factor in determining the fertility patterns of adolescent women, even after adding controls for an array of women's socio-economic characteristics. We find that, when the ancestor's home country live birth rate of women under 20 rises by one, the probability that an adolescent woman in the US is a teen mother rises by about 2.3%. Thus, an adolescent woman with ancestors from Cuba, the country with the highest live birth rate of women under 20, is around 16.5 percentage points more likely to be a teen mother than an adolescent woman from France, the country of origin with the lowest live birth rate of women under 20.

There is a substantial literature analyzing the impact of culture on socio-economic outcomes (see, for a review, Fernández 2011). Utilizing empirical strategies quite analogous to ours, researchers have explored the role of culture on savings rates, finding no effect (Carroll et al. 1994). They have also shown a substantial effect of culture on female labor force participation and fertility (Blau et al. 2013; Contreras and Plaza

2010; Fernández and Fogli 2006; Fernández 2007; Fernández and Fogli 2009), on living arrangements (Giuliano 2007), on unemployment (Brügger et al. 2009) and on divorce (Furtado et al. 2013). We contribute to these lines of research by exploring the impact of culture on the fertility decisions of adolescent women when they take the decision to have a child. [27]

In our main empirical analysis, we include controls for the socio-economic characteristics of teen women that are considered in the literature to be determinants of fertility decisions of adolescents. The NLSY79 also contains information on other potential determinants of the fertility decisions of adolescents, which we do not include in our main model because of endogeneity concerns. One of these determinants is the marital status of teen women. Since, in the period considered, women who become pregnant at a young age tend to get married in a higher proportion than their peers without a child (Manning 1993), then controlling for this endogenous factor would lead us to biased estimates. Being aware of these endogeneity problems, we have repeated the analysis, adding controls for these attributes at the individual level. Our results do not change substantially.

Additionally, we check whether unobserved heterogeneity across ethnic groups is driving our findings. For instance, it is possible to argue that differences in fertility of adolescent women across countries are due to variations in the age at first marriage preferences, rather than fertility culture. To take this issue into account, we add to our main analysis controls for home country characteristics, such as the average age of females at first marriage, per capita GDP, and the minimum legal age of consent. In all specifications, the estimated coefficient on the country of origin live birth rate varies very little. Further, we run placebo tests to check whether our results are driven by the fertility culture of adolescent women rather than other unobserved characteristics that can be correlated with our cultural proxy. If, for example, these unobserved variables, such as risk attitudes, differences in human capital accumulation, and social norms, were the main determinant of divergences in fertility behavior of adolescent women, we would expect them to also affect the fertility behavior of all women. However, in that case, we observe no impact of the national origin live birth rates of women under 20, indicating that we are not erroneously identifying the effect of culture.

[27] Prior literature on the effect of culture only uses information of individual characteristics when the sample was collected. In most cases, this does not coincide with the period in which the decisions are taken (see, for example, Furtado et al. 2013).

The remainder of the chapter is organized as follows. Section 2.2 presents the empirical strategy, and Section 2.3 describes the data. Results are discussed in Section 2.4. Section 2.5 concludes.

## 2.2 Empirical strategy

In order to separate the impact of culture from that of markets and institutions on fertility decisions of adolescent women, we use information on adolescent women who were born and live in the US and report a country of origin or ethnicity. These women live under the same markets and institutions in the US, so that, if only institutions and markets are relevant to their fertility decisions, home country live birth rates of women under 20 should have no impact on the probability of being a teen mother. However, if home country live birth rates can explain the fertility propensities of young women, cross-country differences in fertility can be considered to document the effect of culture. To test this issue, we estimate the following equation:

$$F_{ijk} = \beta_1 LBR_j + \beta_2 X_{ijk} + \delta_k + \gamma_r + \varepsilon_{ijk} \quad (2.1)$$

where $F_{ijk}$ is a dummy variable that takes value 1 when a woman *i* of cultural origin *j* who lives in region *k* is a teen mother.[28] In the baseline regression, our measure of culture, $LBR_j$, is the live birth rate of women under 20 in country of origin *j*, measured in the year when woman *i* is 19 years old (see Appendix B for a detailed definition).[29] The vector $X_{ijk}$ includes individual characteristics, such as education (Manlove 1998) and whether they live in a rural area (Berry et al. 2000; Lee 1997), which may have an impact on fertility decisions for reasons independent of culture. Since laws affecting fertility decisions (abortion laws, the access to the pill, welfare reforms, or family planning policies, among others) vary by place of residence (Bailey et al. 2011; Stevenson and Wolfers 2007), the absence of controls for the place of residence may bias our results. However, information on the geographical location of women is quite

[28] Note that we use a linear probability model for simplicity, as in previous works on the study of the effect of culture. Results are similar when using probit or logit models, see Appendix 2.A.
[29] We revisit this definition of culture below.

limited, in this survey, for non-American researchers.[30] For this reason, and recognizing that it is not the best option, we have only been able to control for the region of residence.[31] Region fixed effects, denoted by $\delta_k$ , are added to the analysis to mitigate the problem that may exist with place of residence.[32] We have also introduced year fixed effects in our main estimation, represented in equation (2.1) by $\gamma_r$, to pick up unobserved characteristics that can bias our points estimated since the women in our sample are 19 years old in a range of years, from 1979 to 1984. Finally, in order to consider any within-ethnicity correlation in the error terms, standard errors are clustered at the country of origin level.

Our variable of interest is $LBR_j$. Higher live birth rates are assumed to correspond to cultural attitudes more accepting of teen motherhood. If culture plays a role here, then young women originating from countries with a more accepting culture regarding teen motherhood should have, everything being equal, a higher probability of having a child at a young age than women from countries with a less accepting attitude. Then, we would expect $\beta_1$ to be positive.

Instead of controlling directly for the country of origin live birth rates, an alternative strategy would be to include dummy variables for these countries. The benefit of this approach would be that it does not require a linear relationship between the cultural proxy and fertility. However, this technique does not allow for a clear identification of how culture matters. Evidence suggests that the two approaches lead to similar conclusions. Young women originating from countries with a more accepting attitude towards teen motherhood tend to be more likely teen mothers.

[30] Non-American researchers do not have access to information on the place of residence. As can be read in the web page of the Bureau of Labor Statistics: "To protect respondent confidentiality, the NLS public-use files do not include geographic variables such as state, county, and metropolitan area" http://www.bls.gov/nls/nlsfaqs.htm#anch25; "The Bureau of Labor Statistics (BLS) only grants access to geocode files for researchers in the United States who agree in writing to adhere to the BLS confidentiality policy and whose projects further the mission of BLS and the NLS program to conduct sound, legitimate research in the social sciences. *Applications from abroad cannot be accepted*." http://www.bls.gov/nls/nlsfaq2.htm#anch32.

[31] The US is divided into four regions, North East, North Central, South, and West. North East is the omitted variable in the analysis.

[32] As can be seen in the literature, the effect of culture on socio-economic outcomes does not disappear after adding controls for the place of residence (introducing state fixed effects or even MSAs fixed effects), although it is somewhat reduced(see, for example, Furtado et al. 2013).

## 2.3 Data

In order to implement this analysis, we use data from the US National Longitudinal Survey of Youth (NLSY79). This survey covers 12,686 young men and women who were first interviewed in 1979, when all of them were between 14 and 22 years old. They were interviewed annually until 1994, and biennially thereafter, providing a wide range of information on Americans living in the US in 1979. The survey includes questions on environmental characteristics, training investments, schooling, family income, labor market experience, health conditions, household composition, and marital and fertility histories.

Our sample consists of adolescent women born in the US who report an ethnicity or national origin. As the preferences and attitudes of these young women are likely similar to those of their parents, ancestors and ethnic communities, we argue that differences in live birth rates by national origin can be considered as supporting evidence of the importance of culture. To identify ancestry or national origin we use information on the first reported ancestry. We incorporate second-and-higher generation immigrants in our analysis. Prior literature on culture mainly uses information on second-generation immigrants, to avoid language barriers (Fernández 2007; Fernández and Fogli 2006; Fernández and Fogli 2009; Giuliano 2007). In our case, we cannot restrict our sample to second-generation immigrants, due to data availability in the NLSY79. Although language problems are avoided, the effect of the ancestor country culture can be diminished as generations go by. Thus, our estimated impact of culture on the fertility decisions of adolescent women should be seen as a lower bound.

In our main analysis, we use as cultural proxy the Live Birth Rate (LBR) of women under 20 in the country of origin, measured in the year when they are 19 years old. The LBR data, obtained from the UN Demographic Yearbooks (several issues), is calculated as the number of live births per hundred women under 20 (see Appendix B for a description). The selection of this birth rate as the cultural proxy reflects the notion that adolescent women's behavior is better determined by the behavior of their counterparts in their country of origin. However, it is possible to argue that teen women's pattern of behavior is best characterized by the preferences of their parents. Thus, we should utilize as cultural proxy the LBR of their country of origin in the year of their birth. Alternatively, it is possible to argue that the attitudes of adolescent women when they

take fertility decisions are better characterized by the behavior of their counterparts at that moment (we revisit this issue below.) It is worth noting that we do not expect considerable differences in our results, since culture changes slowly (Fernández 2007; Furtado et al. 2013).

Our final sample contains 1,885 observations of adolescent women, with 10 different ancestries.[33] Table 2.1 presents summary statistics of the relevant variables by country of origin, ordered from the highest to the lowest average LBR of women under 20, for the period 1979-1984, the period when women are 19 years old in the sample. Column (1) displays large LBR differences across countries: from 8.78 live births per hundred women under 20 in Cuba to 1.62 in France. The other columns describe our main sample. Overall, 12.4% of women are teen mothers, but Mexicans and Portuguese are substantially more likely to be teen mothers. About 48% of women have graduated from high school, although educational levels vary substantially across countries of origin, with Cuba, Poland and Germany having the highest proportion of women enrolled in a college degree and Portugal having the lowest. Most women do not live in a rural area although, as previously, there are variations across countries of origin, with those from the UK and Germany having the highest proportion of women living in a rural area (more than 20%). In most cases, women originating from countries with a high LBR are teen mothers in higher proportion. However, this can also be explained, for example, by differences in educational attainment. Thus, a more detailed analysis is needed.

[33] As in prior literature on culture, in order to make *meaningful comparisons* across averages of adolescent women by country of origin, we exclude those women from countries of origin with less than 10 observations (China, Greece, Japan, Korea, Philippines and Russia). Although our results are not expected to change, since we run the analysis at the individual level, we have repeated the analysis including these women and our results do not vary.

**Table 2.1 - Summary Statistics by Country of Origin**

| Country Origin | Mean Home Country Live Birth Rate Women Under 20 | Proportion Teen Mothers | Proportion Enrolled High School | Proportion High School Graduated | Proportion Enrolled College | Proportion Living Rural Area | GDP per Capita | Mean Female Age First Marriage | Number Observations |
|---|---|---|---|---|---|---|---|---|---|
| Cuba | 8.785 | 0.062 | 0.058 | 0.383 | 0.483 | 0.000 | 2.1 | 19.8 | 13 |
| Mexico | 7.873 | 0.349 | 0.063 | 0.376 | 0.324 | 0.095 | 2.9 | 21.6 | 52 |
| Portugal | 3.993 | 0.320 | 0.313 | 0.190 | 0.090 | 0.000 | 3.1 | 23.4 | 19 |
| Poland | 3.404 | 0.098 | 0.000 | 0.369 | 0.489 | 0.039 | 1.8 | 22.7 | 29 |
| United Kingdom | 2.890 | 0.140 | 0.021 | 0.466 | 0.382 | 0.251 | 8.5 | 23.0 | 800 |
| Spain | 2.375 | 0.133 | 0.000 | 0.572 | 0.323 | 0.078 | 5.1 | 23.4 | 18 |
| Italy | 2.178 | 0.074 | 0.000 | 0.483 | 0.357 | 0.171 | 7.3 | 23.8 | 67 |
| Germany | 2.148 | 0.114 | 0.009 | 0.499 | 0.409 | 0.219 | 10.2 | 22.9 | 530 |
| Ireland | 2.141 | 0.090 | 0.000 | 0.507 | 0.400 | 0.175 | 5.9 | 24.6 | 157 |
| France | 1.625 | 0.109 | 0.026 | 0.532 | 0.314 | 0.172 | 10.8 | 23.0 | 200 |
| Average | 2.508 | 0.124 | 0.016 | 0.484 | 0.384 | 0.217 | 8.8 | 23.1 | |
| Std. Dev. | 0.785 | 0.329 | 0.127 | 0.500 | 0.486 | 0.412 | 1.9 | 0.5 | |

Notes: Countries of origin ordered by home country live birth rate (live births per hundred women under 20). This variable was constructed using information from the UN Demographic Yearbook. The other descriptive statistics were constructed using the National Longitudinal Surveys (NLSY79), except GDP per Capita –United Nations Statistics Division (2010) "Per Capita GDP at Current Prices in US$"- and the Average Female Age at First Marriage –Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat and World Marriage Data -. The Home Country Live Birth of Women under 20 and the GDP per Capita are a mean of the period 1979-1984 when young women were aged 19. The sample consists of 1,885 women born in the US and aged 19 who report an ethnic origin.

# 2.4 Results

## *2.4.1 Baseline regression*

In Table 2.2, we show the estimates for the baseline specification. In this case, the variable used as a cultural proxy is the home country live birth rate of women under 20, measured in the year in which each woman is aged 19. In the first column, it can be seen that a rise in the home country live birth rate of an adolescent woman is related to a greater probability that this woman is a teen mother. In this column, we add controls for individual-level socio-economic characteristics measured when the women are aged 19. These variables may have an effect on the probability of being a teen mother for causes independent of culture. With respect to the education level, since women who do not drop out of school are less likely to have a child when they are adolescent (Manlove 1998), our finding that more educated women are less likely to be teen mothers than those with low levels of education is not striking.[34]

As mentioned above, the place of residence of women is a potential factor affecting fertility decisions. Again, note that we only have information on whether our women live in a rural area, and on the region of residence since, currently, non-American researchers are not allowed to obtain more information on this issue. Living in a rural area is not statistically significant, although the coefficient is negative.

It is comforting that, regardless of the controls included in our regressions, the cultural proxy has a positive and statistically significant impact on the probability of being a teen mother. Focusing on Column (2), which includes year and region fixed effects, an increase of 1 point in the cultural proxy is associated with an increase of 2.3% in the probability of being a teen mother. Put another way, an average woman from Cuba, the country with the highest LBR (8.8 live births per hundred women under 20 on average from 1979 to 1984) is 16.5 percentage points more likely to have a child when she is under 20 than an average woman from France, the country with the lowest LBR (1.6 on average).

[34] The variable omitted is *Not enrolled in high school*, which includes women who completed less than the 12$^{th}$ grade.

**Table 2.2 - Teen Fertility Culture and the Probability of Being a Teen Mother**
*(Dependent Variable: Teen Mother)*

| | (1) | (2) |
|---|---|---|
| Home Country Live Birth Rate | 0.024*** | 0.023*** |
| | (0.006) | (0.006) |
| Enrolled High School | -0.335*** | -0.335*** |
| | (0.030) | (0.031) |
| High School Graduated | -0.247*** | -0.243*** |
| | (0.020) | (0.020) |
| Enrolled in College | -0.381*** | -0.378*** |
| | (0.019) | (0.020) |
| Rural | -0.012 | -0.018 |
| | (0.013) | (0.011) |
| Constant | 0.367*** | 0.334*** |
| | (0.022) | (0.023) |
| Year FE | YES | YES |
| Region FE | NO | YES |
| Observations | 1885 | 1885 |
| R-squared | 0.148 | 0.150 |

Notes: Home country live birth rate is the number of live births per hundred women under 20, and is measured when women were 19 years old. The sample consists of women aged 19 and born in the US. For both women who are teen mothers (have a child at 19 or less) and those who are not, we take their personal information when they are aged 19. We estimate linear probability models where the dependent variable is equal to 1 if the woman is a teen mother and 0 otherwise. Column (1) controls for the level of education, whether the woman's current residence is rural, and year fixed effects. Column (2) adds region of current residence fixed effects. Robust standard errors are in parenthesis. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

### *2.4.1.1 Robustness checks*

To check whether our findings are sensitive to the definition of the cultural proxy, and/or the sample selection, we run several simple robustness checks. We show these results in Tables 2.3 to 2.5.

Existing literature on the effect of culture on socio-economic variables typically employs as a cultural proxy the information on the variable of interest for several years. As Fernández and Fogli (2009) claim, it is not clear, theoretically, which year to utilize. Since most of the prior literature uses information on immigrants, they suggest that the culture of immigrants is best measured at the time of migration. Alternatively, as Furtado et al. (2013) explain, if immigrants remain in contact with their family and/or friends in their home countries during several years after migrating, then their attitudes can be better characterized by the behavior of their counterparts in the country of ancestry, at the time of the survey. For those studies using second-and-higher generation immigrant samples, it can also be argued that the preferences of these individuals are better measured by their parents' counterparts in their country of origin when they were

born, or some years after their arrival, assuming that parents transmit their preferences when the child is young. To tackle this issue rather than solving it theoretically, as in Furtado et al. (2013), we use alternative definitions of our variable of interest, the cultural proxy. Specifically, we use the home country LBR of women under 20 over seven years (see Table 2.3). In Column (1), we use the value of this indicator in the year 1950, in Column (2) the indicator refers to 1960, and so on, up to Column (7), in which this variable refers to 2005. As expected, since changes in culture occur slowly, results are quite similar. Coefficients of interest are always positive and statistically significant at the 5% and 1% level, although the effect decreases somewhat. Additionally, we test this issue by measuring the cultural proxy when women were born. In this case, the range of years of the cultural proxy is 1960 to 1965 and our results are shown in Table 2.4. As before, results do not change substantially.

Another potential problem with our estimates is that adolescent women in the US may not be a representative sample of their counterparts in their ancestor's home countries. As explained in Furtado et al. (2013), for example, those living in home countries may show patterns of adventure-seeking behavior, risk aversion, or political preferences that are quite different from those living in the US. In addition, following Furtado et al. (2013), individuals tend to migrate from specific areas; for example a specific region with economic problems, which possibly makes adolescent women in the US very similar to each other but, probably, quite different from the average women in their ancestor's home countries. This can be a problem for our estimates. However, as explained in Furtado et al. (2013), if, for instance, all adolescent women living in the US and reporting an ancestry were less "risk adverse" than the women in their country of origin, irrespective of their ancestry, then our work would not be affected by any bias since it is based on cross-country variation.

It could be the case that those women originating from Cuba and living in the US are different from those living in the home country, mainly because their parents had to migrate to the US for political reasons in the 1950s and 1960s, during the Cuban revolution and after the establishment of the Communist regime. Thus, it could be argued that there are differences in the preferences and attitudes of ethnic-Cubans born in the US and their counterparts living in Cuba. If these differences matter, then we should observe changes in our estimates after excluding women originating from Cuba. We check this in Table 2.5. Column (1) displays the estimated coefficients after excluding young Cuban women, and we observe that the impact of the cultural proxy

increases slightly in magnitude. The interpretation is difficult, since the impact of eliminating Cubans does not seem particularly important - but this result can also be conditional on the scarcity of observations from Cuba, just 13. All in all, adding or deleting these observations does not substantially change our results.

In Table 2.5, we show other simple robustness checks, following Furtado et al. (2013), in order to test whether our findings are sensitive to sample selection. Column (2) excludes information for women originating from the country with the most observations, the UK, and Column (3) excludes women from Cuba and the UK, the countries with the fewest and the highest number of observations, respectively. Results remain unchanged. Similarly, Column (4) excludes the country with the lowest average live birth rate, France (the highest LBR is for Cuba, and Column (2) already reports these estimates). Finally, Column (5) does not incorporate observations for Cubans and French. Again, results do not vary. The positive impact of culture on fertility of teen women appears to be quite consistent.

**Table 2.3 - Teen Fertility Culture and the Probability of Being a Teen Mother Using the Cultural Proxy in Different Years**

*(Dependent variable: Teen Mother)*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Home Country Live Birth Rate 1950 | 0.013** | | | | | | |
| | (0.005) | | | | | | |
| Home Country Live Birth Rate 1960 | | 0.015** | | | | | |
| | | (0.005) | | | | | |
| Home Country Live Birth Rate 1970 | | | 0.013** | | | | |
| | | | (0.004) | | | | |
| Home Country Live Birth Rate 1980 | | | | 0.028*** | | | |
| | | | | (0.008) | | | |
| Home Country Live Birth Rate 1990 | | | | | 0.016*** | | |
| | | | | | (0.004) | | |
| Home Country Live Birth Rate 2000 | | | | | | 0.016** | |
| | | | | | | (0.005) | |
| Home Country Live Birth Rate 2005 | | | | | | | 0.017*** |
| | | | | | | | (0.005) |
| Enrolled High School | -0.332*** | -0.333*** | -0.331*** | -0.335*** | -0.334*** | -0.333*** | -0.334*** |
| | (0.030) | (0.030) | (0.029) | (0.032) | (0.030) | (0.030) | (0.030) |
| High School Graduated | -0.244*** | -0.244*** | -0.245*** | -0.243*** | -0.244*** | -0.244*** | -0.244*** |
| | (0.020) | (0.020) | (0.020) | (0.020) | (0.020) | (0.020) | (0.020) |
| Enrolled in College | -0.379*** | -0.379*** | -0.380*** | -0.378*** | -0.378*** | -0.378*** | -0.378*** |
| | (0.021) | (0.021) | (0.020) | (0.020) | (0.020) | (0.020) | (0.020) |
| Rural | -0.018 | -0.019 | -0.020* | -0.019 | -0.019 | -0.019 | -0.019 |
| | (0.011) | (0.010) | (0.010) | (0.011) | (0.011) | (0.011) | (0.011) |
| Constant | 0.359*** | 0.345*** | 0.339*** | 0.315*** | 0.353*** | 0.358*** | 0.359*** |
| | (0.028) | (0.027) | (0.024) | (0.025) | (0.021) | (0.022) | (0.023) |
| Year FE | YES | YES | YES | YES | YES | YES | YES |
| Region FE | YES | YES | YES | YES | YES | YES | YES |
| Observations | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 | 1885 |
| R-squared | 0.149 | 0.150 | 0.149 | 0.150 | 0.150 | 0.150 | 0.150 |

Notes: Home country live birth rate is the number of live births per hundred women under 20, and is measured in different years. For both women who are teen mothers (have a child at 19 or less) and those who are not we take their personal information when they are aged 19. We estimate linear probability models where the dependent variable is equal to 1 if the woman is a teen mother and 0 otherwise. All columns include controls for level of education, whether the woman's current residence is rural, year fixed effects and region of current residence fixed effects. Robust standard errors are in parenthesis. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

**Table 2.4 - Teen Fertility Culture and the Probability of Being a Teen Mother Using the Cultural Proxy in the Year in Which Women Were Born**

*(Dependent Variable: Teen Mother)*

| | (1) | (2) |
|---|---|---|
| Home Country Live Birth Rate | 0.015** | 0.014** |
| | (0.005) | (0.005) |
| Enrolled High School | -0.335*** | -0.333*** |
| | (0.028) | (0.029) |
| High School Graduated | -0.249*** | -0.245*** |
| | (0.020) | (0.020) |
| Enrolled in College | -0.384*** | -0.380*** |
| | (0.019) | (0.020) |
| Rural | -0.013 | -0.019* |
| | (0.012) | (0.010) |
| Constant | 0.367*** | 0.338*** |
| | (0.025) | (0.026) |
| Year FE | YES | YES |
| Region FE | NO | YES |
| Observations | 1885 | 1885 |
| R-squared | 0.148 | 0.150 |

Notes: Home country live birth rate is the number of live births per hundred women under 20, and is measured when each woman was born. For both women who are teen mothers (have a child at 19 or less) and those who are not, we take their personal information when they are aged 19. We estimate linear probability models where the dependent variable is equal to 1 if the woman is a teen mother and 0 otherwise. Column (1) includes controls for the level of education, whether the woman's current residence is rural and year fixed effects. Column (2) adds region of current residence fixed effects. Robust standard errors are in parenthesis. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

**Table 2.5 - Teen Fertility Culture and the Probability of Being a Teen Mother Using Different Samples**

*(Dependent Variable: Teen Mother)*

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Home Country Live Birth Rate | 0.028*** | 0.022** | 0.028*** | 0.023** | 0.029*** |
| | (0.004) | (0.007) | (0.003) | (0.008) | (0.005) |
| Enrolled High School | -0.335*** | -0.379*** | -0.381*** | -0.342*** | -0.343*** |
| | (0.032) | (0.047) | (0.048) | (0.037) | (0.038) |
| High School Graduated | -0.243*** | -0.250*** | -0.250*** | -0.259*** | -0.259*** |
| | (0.020) | (0.039) | (0.039) | (0.019) | (0.019) |
| Enrolled in College | -0.378*** | -0.359*** | -0.359*** | -0.395*** | -0.395*** |
| | (0.020) | (0.034) | (0.034) | (0.008) | (0.008) |
| Rural | -0.019 | -0.019 | -0.020 | -0.014 | -0.015 |
| | (0.011) | (0.021) | (0.021) | (0.013) | (0.012) |
| Constant | 0.262*** | 0.262*** | 0.249*** | 0.353*** | 0.340*** |
| | (0.023) | (0.045) | (0.043) | (0.018) | (0.012) |
| Year FE | YES | YES | YES | YES | YES |
| Region FE | YES | YES | YES | YES | YES |
| Observations | 1872 | 1085 | 1072 | 1685 | 1672 |
| R-squared | 0.151 | 0.152 | 0.153 | 0.156 | 0.158 |

Notes: Home country live birth rate is defined as in Table 2.2. For both women who are teen mothers (have a child at 19 or less) and those who are not, we take their personal information when they are aged 19. We estimate linear probability models where the dependent variable is equal to 1 if the woman is a teen mother and 0 otherwise. Column (1) does not include information on the country with fewer observations (Cuba). Column (2) does not include information on the country with more observations (United Kingdom). Column (3) does not include information on the countries with more observations (United Kingdom) and with fewer observations (Cuba). Column (4) does not include information on the country with the lower Live Birth Rate (France). Column (5) does not include information on the countries with the higher Live Birth Rate (Cuba) and with the lower Live Birth Rate (France). Robust standard errors are in parenthesis. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

### *2.4.2 Other family and individual attributes*

Heretofore, we have included in the baseline regression many of the factors determining fertility decisions among adolescent women. The NLSY79 also contains information on other potentially relevant variables, not included by us in the baseline model mainly because of endogeneity concerns.[35] One of these determinants is the marital status of women. Married women have children in higher proportion than non-married women. The ratio of births to married mothers per 100 total live births for women aged 18-19 years old pregnant was almost 60% in 1979 (data come from the US National Vital Statistics Report). However, a child conceived as a result of premarital intercourse also increases the probability of marriage, the popularly known as shotgun marriages. The marriage and cohabitation expectations of young women appear to be a relevant issue when having a child at a young age (Manning 1993; Wolfe et al. 2007). Then, the inclusion of these endogenous factors would lead to bias our estimates. Being aware of this, we have repeated the analysis, adding controls for whether adolescent women have never been married. Table 2.6 presents our findings. As expected, never-married adolescent women are less likely to be teen mothers. Oddly enough, our estimate of the impact of culture on the probability of being a teen mother does not change.

Similarly, the income variables are not included in the baseline model because of potential endogeneity concerns. Teen mothers live in poor families in higher proportion than non-teen mothers (Hobcraft and Kiernan 2001). If teen mothers are those living in poor families and having low income expectations, controlling for income variables would lead to bias our results. Mindful of this, we have repeated the analysis by adding a dummy variable that takes the value of 1 if a woman reports that her family is in poverty. Estimated coefficients are shown in Table 2.7. As before, our coefficient of interest does not vary substantially in Column (1), it remains positive and statistically significant, although its impact decreases slightly.

Religious affiliation can also be an important determinant of fertility decisions among teen women (Cooksey 1990). As previously, the introduction of these variables can be problematic if they are highly correlated with unobserved determinants of teen fertility. For example, the use of contraceptive methods, which is unobserved, is related

[35] It is possible to argue that the level of education of adolescent women is an endogenous factor which can bias our estimates. As with the rest of potential endogenous variables, for consistency, we have also repeated the analysis without controls for educational level and results do not vary although we do not show the results in the chapter.

with the probability of getting pregnant but it is also correlated with the religious affiliation of women since some religions reject the use of these methods. Then, adding controls for religion affiliation may generate biased estimates. Being aware of this problem, we have run our main regression after adding controls for religion variables in Columns (2) and (3) of Table 2.7. Note that we have separately considered the religious affiliation when the subjects are 19, Column (3), and the religious affiliation in which they were raised, Column (2). Results show that only those women who were raised in the Roman Catholic religion are less likely to be teen mothers. With respect to our variable of interest, once again, the impact of culture on the probability of being a teen mother remains unchanged.

The NLSY79 also reports the family size of the respondents. Since this variable can also generate endogeneity concerns, we have not included it in the main analysis (Cooksey 1990). Just to check whether our results are robust to the inclusion of the family size, we have repeated the analysis including this variable. We observe that our results are quite similar. Finally, we have added all controls in Column (5) of Table 2.7. It is again comforting that our results do not change, even while we are conscious of the endogeneity problems that the inclusion of these variables can generate.

In Table 2.8, we have included other personal characteristics that are potential determinants of fertility decisions. As before, they are not added to the baseline analysis, mainly because they can bias our estimates. Since teen mothers are more likely to grow up under mono-parental families, or without parents at all (Painter and Levine 2000), if an unobserved process jointly determines family structure and the fertility behavior of adolescent women, adding controls for family structure may lead to biased results. We have checked whether our results vary after adding variables picking up the effect of family structure. Columns (1), (2) and (3) include variables controlling for whether respondent's father, mother, or none of them are still living, respectively. Our results remain unchanged.

Risk attitudes can also be a determinant of fertility behavior of adolescent women (Cooper 2002). The omission of controls for this is due to the potential correlation of these risk attitude characteristics and the unobserved determinants of fertility decisions. Having knowledge of the endogeneity concerns, we have included in the analysis controls for risk attitudes to check whether our results do not vary. Column (4) controls for whether the respondent started drinking at least once a week when she was 16 or younger; Column (5) controls for whether the respondent ever had an abortion; Column

(6) includes a variable controlling for whether the respondent had used narcotics when she was 18 or younger; and Column (7) controls for whether the respondent had her first sexual intercourse when she was 16 or younger. As can be seen, our findings do not substantially change. Note that the interpretation of some of these results is difficult, due to the scarcity of observations and the potential difference between the response young women give to this kind of question in a survey, and what they actually do.

Finally, Columns (8), (9) and (10) include controls for female attitudes that, again, can be related with unobserved determinants of fertility decisions. Although the inclusion of these variables generates doubts because of the endogeneity concerns, we have run the analysis to check the consistency of our findings. In these columns, women are considered traditional if they strongly agree/disagree with different statements (see Table 2.8 for a description). Again, after adding these variables, our results do not vary, nor do they change when we introduce all these controls in the same specification. We conclude that culture appears to play an important role in the fertility decisions of teen women.

**Table 2.6 - Teen Fertility Culture and the Probability of Being a Teen Mother Controlling for the Marital Status**
*(Dependent Variable: Teen Mother)*

| | (1) |
|---|---|
| Home Country Live Birth Rate | 0.021*** |
| | (0.005) |
| Enrolled High School | -0.146*** |
| | (0.024) |
| High School Graduated | -0.133*** |
| | (0.021) |
| Enrolled in College | -0.187*** |
| | (0.029) |
| Rural | -0.032* |
| | (0.014) |
| Never Married | -0.339*** |
| | (0.014) |
| Constant | 0.512*** |
| | (0.026) |
| Year FE | YES |
| Region FE | YES |
| Observations | 1885 |
| R-squared | 0.278 |

Notes: Home country live birth rate is defined as in Table 2.2. For both women who are teen mothers (have a child at 19 or less) and those who are not, we take their personal information when they are 19 years old. We estimate linear probability models where the dependent variable is equal to 1 if the woman is a teen mother and 0 otherwise. Column (1) controls for the marital status of women. Robust standard errors are in parenthesis. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

**Table 2.7 - Teen Fertility Culture and the Probability of Being a Teen Mother Including Family Characteristics and Religion**

*(Dependent Variable: Teen Mother)*

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Home Country Live Birth Rate | 0.021** | 0.023*** | 0.023** | 0.023*** | 0.021** |
| | (0.007) | (0.007) | (0.007) | (0.006) | (0.008) |
| Enrolled High School | -0.339*** | -0.336*** | -0.331*** | -0.334*** | -0.340*** |
| | (0.032) | (0.031) | (0.032) | (0.031) | (0.031) |
| High School Graduated | -0.250*** | -0.245*** | -0.244*** | -0.243*** | -0.254*** |
| | (0.018) | (0.020) | (0.020) | (0.020) | (0.018) |
| Enrolled in College | -0.375*** | -0.380*** | -0.379*** | -0.377*** | -0.381*** |
| | (0.018) | (0.020) | (0.021) | (0.021) | (0.020) |
| Rural | -0.012 | -0.018 | -0.021* | -0.018 | -0.012 |
| | (0.015) | (0.010) | (0.011) | (0.011) | (0.013) |
| Povstat | 0.048 | | | | 0.045 |
| | (0.043) | | | | (0.042) |
| Protestant | | -0.010 | | | 0.009 |
| | | (0.010) | | | (0.056) |
| Roman Catholic | | -0.027* | | | 0.015 |
| | | (0.014) | | | (0.065) |
| No Religion | | 0.032 | | | 0.046 |
| | | (0.024) | | | (0.061) |
| Protestant Current | | | -0.013 | | -0.021 |
| | | | (0.013) | | (0.066) |
| Roman Catholic Current | | | -0.035 | | -0.048 |
| | | | (0.019) | | (0.072) |
| No Religion Current | | | -0.023 | | -0.049 |
| | | | (0.022) | | (0.033) |
| Family Size | | | | -0.001 | 0.003 |
| | | | | (0.002) | (0.004) |
| Constant | 0.340*** | 0.351*** | 0.300*** | 0.336*** | 0.293*** |
| | (0.026) | (0.020) | (0.028) | (0.020) | (0.030) |
| Year FE | YES | YES | YES | YES | YES |
| Region FE | YES | YES | YES | YES | YES |
| Observations | 1767 | 1881 | 1882 | 1885 | 1761 |
| R-squared | 0.155 | 0.151 | 0.151 | 0.150 | 0.156 |

Notes: Home country live birth rate is defined as in Table 2.2. For both women who are teen mothers (have a child at 19 or less) and those who are not, we take their personal information when they are 19 years old. We estimate linear probability models where the dependent variable is equal to 1 if the woman is a teen mother and 0 otherwise. Column (1) adds a control for family poverty status. Column (2) includes controls for the religion within which women were raised (Other religions is omitted). Column (3) controls for the current religious affiliation (Other religions is omitted). Column (4) controls for the family size. Finally, Column (5) includes all controls. Robust standard errors are in parenthesis. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

**Table 2.8 - Teen Fertility Culture and the Probability of Being a Teen Mother Including Personal Characteristics**

*(Dependent Variable: Teen Mother)*

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Home Country Live Birth Rate | 0.028*** | 0.024** | 0.027** | 0.024*** | 0.023*** |
| | (0.008) | (0.008) | (0.008) | (0.006) | (0.007) |
| Enrolled High School | -0.277*** | -0.292*** | -0.275*** | -0.332*** | -0.335*** |
| | (0.043) | (0.038) | (0.047) | (0.031) | (0.038) |
| High School Graduated | -0.193*** | -0.210*** | -0.195*** | -0.241*** | -0.240*** |
| | (0.034) | (0.031) | (0.034) | (0.021) | (0.024) |
| Enrolled in College | -0.326*** | -0.346*** | -0.327*** | -0.374*** | -0.374*** |
| | (0.025) | (0.028) | (0.027) | (0.021) | (0.019) |
| Rural | -0.029** | -0.033** | -0.034** | -0.022 | -0.021 |
| | (0.012) | (0.010) | (0.011) | (0.013) | (0.015) |
| With Father | -0.016 | | | | |
| | (0.016) | | | | |
| With Mother | | 0.006 | | | |
| | | (0.041) | | | |
| Orphan | | | 0.020 | | |
| | | | (0.045) | | |
| Drink | | | | 0.046** | |
| | | | | (0.015) | |
| Abortion | | | | | 0.041 |
| | | | | | (0.030) |
| Constant | 0.285*** | 0.295*** | 0.273*** | 0.324*** | 0.267*** |
| | (0.033) | (0.025) | (0.044) | (0.024) | (0.027) |
| Year FE | YES | YES | YES | YES | YES |
| Region FE | YES | YES | YES | YES | YES |
| Observations | 1263 | 1282 | 1259 | 1863 | 1796 |
| R-squared | 0.126 | 0.135 | 0.128 | 0.153 | 0.151 |

Notes: Home country live birth rate is defined as in Table 2.2. For both women who are teen mothers (have a child at 19 or less) and those who are not, we take their personal information when they are 19 years old. Columns (1) and (2) include a variable for whether respondent´s father and mother are still alive, respectively. Column (3) controls for whether respondent is orphan. Column (4) controls for whether the respondent began drinking at least once a week when she was 16 years old or before. Column (5) controls for whether women ever had an abortion. All columns include controls for the level of education, whether the woman's current residence is rural, year fixed effects and region of current residence fixed effects. Robust standard errors are in parenthesis. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

**Table 2.8 - Teen Fertility Culture and the Probability of Being a Teen Mother Including Personal Characteristics (Continuation)**
*(Dependent Variable: Teen Mother)*

| | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|
| Home Country Live Birth Rate | 0.023*** | 0.016* | 0.023*** | 0.023*** | 0.023*** |
| | (0.007) | (0.009) | (0.006) | (0.006) | (0.006) |
| Enrolled High School | -0.342*** | -0.375*** | -0.333*** | -0.330*** | -0.335*** |
| | (0.036) | (0.078) | (0.033) | (0.031) | (0.031) |
| High School Graduated | -0.247*** | -0.316*** | -0.242*** | -0.240*** | -0.243*** |
| | (0.023) | (0.066) | (0.020) | (0.019) | (0.020) |
| Enrolled in College | -0.383*** | -0.450*** | -0.376*** | -0.374*** | -0.378*** |
| | (0.021) | (0.057) | (0.020) | (0.020) | (0.021) |
| Rural | -0.024* | 0.021 | -0.019 | -0.016 | -0.018 |
| | (0.013) | (0.014) | (0.011) | (0.011) | (0.011) |
| Drug | 0.052 | | | | |
| | (0.046) | | | | |
| Sex Under 16 | | 0.149** | | | |
| | | (0.050) | | | |
| Traditional I | | | -0.030 | | |
| | | | (0.022) | | |
| Traditional II | | | | 0.132* | |
| | | | | (0.061) | |
| Traditional II | | | | | 0.004 |
| | | | | | (0.027) |
| Constant | 0.278*** | 0.347*** | 0.272*** | 0.272*** | 0.273*** |
| | (0.031) | (0.069) | (0.028) | (0.029) | (0.028) |
| Year FE | YES | YES | YES | YES | YES |
| Region FE | YES | YES | YES | YES | YES |
| Observations | 1826 | 515 | 1882 | 1882 | 1882 |
| R-squared | 0.155 | 0.244 | 0.151 | 0.154 | 0.150 |

Notes: Column (6) controls for whether respondent had used narcotics when she was 18 years old or before. Column (7) controls for whether respondent had her first sexual intercourse when she was 16 years old or before. Columns (8), (9) and (10) include controls for female attitudes. In Column (8) women are considered traditional if they strongly disagree with the affirmation "Men should share the work around the house with women, such as doing dishes, cleaning and so forth". In Column (9) women are considered traditional if they strongly agree with the affirmation "It is much better for everyone concerned if the man is the achiever outside the home and the woman takes care of the home and family". In Column (10) women are considered traditional if they strongly agree with the affirmation "Women are much happier if they stay at home and take care of their children". ***, **, * Significant at the 1%, 5%, 10% level, respectively.

## *2.4.3 Unobserved heterogeneity and differences across ancestries*

In this analysis, we consider more deeply the possibility that our estimates could be picking up differences in other country of origin characteristics, in addition to or instead of fertility culture. For example, it is possible to argue that those women originating from countries where women marry young also have children when they are younger. Similarly, if young women from poor countries of origin have a child (Becker 1960; Singh 1998), then the differences in fertility of young women could be due to poverty conditions (considering that this situation is translated to the US) rather than to fertility culture.

Although this problem should be mitigated by adding controls for marital status and poverty status at the individual level (see above), we have tested this further by adding home country characteristics in Table 2.9. We first add per capita GDP at the country of origin level (data from the United Nations Statistics Division, see Appendix B) to our main model in Column (1). Surprisingly, we obtain a positive relationship between per capita GDP and the probability of teen motherhood. This can be explained by differences in migration patterns. For example, it can be argued that rich people living in poor countries tend to migrate to more developed countries, such as the US; then, the fertility behavior of these adolescent women can be different from their counterparts in their ancestor home country. In this case, our cultural proxy is still positively correlated with the probability of being a teen mother, and the magnitude of the effect has slightly increased. We then incorporate controls for the average age at first marriage at the country level (see, for a description, Appendix B). Results are reported in Column (2) of Table 2.9. As expected, an increase in the age at first marriage decreases the probability of being a teen mother. In this case, the coefficient picking up the cultural effect decreases in magnitude.

Finally, we introduce controls for the minimum legal age of consent (several sources, see Appendix B) in each country, in Column (3). Again, as expected, an increase in the minimum legal age of consent decreases the probability of being a teen mother. The effect of culture on the probability of being a teen mother remains positive and statistically significant. We also add all controls in Column (4). In this case, coefficients on the control variables turn out to be non-significant. Our variable of interest is still positive and statistically significant. It appears that we are not misguidedly interpreting our results as evidence of culture.

### *2.4.4 Placebo tests*

We present additional evidence that we are not capturing unobserved characteristics, such as risk attitudes or norms that can be correlated with our cultural proxy. If, for example, these unobserved variables were the main factor in divergence in the fertility behavior of adolescent women, we would expect it to affect the fertility behavior of all women. Similarly, unobserved characteristics of the parents of the young women that

can also be correlated with our cultural proxy, and that may impact the fertility behavior of adolescent women, can certainly have an effect on the family income.

**Table 2.9 - Teen Fertility Culture and the Probability of Being a Teen Mother, Cross-Country Differences**

*(Dependent Variable: Teen Mother)*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Home Country Live Birth Rate | 0.029*** | 0.020** | 0.024*** | 0.027*** |
| | (0.006) | (0.006) | (0.006) | (0.007) |
| Enrolled High School | -0.336*** | -0.336*** | -0.334*** | -0.336*** |
| | (0.031) | (0.031) | (0.031) | (0.031) |
| High School Graduated | -0.244*** | -0.243*** | -0.243*** | -0.243*** |
| | (0.020) | (0.020) | (0.020) | (0.020) |
| Enrolled in College | -0.378*** | -0.378*** | -0.378*** | -0.378*** |
| | (0.020) | (0.020) | (0.020) | (0.020) |
| Rural | -0.019 | -0.019 | -0.018 | -0.019 |
| | (0.011) | (0.011) | (0.011) | (0.011) |
| Per Capita GDP | 0.005** | | | 0.003 |
| | (0.002) | | | (0.003) |
| Age at First Marriage | | -0.014** | | -0.003 |
| | | (0.005) | | (0.012) |
| Age Consensual Relations | | | -0.005* | -0.002 |
| | | | (0.003) | (0.005) |
| Constant | 0.287*** | 0.656*** | 0.409*** | 0.394 |
| | (0.025) | (0.130) | (0.041) | (0.246) |
| Year FE | YES | YES | YES | YES |
| Region FE | YES | YES | YES | YES |
| Observations | 1885 | 1885 | 1885 | 1885 |
| R-squared | 0.151 | 0.150 | 0.150 | 0.151 |

Notes: Home country live birth rate is defined as in table 2.2. For both women who are teen mothers (have a child at 19 or less) and those who are not, we take their personal information when they are 19 years old. We estimate linear probability models where the dependent variable is equal to 1 if the woman is a teen mother and 0 otherwise. Column (1) controls for the per capita GDP of the country of origin (see Appendix B for a description). Column (2) controls for the mean age at first marriage in each country in 1980. Column (3) controls for the minimum legal age of consent. Finally, Column (4) includes all controls. Robust standard errors are in parenthesis. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

To tackle this issue, we follow Fernández and Fogli (2009) and Furtado et al. (2013) by running placebo tests. We first consider as dependent variable an indicator variable that takes the value of 1 if the women forming the sample have been a mother in any period of their life. Results are reported in Column (1) of Table 2.10. We also repeat the analysis, but now including as dependent variable the total net family income measured in logarithm in Column (2). As can be seen, we obtain no statistically significant coefficient of the cultural proxy, implying that these unobserved factors are not likely to bias our main point estimates.

**Table 2.10 - Teen Fertility Culture and the Probability of Being a Teen Mother**
**Placebo tests**
*(Dependent Variables: Mother and Log Total Net Family Income)*

| | (1) | (2) |
|---|---|---|
| Home Country Live Birth Rate | -0.010 | 0.009 |
| | (0.018) | (0.008) |
| Enrolled High School | -0.187** | 0.440*** |
| | (0.073) | (0.102) |
| High School Graduated | -0.091** | 0.574*** |
| | (0.030) | (0.078) |
| Enrolled in College | -0.174*** | 1.024*** |
| | (0.041) | (0.096) |
| Rural | 0.039 | -0.155*** |
| | (0.037) | (0.033) |
| Constant | 0.830*** | 9.224*** |
| | (0.067) | (0.150) |
| Year FE | YES | YES |
| Region FE | YES | YES |
| Observations | 1885 | 1481 |
| R-squared | 0.031 | 0.105 |

Notes: Home country live birth rate is defined as in table 2.2. For both women who are teen mothers (have a child at 19 or less) and those who are not, we take their personal information when they are 19 years old. Column (1) includes the variable mother as dependent variable that takes value 1 if the woman is a mother and 0 otherwise. Column (2) includes the logarithm of the Total Net Family Income as dependent variable. All columns include controls for the level of education, whether the woman's current residence is rural, year fixed effects and region of current residence fixed effects. Robust standard errors are in parenthesis. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

### *2.4.5 Fertility decisions*

Although in the previous subsection we have included as controls a range of characteristics of women when they are 19 years old, it could be argued that what is relevant in determining the effect of culture are the characteristics of these women when they decide, or not, to have a child. One of these potential factors may be the education level of adolescent women at the time of the decision. It is even possible to hypothesize that the social norms and preferences of adolescent women are better measured when they decide, or not, to have a child, thus the cultural proxy should be measured at the time of the decision.

To further analyze this issue, we incorporate in our analysis the home country live birth rate, measured in the year of the birth, if they are teen mothers, and when they are 18 or 19 years old, if they are not teen mothers. In the case of teen mothers, we choose the year of birth as a proxy of the characteristics of women when they decide to have a child. We consider this a good proxy, since the decision to have a child, or to abort, is normally taken in the period between becoming pregnant (information on when these women become pregnant is not available), and the legal limit of abortion, then close to the date in which this young women have the child. For non-teen mothers, it is more

complicated, although since almost 70% of women have their children when they are 18 or 19 years old, with the greater percentage being when they are 19 (40%), it is possible to argue that non-teen mothers took the decision not to have a child when they were 18 and 19 years old.[36]

We also introduce in our analysis controls for the level of education of women when they decide, or not, to have a child. As before, for teen mothers, we would not expect important variations in these dummies during the short period between taking the decision and having the child. Results are shown in Table 2.11. As can be seen, our findings are maintained even after using information of the moment in which women take the decision. In sum, the fertility culture of adolescent women appears to be a relevant factor in determining fertility decisions.

**Table 2.11 - Teen Fertility Culture and the Probability of Being a Teen Mother Using Live Birth Rates of the Year of Birth of the First Child**
*(Dependent Variable: Teen Mother)*

| | (1) | (2) | (3) |
|---|---|---|---|
| Home Country Live Birth Rate | 0.038*** | 0.024** | 0.026*** |
| | (0.010) | (0.008) | (0.007) |
| Enrolled High School | -0.337*** | -0.334*** | -0.321*** |
| | (0.033) | (0.031) | (0.064) |
| High School Graduated | -0.240*** | -0.243*** | -0.247** |
| | (0.019) | (0.020) | (0.087) |
| Enrolled in College | -0.375*** | -0.377*** | -0.338*** |
| | (0.019) | (0.020) | (0.087) |
| Rural | -0.018 | -0.018 | -0.002 |
| | (0.011) | (0.011) | (0.016) |
| Enrolled High School at | | | -0.088 |
| Fertility Decision | | | (0.065) |
| High School Graduated at | | | -0.002 |
| Fertility Decision | | | (0.086) |
| Enrolled in College at | | | -0.120 |
| Fertility Decision | | | (0.075) |
| Constant | 0.297*** | 0.331*** | 0.368*** |
| | (0.026) | (0.025) | (0.018) |
| Year FE | YES | YES | YES |
| Region FE | YES | YES | YES |
| Observations | 1885 | 1885 | 1538 |
| R-squared | 0.155 | 0.150 | 0.227 |

Notes: Home country live birth rate is the number of live births per hundred women under 20. In Columns (1) and (2), the home country live birth rate is measured in the year of birth of the first child if the woman is a teen mother, or when a young woman is 19 or 18 if they are not teen mothers, respectively. We estimate linear probability models where the dependent variable is equal to 1 if the woman is a teen mother and 0 otherwise. All columns include controls for the level of education, whether the woman's current residence is rural, year fixed effects and region of current residence fixed effects. Robust standard errors are in parenthesis. In Column (3), the home country live birth rate is measured when women were 19 years old. In this column, we add dummies to control for the education level of women when they take the fertility decisions. For teen mothers it is the year in which they have their first child and for non-teen mothers it is assumed to be the year in which they are 18 years old. Observations are weighted using survey weights. ***, **, * Significant at the 1%, 5%, 10% level, respectively.

[36] Note that problems of availability of data make quite complicated a consistent comparison at the country level with a sample of women under 18.

# 2.5 Conclusions

This chapter examines the impact of culture on teen motherhood. To pick up its effect, we exploit the variation in fertility rates of adolescent women by country of origin of their ancestors. The differences in fertility rates of adolescent women by national origin can be interpreted as supporting evidence of the relevance of fertility culture. This epidemiological approach allows us to strictly separate the impacts of markets and institutions from the effects of culture in ascertaining fertility decisions of teen women. We find that home country live birth rates, our main cultural proxy, have economically and statistically significant effects on the probability of being a teen mother.

Our findings are robust to alternative specifications, to different samples, and to individual characteristics, measured when women take the decision, or not, to have a child. In addition, we check whether unobserved heterogeneity across ethnic groups is driving our results, by adding to the main analysis controls for home country characteristics, such as the average age at first marriage, per capita GDP, and the minimum legal age of consent. In all specifications, the estimated coefficient on home country live birth rates varies very little. Placebo tests also suggest that we are not erroneously interpreting the impact of our cultural proxy.

Our results suggest that differences in fertility rates of teen women by ethnicity can explain, at least in part, the fertility behavior of adolescent women who have spent their lives in the US. This can be understood as supporting evidence that cultural differences are, at least, a partial explanation for the variations in fertility rates of adolescent women across countries.

This finding can explain the differences in the effects of traditional or conventional policies, such as the diffusion of contraception information, and the improvement of adolescent sex education. Policy makers should take cultural differences into consideration to act more efficiently in decreasing teen motherhood rates in the US. The tools used for this should be focused on the specific characteristics of each segment of teenagers by ethnicity, for example, by providing family planning specialists of appropriate racial/ethnic background, or by hiring social workers who can more fully understand the specific circumstances and culture of teen women. In our opinion, this investment in policies to prevent teenage pregnancies will be more appropriate than policies conducted to help lone mothers (Himmelweit et al. 2004).

# 2.A Appendix A: Logit / Probit models

**Table A.- Teen Fertility Culture and the Probability of Being a Teen Mother Using Logit and Probit Models**

*(Dependent Variable: Teen Mother)*

| | (1) | (2) | (3) |
|---|---|---|---|
| Home Country Live Birth Rate | 0.023*** | 0.195*** | 0.107*** |
| | (0.006) | (0.040) | (0.022) |
| Enrolled High School | -0.335*** | -2.361*** | -1.303*** |
| | (0.031) | (0.475) | (0.245) |
| High School Graduated | -0.243*** | -1.362*** | -0.791*** |
| | (0.020) | (0.119) | (0.069) |
| Enrolled in College | -0.378*** | -3.994*** | -2.022*** |
| | (0.020) | (0.242) | (0.109) |
| Rural | -0.018 | -0.190* | -0.114* |
| | (0.011) | (0.104) | (0.063) |
| Constant | 0.334*** | -1.033*** | -0.584*** |
| | (0.023) | (0.141) | (0.094) |
| Year FE | YES | YES | YES |
| Region FE | YES | YES | YES |
| Observations | 1885 | 1885 | 1885 |
| R-squared | 0.150 | | |
| Pseudo R-squared | | 0.207 | 0.209 |

Notes: Home country live birth rate is defined as the number of live births per hundred women under 20 and is measured in the year in which women were 19 years old. The sample consists of women aged 19 and born in the US. For both women who are teen mothers (these who become mothers when they are 19 years old or less) and those who are not teen mothers we take their personal information in the year in which they are 19 years old. We estimate a linear probability model in Column (1) –our baseline regression-, a logit model in Column (2) and a probit model in Column (3), where the dependent variable is an indicator variable equals to 1 if the woman is a teen mother, and 0 otherwise. All columns include controls for the level of education, whether the woman's current residence is rural, year fixed effects and region of current residence fixed effects. Robust standard errors are in parenthesis. Observations are weighted using survey weights that adjust both for the complex survey design and for using data from multiple years. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

# 2.B Appendix B: Data sources and definition of variables

| Variable | Definition | Source |
|---|---|---|
| **Dependent Variable** | | |
| Teen Mother | 1 if woman is a teen mother (she had her first child under 20 years old). 0 otherwise | NLSY79 |
| Mother | 1 if woman is a mother. 0 otherwise | NLSY79 |
| Log tnfi | Logarithm of the total net family income | NLSY79 |
| **Control Variables** | | |
| Enrolled High School | 1 if woman reports that is enrolled in high school. 0 otherwise | NLSY79 |
| High School Graduated | 1 if woman reports that is not enrolled but is high school graduated. 0 otherwise | NLSY79 |
| Enrolled in College | 1 if woman reports that is enrolled in college. 0 otherwise | NLSY79 |
| Rural | 1 if woman reports that her current residence is rural. 0 if it is urban | NLSY79 |
| Region FE | Dummy variables for the region of residence (North East (omitted), North Central, South, and West) | NLSY79 |
| Year FE | Dummy variables for the years: 1979, 1980, 1981, 1982, and 1983 (1984 omitted) | NLSY79 |
| Never Married | 1 if woman has never been married. 0 otherwise | NLSY79 |
| Povstat | 1 if woman reports that in 1979 her family was in poverty. 0 otherwise | NLSY79 |
| Protestant | 1 if woman reports that she was raised in a protestant religion (Protestant, Baptist, Episcopalian, Lutheran, Methodist, Presbyterian). 0 otherwise | NLSY79 |

| | | |
|---|---|---|
| Roman Catholic | 1 if woman reports that she was raised in the Roman Catholic religion. 0 otherwise | NLSY79 |
| No Religion | 1 if woman reports that she was raised following no religion. 0 otherwise | NLSY79 |
| Protestant Current | 1 if woman reports that her current religious affiliation is Protestant (Protestant, Baptist, Episcopalian, Lutheran, Methodist, Presbyterian). 0 otherwise | NLSY79 |
| Roman Catholic Current | 1 if woman reports that her current religious affiliation is Roman Catholic. 0 otherwise | NLSY79 |
| No Religion Current | 1 if woman reports that her current religious affiliation is none. 0 otherwise | NLSY79 |
| Family Size | Number of family members, ranging from 1 to 14 | NLSY79 |
| With Father | 1 if woman´s biological father is still alive. 0 otherwise | NLSY79 |
| With Mother | 1 if woman´s biological mother is still alive. 0 otherwise | NLSY79 |
| Orphan | 1 if woman´s father and mother are both dead. 0 otherwise | NLSY79 |
| Abortion | 1 if woman has ever had an abortion. 0 otherwise | NLSY79 |
| Use Drugs | 1 if woman first took narcotics when she was 18 years old or younger. 0 otherwise | NLSY79 |
| Teen Sex | 1 if woman had her first sexual intercourse when she was 16 years old or younger. 0 otherwise | NLSY79 |
| Traditional I | 1 if woman strongly disagrees with the affirmation “Men should share the work around the house with women, such as doing dishes, cleaning, and so forth”. 0 otherwise | NLSY79 |
| Traditional II | 1 if woman strongly agrees with the affirmation “It is much better for everyone concerned if the man is the achiever outside the home and the woman takes care of the home and family”. 0 otherwise | NLSY79 |

| | | |
|---|---|---|
| Traditional III | 1 if woman strongly agrees with the affirmation “Women are much happier if they stay at home and take care of their children”. 0 otherwise | NLSY79 |

**Cultural Proxies**

| | | |
|---|---|---|
| Home Country Live Birth Rates of Women Under 20 | The number of live births per hundred women under 20 | Data on Live Birth Rates of women under 20 were obtained from the UN Demographic Yearbooks (several issues). I use data related to the Home Country Live Birth Rates of the year in which adolescent women were 19 years old (1979-1984). In the case of Germany I calculate the data based on the information available about the Federal Republic of Germany and the Former German Democratic Republic and in the case of United Kingdom, for the years 1979-1981 I calculate the data based on the information available about England and Wales, Northern Ireland and Scotland. I have data for each country of origin and each year, with the exception of Italy 1983 (I use 1982), Mexico 1981-1984 (I use 1980 for 1981 and 1982 and I use 1985 for 1983 and 1984), Spain 1979 and 1981-1984 (I use 1978 for 1979 and 1981 for the rest of years) and Portugal 1982 (I use 1981) |
| Home Country Live Birth Rate 1950 | The number of live births per hundred women under 20 in 1950 | Data on Live Birth Rates in 1950 of women under 20 were obtained from the UN Demographic Yearbooks (several issues). In the case of Germany I calculate the data based on the information available about the Federal Republic of Germany and the Former German Democratic Republic and in the case of United Kingdom, for the year 1950 I calculate the data based on the information available about England and Wales and Scotland. I have data for each country of origin and each year, with the exception of Italy (I use 1951), Germany (1955), Ireland (1956), and Mexico (1955) |
| Home Country Live Birth Rate 1960 | The number of live births per hundred women under 20 in 1960 | Data on Live Birth Rates in 1960 of women under 20 were obtained from the UN Demographic Yearbooks (several issues). In the case of Germany I calculate the data based on the information available about the Federal Republic of Germany and the Former German Democratic Republic and in the case of United Kingdom, for the year 1960 I calculate the data based on the information available about England and Wales and Scotland. I have data for each country of origin and each year, with the exception of Ireland (1961) |
| Home Country Live Birth Rate 1970 | The number of live births per hundred women under 20 in 1970. | Data on Live Birth Rates in 1970 of women under 20 were obtained from the UN Demographic Yearbooks (several issues). In the case of Germany I calculate the data based on the information available about the Federal Republic of Germany and the Former German Democratic Republic and in the case of United Kingdom, for the year 1970 I calculate the data based on the information available about England and Wales and Scotland. I have data for each country of origin and each year, with the exception of Italy (I use 1971) |
| Home Country Live Birth Rate 1980 | The number of live births per hundred women under 20. in 1980 | Data on Live Birth Rates in 1980 of women under 20 were obtained from the UN Demographic Yearbooks (several issues). In the case of Germany I calculate the data based on the information available about the Federal Republic of Germany and the Former German Democratic Republic and in the case of United Kingdom, for the year 1980 I calculate the data based on the information available about England, Northern Ireland and Wales and Scotland. I have data for each country of origin and each year, with the exception of Spain (I use 1981) |
| Home Country Live Birth Rate 1990 | The number of live births per hundred women under 20 in 1990 | Data on Live Birth Rates in 1980 of women under 20 were obtained from the UN Demographic Yearbooks (several issues). In the case of Germany I calculate the data based on the information available about the Federal Republic of Germany and the Former German Democratic Republic. I have data for each country of origin and each year, with the exception of Germany (I use 1989) and Portugal (1989) |

| | | |
|---|---|---|
| Home Country Live Birth Rate 2000 | The number of live births per hundred women under 20 in 2000 | Data on Live Birth Rates in 2000 of women under 20 were obtained from the UN Demographic Yearbooks (several issues). I have data for each country of origin and each year, with the exception of Germany (I use 2001), Ireland (1999), Mexico (1995), Spain (2001), Poland (2001), Portugal (2001) and United Kingdom (1999) |
| Home Country Live Birth Rate 2005 | The number of live births per hundred women under 20 in 2005 | Data on Live Birth Rates in 2005 of women under 20 were obtained from the UN Demographic Yearbooks (several issues). I have data for each country of origin and each year, with the exception of Germany (2006), Mexico (1995), Poland (2006) and United Kingdom (2004) |
| Home Country Live Birth Rates of Women Under 20 of the Year in Which They Were Born | The number of live births per hundred women under 20 | Data on Live Birth Rates of women under 20 were obtained from the UN Demographic Yearbooks (several issues). I use data related to the Home Country Live Birth Rates of the year in which women were born (1960-1965). In the case of Germany I calculate the data based on the information available about the Federal Republic of Germany and the Former German Democratic Republic and in the case of United Kingdom, for the years 1960-1965 I calculate the data based on the information available about England and Wales and Scotland. I have data for each country of origin and each year, with the exception of Ireland in 1960 and 1962-1965 (I use 1961 for 1960, 1962 and 1963 and I use 1966 for 1964 and 1965), Mexico 1961-1964 (I use 1960 for 1960 and 1962 and I use 1965 for 1963 and 1964), Spain 1961-1965 (I use 1960 for 1961-1964 and I use 1968 for 1965) and Portugal 1961, 1962 and 1965 (I use 1960 for 1961, 1963 for 1962 and 1964 for 1965) |
| Home Country Live Birth Rates of Women Under 20 of the Year in Which They Take the Fertility Decision | The number of live births per hundred women under 20 | Data on Live Birth Rates of women under 20 were obtained from the UN Demographic Yearbooks (several issues). I use data related to the Home Country Live Birth Rates of the year in which their first child was born (1979-1984) for teen mothers and of the year in which they were 19 years old and 18 years old (1979-1984) for non-teen mothers. In the case of Germany I calculate the data based on the information available about the Federal Republic of Germany and the Former German Democratic Republic and in the case of United Kingdom, for the years 1979-1981 I calculate the data based on the information available about England and Wales, Northern Ireland and Scotland. I have data for each country of origin and each year, with the exception of Italy 1983 (I use 1982), Mexico 1981-1984 (I use 1980 for 1981 and 1982 and I use 1985 for 1983 and 1984), Spain 1979 and 1981-1984 (I use 1978 for 1979 and 1981 for the rest of years) and Portugal 1982 (I use 1981) |

**Country of Origin Variables**

| | | |
|---|---|---|
| Gross Domestic Product (GDP) | Per capita GDP in hundreds of thousands of US dollars | United Nations Statistics Division (2010). The value of this variable for teen mothers is of the year in which their first child was born and for non-teen mothers of the year in which they were 19 years old |
| Age at First Marriage | The average length of single life expressed in years among those women who marry before age 50 in 1980 | For Germany, Spain, France, Ireland, Italy, Poland, Portugal and United Kingdom I use data from the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. For Cuba and Mexico I use data from World Marriage Data 2008 (United Nations, Department of Economic and Social Affairs, Population Division). In the case of Cuba I use data of the year 1981. |
| Age Consensual Relations | The minimum legal age for having consensual relations | Data for Mexico comes from the Federal Penal Code, last published 17/04/2012 (art. 261-263). Data for Germany comes from the German Criminal Code (art. 176). Data for Ireland comes from the Criminal Law (Sexual Offenders) Act. 2006. Data for Italy comes from the Italian Penal Code (art. 609). Data for Portugal comes from the Portuguese Penal Code. Data for Spain comes from the Spanish Civil Code (art. 181-183). Data for United Kingdom comes from the Sexual Offences Act. 2003. Data for France comes from the French Penal Code (art. 227-25). Data for Polish comes from the Criminal Code (art. 200). Data for Cuba comes from the Cuban Penal Code (art. 300). |

# References

Aassve, A. (2003) The Impact of Economic Resources on Premarital Childbearing and Subsequent Marriage among Young American Women, *Demography*, **40**, 105-126.

Bailey, M., Guldi, M., Davido, A. and Buzuvis, E. (2011) Early Legal Access: Laws and Policies Governing Contraceptive Access, 1960-1980, *Working Paper*. http://www-personal.umich.edu/~baileymj/ELA_laws.pdf

Becker, G. (1960) An Economic Analysis of Fertility, in Ansley J. Coale, ed., *Demographic and Economic Change in Developed Countries*, Princeton NJ: Princeton University Press, 209-240.

Berry, E., Shillington, A., Peak, T. and Hohman, M. (2000) Multi-Ethnic Comparison of Risk and Protective Factors for Adolescent Pregnancy, *Child and Adolescent Social Work Journal*, **17**, 79-96.

Blank, R. (1995) Teen Pregnancy: Government Programs Are not the Cause, *Feminist Economics*, **1**, 47-58.

Black, S., Devereux, P. and Salvanes, K. (2008) Staying in the Classroom and Out of the Maternity Ward? The Effect of Compulsory Schooling Laws on Teenage Births, *The Economic Journal*, **118**, 1025-1054.

Blau F., Kahn, L., Yung-Hsu Liu, A. and Papps, K. (2013) The Transmission of Women's Fertility, Human Capital, and Work Orientation across Immigrant Generations, *Journal of Population Economics*, **26**, 405-435.

Brügger, B., Lalive, R. and Zweimüller, J. (2009) Does Culture Affect Unemployment? Evidence from Röstigraben, *IZA DP No. 4283*.

Carroll, C., Rhee, B. and Rhee, C. (1994) Are There Cultural Effects on Saving? Some Cross-Sectional Evidence, *The Quarterly Journal of Economics*, **109**, 685-699.

Chevalier, A. and Viitanen, T. (2003) The Long-run Labour Market Consequences of Teenage Motherhood in Britain, *Journal of Population Economics*, **16**, 323-343.

Contreras, D. and Plaza, G. (2010) Cultural Factors in Women's Labor Force Participation in Chile, *Feminist Economics*, **16**, 27-46.

Cooksey, E. (1990) Factors in the Resolution of Adolescent Premarital Pregnancies, *Demography*, **27**, 207-218.

Cooper, M. (2002) Alcohol Use and Risky Sexual Behavior among College Students and Youth: Evaluating the Evidence, *Journal of Studies on Alcohol and Drugs*, **14 suppl.**, 101-117.

Donohue, J., Grogger, J. and Levitt, S. (2009) The Impact of Legalized Abortion on Teen Childbearing, *American Law and Economic Review*, **11**, 24-46.

Fernández, R. (2007) Women, Work, and Culture, *Journal of the European Economic Association*, **5**, 305-332.

Fernández, R. (2011) Does Culture Matter?, *Chapter 11 in J. Benhabib, M. O. Jackson and A. Bisin, editors, Handbook of Social Economics*, Vol. 1A, North-Holland, 481-510.

Fernández, R. and Fogli, A. (2006) Fertility: The Role of Culture and Family Experience, *Journal of the European Economic Association*, **4**, 552-561.

Fernández, R. and Fogli, A. (2009) Culture: An Empirical Investigation of Beliefs, Work, and Fertility, *American Economic Journal: Macroeconomics*, **1**, 146-177.

Francesconi, M. (2008) Adult Outcomes for Children of Teenage Mothers, *Scandinavian Journal of Economics*, **110**, 93–117.

Furtado, D., Marcén, M. and Sevilla-Sanz, A. (2013) Does Culture Affect Divorce? Evidence from European Immigrants in the US, *Demography*, **50**, 1013-1038.

Giuliano, P. (2007) Living Arrangements in Western Europe: Does Cultural Origin Matter?, *Journal of the European Economic Association*, **5**, 927-952.

Himmelweit, S., Bergmann, B., Green, K., Albelda, R., the Women's Committee of One Hundred, and Koren, C. (2004) Lone Mothers: What Is to Be Done?, *Feminist Economics*, **10**, 237-264.

Hobcraft, J. and Kiernan, K. (2001) Childhood Poverty, Early Motherhood and Adult Social Exclusion, *The British Journal of Sociology*, **52**, 495-517.

Hofferth, S., Reid, L. and Mott, F. (2001) The Effects of Early Childbearing on Schooling Over Time, *Family Planning Perspectives*, **33**, 259-267.

Hofferth, S. and Goldscheider, F. (2010) Family Structure and the Transition to Early Parenthood, *Demography*, **47**, 415-437.

Hoffman, S., Foster, E. and Furstenberg, F. (1993) Re-evaluating the Costs of Teenage Childbearing, *Demography*, **30**, 1-13.

Klepinger, D., Lundberg, S. and Plotnick, R. (1999) How Does Adolescent Fertility Affect the Human Capital and Wages of Young Women, *Journal of Human Resources*, **34**, 421-448.

Lee, I. (1997) Adolescents, in Goreham, G. A. (ed.), Encyclopedia of Rural America. Santa Barbara, CA: ABC-CLIO.

Lopoo, L. (2004) The Effect of Maternal Employment on Teenage Childbearing, *Journal of Population Economics*, **17**, 681-702.

Lopoo, L. and DeLeire, T. (2006) Did Welfare Reform Influence the Fertility of Young Teens?, *Journal of Policy Analysis and Management*, **25**, 275–298.

Lundberg, S. and Plotnick, R. (1995) Adolescent Premarital Childbearing: Do Economic Incentives Matter?, *Journal of Labor Economics*, **13**, 177-200.

Manlove, J. (1998) The Influence of High School Dropout and School Disengagement on the Risk of School-Age Pregnancy, *Journal of Research on Adolescence*, **8**, 187-200.

Manning, W. (1993) Marriage and Cohabitation Following Premarital Conception, *Journal of Marriage and Family*, **55**, 839-850.

Miller, A. (2011) The Effect of Motherhood Timing on Career Path, *Journal of Population Economics*, **24**, 1071-1100.

Monstad, K., Propper, C. and Salvanes, K. (2011) Is Teenage Motherhood Contagious? Evidence from a Natural Experiment, *CEPR DP No. 8505*.

Painter, G. and Levine, D. (2000) Family Structure and Youths' Outcomes: Which correlations are causal?, *Journal of Human Resources*, **35**, 524-549.

Singh, S. (1998) Adolescent Childbearing in Developing Countries: A Global Review, *Studies in Family Planning*, **29**, 117-136.

South, S. (1999) Historical Changes and Life Course Variation in the Determinants of Premarital Childbearing, *Journal of Marriage and Family*, **61**, 752-763.

Stevenson, B. and Wolfers, J. (2007) Marriage and Divorce: Changes and their Driving Forces, *Journal of Economic Perspectives*, **21**, 27-52.

UNESCO (2001) Universal declaration on cultural diversity, 31st Session of the General Conference of Unesco, Paris.

Webbink, D., Martin, N. and Visscher, P. (2008) Does Teenage Childbearing Increase Smoking, Drinking and Body Size?, *Journal of Health Economics*, **27**, 888–903.

Wolfe, B., Haveman, R., Pence, K. and Schwabish, J. (2007) Do Youth Non-Marital Childbearing Choices Reflect Income and Relationship Expectations?, *Journal of Population Economics*, **20**, 73-100.

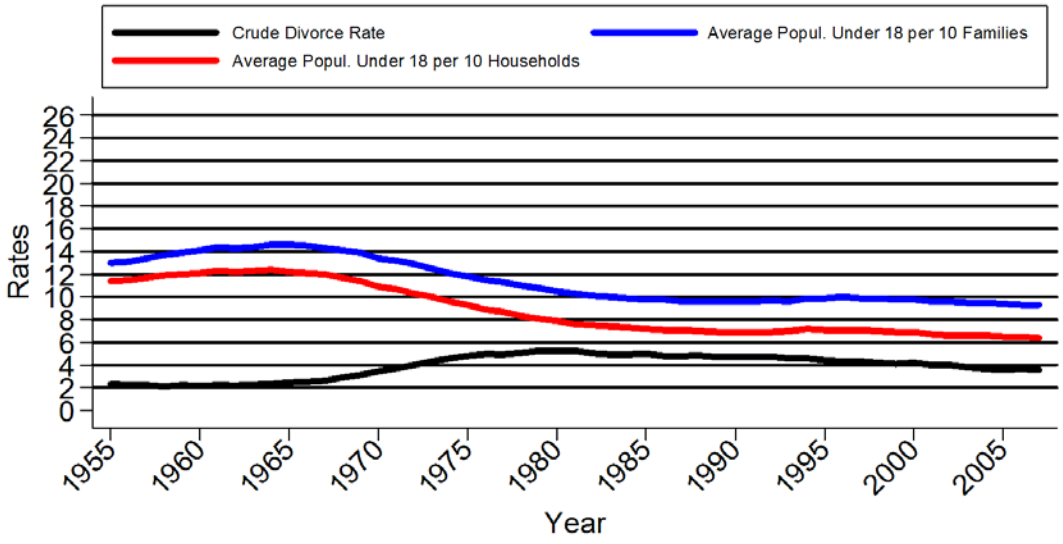
# Chapter 3: Which children stabilize marriage? New evidence from the NLSY

## 3.1 Introduction

Over the last five decades, the divorce rate in the United States has not maintained a steady trend. From the early 1960s to the early 1980s, the divorce rate increased significantly, and then began a steady decline (Drewianka 2008). As Figure 3.1 shows, the Crude Divorce Rate - defined as the annual number of divorces per 1,000 mid-year population - began to increase by the year 1960, reaching its maximum value of 5.27 in 1981. From that point, this indicator leveled off to 3.5 divorces per 1,000 population in the year 2007. The data come from several issues of the UN Demographic Yearbook and the Organization for Economic Cooperation and Development (OECD). The evolution of this variable has focused the attention of researchers, since it has been one of the major determinants of the dramatic changes in the institution of the family: an increasing percentage of single-parent families, a rapid growth in cohabitation, an increase of the age at first marriage, and a continuing decline in the number of traditional families, consisting of a breadwinner-husband and a homemaker-wife (Bianchi and Casper 2000; Gruber 2004; Wolfers 2006). Simultaneously, the average population under 18 years old per household - and also the population under 18 years old per family - experienced a sharp fall from the early 1960s to the early 1980s, then stabilized and even grew slightly (data from the US Census Bureau). In this chapter, we study whether there is a causal relation between these two variables, by analyzing the impact that the number of children conceived during first marriage has on the risk of marital disruption of the couple.[37]

[37] Children conceived during first marriage do not include those children who were born during the first eight months of marriage, or before the marriage took place.
The marital dissolution can be reported by declaring that the marital status is separated or divorced. However, since every person in our sample is married, not cohabiting, and the marital status "separated" normally is the threshold of legal divorce, we make no distinction, following Chan and Halpin (2002).

Figure 3.1:
Crude Divorce Rate/Average Population Under 18




Note: Data on Crude Divorce Rate come from the UN Demographic Yearbook (several issues) and from the OECD (Organization for Economic Co-operation and Development).
Crude Divorce Rate is defined as the annual number of divorces per 1,000 mid-year population.
Data on the average population under 18 per 10 households and per 10 families come from United States Census Bureau (http://www.census.gov/population/socdemo/hh-fam/hh6.xls)

Prior research has shown that the negative consequences of divorce are many and significant, not only for the members of the couple, but also for their children (see, for a review, Amato 2004). Many studies have examined the effect of divorce on the financial situation of the spouses. McManus and DiPetre (2001) focus their research on the economic situation of men after divorce, finding that most men lose economic status, while Peterson (1996) determines that women have to address serious financial problems as a consequence of divorce, since they experience a decline in their standard of living of up to 27%. Zagorsky (2005) finds that divorced women experience a greater decline in their wealth than divorced men. McKeever and Wolfinger (2001) confirm the negative economic consequences of divorce for women, although the impact is less than in previous years due to women's greater participation in the labour market and their improved human capital. Ananat and Michaels (2008), in turn, conclude that marital disruption has important welfare consequences through increased poverty and social differences. In addition, they find increased probabilities that women will have either much lower or much higher income after divorce. Burkhauser et al. (1990) present a cross-country comparison between the US and Germany, finding that in both countries the post-marital economic situation of women and children is worse than for men, despite the more developed German tax and transfer system. In addition, previous

researches have shown that a divorce affects not only economically, but also in terms of well-being and health (see, for a review, Amato 2004; Williams and Dunne-Bryant 2006; Williams 2003). It has also been shown that children suffer the impact of divorce through academic, emotional, and health outcomes, which has been widely documented in the sociological, psychological and economic literature (Amato 2001; Ermisch and Francesconi 2001; Evenhouse and Reilly 2004; Frisco et al. 2007; Fronstin et al. 2001; Gennetian 2005; Gruber 2004; Kim 2011; Strohschein 2005; Sun and Li 2001).

All these negative consequences of marital disruption justify the efforts made by researchers to identify the determinants of divorce, among which are the negative impact of a slowing or depressed economy, and changes in the couple's economic circumstances (Böheim and Ermisch 2001; Conger et al. 1990; Hoffman and Duncan 1995; Voydanoff 1990; Weiss and Willis 1997; White and Rogers 2000). The impact of age at marriage on the probability of divorce has also been studied, with research finding that those who marry as teenagers or in their early twenties are more likely to divorce (Booth and Edwards 1985; Lehrer 2008). The level of education is also a factor, with those of low education being more likely to end their marriage in divorce (Amato and James 2010; Bramlett and Mosher 2002). Other risk factors for divorce are the presence of children in the household from a previous union (Waite and Lillard 1991), coming from a single-parent home (Amato 1996; Amato and DeBoer 2001; Cherlin and Kiernan 1999; McLanahan and Bumpass 1988), living in an urban area (Lyngstad and Jalovaara 2010; South and Spitze 1986) and having no religious affiliation (Call and Heaton 1997; Vaaler et al. 2009). This chapter adds to these studies by analyzing the effect that the number of children conceived during first marriage has on the probability of marital disruption.

The influence of children on marital stability has been previously analyzed. Andersson (1997), using data from Sweden, finds that children reduce the risk of divorce, especially when they are young, but this effect disappears from the third child onwards. Chan and Halpin (2002), using data for Britain, show that the effect of children on marital stability turned from positive to negative during the 1980s, and Cherlin (1977) finds that, in the US, children have a deterrent effect on the dissolution of marriage only when they are very young, and this deterrent fades as the children grow up. To obtain these results, Cherlin used an OLS regression, and then a more appropriate logit-maximum likelihood estimation procedure, finding very similar results. However, these studies do not consider the potential endogeneity between the

children of a married couple and their marital stability. While it is true that, according to the theory developed by Becker (1981), children can be considered marriage-specific investments, and therefore should reduce the risk of marital breakdown, so it is also true that a couple with serious marital problems and close to divorce is less likely to conceive children, since they will hardly invest in something that is already devalued (Myers 1997). From this perspective, research has focused on this issue by considering the potential endogeneity. Koo and Janowitz (1983) address the potential endogeneity between childbearing and the marital dissolution process by developing a simultaneous logit model, finding neither an effect of the number of children on the risk of divorce, nor an impact of the risk of divorce on fertility decisions. Waite and Lillard (1993), using data for the US, also consider the possibility that the processes of childbearing and divorce are interrelated, and, including this simultaneous relationship in their model, they find that the first child contributes to marital stability, whereas subsequent children have the opposite effect. Another study that considers the potential endogeneity between childbearing and marital disruption is Steele et al. (2005), who employ a multi-process model that allow them to jointly determine the processes of childbearing and marital stability. Using this simultaneous equation model, they determine that young children have a stabilizing effect on marital relations, and that this impact is greater than the effect of older children. Svarer and Verner (2008), using data for Denmark, initially find that children have a positive effect on marital stability, but when the endogeneity between marital duration and fertility decisions is accounted for, by applying the timing-of-event method (a bivariate duration model), they conclude that the effect of children is just the opposite: an increase in the risk of marital disruption. Other methodology that overcomes the potential endogeneity issue is the Instrumental Variable approach, which requires the presence of valid instruments related to the endogenous covariate but independent of the error term, providing the possibility of obtaining good estimates and solving endogeneity concerns. Vuri (2001) develops an instrumental variable model that relates the fertility decisions of a couple and their probability of marital dissolution, using as instrument for exogenous fertility movements the sex of the two previous children. Once she takes into account the endogeneity concern, she determines that children have a positive impact on the risk of marital disruption, the opposite result to the one that she obtained using the conventional least squares model.

As can be seen, there is conflicting evidence regarding the effect of the number of children on marital disruption. In an attempt to resolve some of these issues we first develop a model to exploit the panel structure of the data, which allows us to control for the unobserved heterogeneity of individuals. Results show that children conceived during first marriage have a deterrent effect on the risk of marital dissolution.

Second, we consider the potential endogeneity in the relationship between the number of children and the risk of marital dissolution: children are supposed to act as a deterrent to marital dissolution, but couples who are more likely to divorce are less likely to have children. Considering this potential endogeneity, we develop a two-stage least squares model that allows us to determine the causal effect of fertility decisions on the risk of marital disruption. We contribute by creating two different sets of instruments - which is difficult due to the close relationship between childbearing decisions and partnership stability (Steele et al. 2005) – and our results, again, do show a deterrent effect of children conceived during first marriage on the risk of marital disruption.

We also contribute by analyzing whether the deterrent effect of the number of children conceived during first marriage varies depending on the educational level of their parents. Following Becker (1981), children considered as a marriage-specific investment increase the value of the union, reducing the probability of marital disruption. However, since prior research has shown that there exists an intergenerational transmission of human capital (Black et al. 2005; Currie and Moretti 2003), the offspring of parents with a higher level of education may have a greater "value" than the offspring of low-educated parents, so the former should have a greater deterrent effect on the risk of marital disruption. In other words, the investment of a high-educated couple in their marriage by having children should be greater than the investment made by a low-educated couple, so the increase in the value of the marriage would be greater in the first case, as well as the reduction in the risk of marital disruption. Our results confirm that the higher the educational level of the parents, the greater the deterrent effect of their children on the risk of marital dissolution.

Finally, we specify a duration model of the first marriage duration to test the robustness of our estimates to the model specification adopted. Prior research, such as that of Svarer and Verner (2008) using Danish data, applied these duration models as an empirical strategy. As expected, we find empirical evidence of the deterrent effect of

children conceived during first marriage on the risk of marital disruption of their parents.

The remainder of this chapter is structured as follows. Section 3.2 presents the empirical strategy. In Section 3.3, we present the data used in our analysis, while our main results and robustness checks are presented in Section 3.4. In Section 3.5 we analyze the impact of children on marital stability by the educational level of their parents. Section 3.6 introduces the survival analysis methodology, and Section 3.7 presents our main conclusions.

# 3.2 Empirical strategy

We develop an empirical strategy that exploits the panel structure of our data, allowing us to observe the behavior of a range of individuals across time. Using fixed effects, we can remove the effect of those time-invariant characteristics of each individual that may have an influence on their divorce decisions and that would bias our results; that is, we control for individual unobserved heterogeneity. We estimate Equation (3.1) to obtain the effect of the number of children conceived during first marriage on the risk of marital dissolution, controlling for individual fixed effects:

$$Divorce_{it} = \beta_1 Children_{it} + \beta_2 X_{it} + \alpha_i + \varepsilon_{it} \quad (3.1)$$

where $Divorce_{it}$ is a dummy variable that takes value 1 in year *t* if individual *i* suffers a marital disruption in year *t+1*.[38] In our estimates, the variable of interest is $Children_{it}$, defined as the number of children conceived during first marriage by individual *i* until year *t*, and $X_{it}$ is a vector of characteristics widely considered as standard determinants of the risk of marital disruption, such as age, level of education, and region of residence. Furthermore, $\alpha_i$ is the unknown intercept for each individual in our database, and $\varepsilon_{it}$ is the error term.

Our main concern is that we cannot know the state of origin of the individuals, due to data restrictions for foreign researchers.[39] The only geographical information

[38] We revisit this definition of the variable divorce below.

[39] Non-American researchers do not have access to information on the place of residence. As can be read on the web page of the Bureau of Labor Statistics: "To protect respondent confidentiality, the NLS public-use files do not include geographic variables such as state, county, and metropolitan area" http://www.bls.gov/nls/nlsfaqs.htm#anch25; "The

available in the dataset divides the US territory into four regions: North East, North Central, South, and West. North East is the omitted variable in the analysis.[40]

### *3.2.1 Instrumental variables*

As mentioned above, several studies discuss the possibility of endogeneity in the number of children-divorce relationship. On the one hand, and according to Becker (1981), children conceived within marriage act as a deterrent to marital disruption, since they can be considered as marriage-specific investments. So, if the couple "invests" in their marriage by having children, its value will rise, decreasing the incentives for marital disruption. On the other hand, those couples who have more marital problems have lower "quality" marriages, and therefore their incentives to invest in their union by having children are lower (Myers 1997). Throughout this subsection, we present the two-stage least squares model developed to study the effect of the number of children conceived during first marriage on marital stability, considering the potential endogeneity between them.

To develop this methodology, we need a range of instruments correlated with the variable suspected to be endogenous - the number of children conceived during first marriage - conditional on the other covariates, but that are independent with respect to the dependent variable, the risk of marital disruption, i.e. they are not correlated with the error term. Thus, we estimate the following equations:

$$Divorce_{it} = \gamma_1 Children_{it} + \gamma_2 X_{it} + \lambda_{it} \quad (3.2)$$

$$Children_{it} = \theta_1 IV_{it} + \theta_2 X_{it} + \mu_{it} \quad (3.3)$$

where $Divorce_{it}$ is a dummy variable that takes value 1 in year *t* if individual *i* suffers a marital disruption in year *t+1*, since we want to show the effect of characteristics in year t in the divorce decision made in year t+1 –we revisit this issue below-. $Children_{it}$

Bureau of Labor Statistics (BLS) only grants access to geocode files for researchers in the United States who agree in writing to adhere to the BLS confidentiality policy and whose projects further the mission of BLS and the NLS program to conduct sound, legitimate research in the social sciences. *Applications from abroad cannot be accepted*." http://www.bls.gov/nls/nlsfaq2.htm#anch32.

[40] Since divorce laws vary by state (Cáceres-Delpiano and Giolito 2008), and they have an impact on the probability of divorce (Friedberg 1998; Marcassa 2011; Wolfers 2006), this absence of geographical information may bias our results. However, we make use of the only geographical information available for foreign researchers to try to mitigate the problem.

indicates the number of children conceived during the marriage by the individual *i*, and $X_{it}$ is a set of personal, household, and partner characteristics of individual *i* that are considered to be potential determinants of marital instability, such as educational level, age at first marriage, and the existence of an age gap between the members of the couple. Previously, we had estimated the endogenous variable, $Children_{it}$, using as covariates the same set of characteristics collected by $X_{it}$, and some excluded instruments included in $IV_{it}$.

As instruments to identify the selection equation (3.3) we present two different options that meet the requirements to be valid instruments. First, we create dummy variables indicating the number of siblings of the respondent to the questionnaire. Thus, there are five dummies indicating whether the respondent has no siblings, has only one, two, three, and four or more. The reasoning behind these variables is that if an individual has been raised in a family with a large number of siblings, the individual has a greater tendency to form a large family with many children, replicating the fertility behavior of his/her parents. This intergenerational transmission of fertility behavior has been shown by many studies (Axinn et al. 1994; Booth and Kee 2006; Kotte and Ludwig 2011; Murphy and Wang 2001; Regnier-Loilier 2006). Second, we create as instrument a dummy variable that takes value 1 if the respondent has a multiple birth (twins, triplets…) during first marriage.[41] In addition, the presence of an unplanned child (as a consequence of a multiple birth) is not related to the probability of marital disruption (Jacobsen et al. 2001).

# 3.3 Data and variables

In our research, we use data from the National Longitudinal Survey of Youth 1979 (NLSY79), a national representative database formed by 12,686 young men and women who were born between 1957 and 1965 (so they were aged between 14 and 22 years old in 1979, the year of the first wave). These individuals were interviewed each year until 1994 and from that point only in even-numbered years. This survey provides information on several significant life events related to marital and fertility histories, family background, educational experience, labor market behavior, health issues, and assets and incomes, among others.

[41] Cáceres-Delpiano (2012) also uses the presence of a multiple birth as instrumental variable for the family size.

Our sample consists of individuals who married when they were at least 21 years old.[42] We consider them from the first moment they appear in the sample being married, until they cease to be interviewed or they report their marriage dissolution. From that moment, we remove them from the database. We also remove from our sample those individuals whose first marriage ends with the death of the spouse.

With respect to our dependent variable -whether the individual is married or separated/divorced- we emphasize that it is delayed one period of time in order to obtain the effect of individual characteristics in year t-1 on the decision taken on marital status in year t, since individual characteristics are measured once per year. Other way, the explanatory variables could have already suffered variations due to the divorce experienced the same year. It is also important to note that the variable measuring fertility decisions only considers those children conceived from the month the marriage occurs, so those children born before or during the first 8 months of marriage are considered to be conceived out of marriage and are not included (Amato 2010; Becker et al. 1977; Waite and Lillard 1991; White and Booth 1985). So, since we do not know whether those children conceived before marriage are the natural children of the partners in the marriage or not, we do not include them in the variable measuring the number of children –we revisit this issue below-.

Our final sample is formed by 5,622 individuals. Table 3.1 presents the summary statistics of the entire sample, while Table 3.1.1 shows the statistical differences between individuals who suffer a marital disruption at some time, and those who never do. Among the members of the first group, the mean age at divorce is almost 32, while the mean age at first marriage is 24.47. Those who never suffer a marital disruption marry later, when they are 25.07 years old, and have an average of 0.42 more children conceived during first marriage than those who suffer a marital disruption. In addition, those who remain married have a higher educational level. The percentage of blacks among those who remain married is 10 points lower than among those who experience marital disruption.

[42] We consider those people who married at 21 or after since when they were born, the mean age at first marriage was 22.6 and 20.3 in 1957 for men and women, respectively, and 23.1 and 20.5 in 1964. People in our database were born between 1957 and 1964. Some cultural preferences can be transmitted by parents to their offspring during the early childhood (Furtado et al. 2013). We revisit this issue below. Source: United States Census Bureau http://www.census.gov/population/socdemo/hh-fam/ms2.pdf

**Table 3.1 - Summary Statistics**
(Variables Used in our Baseline Regression)

| Variables | Observations | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| Divorce | 45,632 | 0.046 | 0.209 | 0 | 1 |
| Children Conceived Within Marriage | 45,632 | 1.090 | 1.085 | 0 | 10 |
| Gender | 45,632 | 0.534 | 0.499 | 0 | 1 |
| Age | 45,632 | 33.161 | 7.039 | 21 | 51 |
| Age Squared | 45,632 | 1,149.228 | 497.113 | 441 | 2,601 |
| Wife Five Years Older | 45,632 | 0.034 | 0.180 | 0 | 1 |
| Husband Five Years Older | 45,632 | 0.191 | 0.393 | 0 | 1 |
| Same Age | 45,632 | 0.775 | 0.417 | 0 | 1 |
| Highest Educ: Lowest Level | 45,632 | 0.074 | 0.262 | 0 | 1 |
| Highest Educ: High School Level | 45,632 | 0.369 | 0.483 | 0 | 1 |
| Highest Educ: College Level | 45,632 | 0.247 | 0.431 | 0 | 1 |
| Highest Educ: More Than College Level | 45,632 | 0.309 | 0.462 | 0 | 1 |
| Highest Educ Spouse: Lowest Level | 45,632 | 0.087 | 0.282 | 0 | 1 |
| Highest Educ Spouse: High School Level | 45,632 | 0.386 | 0.487 | 0 | 1 |
| Highest Educ Spouse: College Level | 45,632 | 0.237 | 0.425 | 0 | 1 |
| Highest Educ Spouse: More Than College Level | 45,632 | 0.289 | 0.453 | 0 | 1 |
| Father in Household in 1979 | 45,632 | 0.679 | 0.467 | 0 | 1 |
| Without Father Figure in 1979 | 45,632 | 0.010 | 0.102 | 0 | 1 |
| Father out Household in 1979 | 45,632 | 0.311 | 0.463 | 0 | 1 |
| Charged Illegal by 1980 | 45,632 | 0.073 | 0.261 | 0 | 1 |
| Age First Marriage | 45,632 | 24.925 | 3.893 | 21 | 49 |
| Child Before Marriage | 45,632 | 0.154 | 0.361 | 0 | 1 |
| Race: Hispanic | 45,632 | 0.163 | 0.370 | 0 | 1 |
| Race: Black | 45,632 | 0.191 | 0.393 | 0 | 1 |
| Race: Other | 45,632 | 0.646 | 0.478 | 0 | 1 |

Notes: This table contains the main summary statistics of variables in our baseline estimates, including the dependent variable, our variable of interest and the rest of covariates included in our analysis.

**Table 3.1.1 - Summary Statistics**
(People Divorced at Anytime/People Never Divorced)

| Variables | Those Divorced at Anytime | Those Never Divorced |
|---|---|---|
| Observations | 11,240 | 34,392 |
| Mean Age at Divorce | 31.80 | - |
| Mean Age at First Marriage | 24.47 | 25.07 |
| Mean Number Children Conceived During First Marriage | 0.77 | 1.19 |
| % With Lowest Level of Education | 10.62 | 6.39 |
| % With High Level of Education | 44.72 | 34.41 |
| % With College Level of Education | 26.21 | 24.22 |
| % With More Than College Level of Education | 18.44 | 34.98 |
| % With Spouse Lowest Level of Education | 12.15 | 7.58 |
| % With Spouse High Level of Education | 46.62 | 36.05 |
| % With Spouse College Level of Education | 23.83 | 23.65 |
| % With Spouse More Than College Level of Education | 17.39 | 32.72 |
| % With father in Household in 1979 | 61.81 | 69.88 |
| % Without Father Figure in 1979 | 1.37 | 0.94 |
| % With Father out Household in 1979 | 36.81 | 29.18 |
| % With Child Before Marriage | 22.39 | 13.09 |
| % race: Black | 26.41 | 16.71 |
| % race: Hispanic | 17.90 | 15.84 |
| % race: Other | 55.69 | 67.46 |

Notes: This table contains the main summary statistics, dividing the sample between those who were divorced at any time, Column (1), and those who never experienced a divorce, Column (2).

# 3.4 Results: number of children and marital instability

## *3.4.1 Baseline results*

Before applying our empirical strategy, we use the Haussman test (Hausman 1978) to decide between using the Fixed Effects or the Random Effects technique. As expected, the Hausman test recommends the Fixed Effects method (Table 3.2). However, we also present the estimates using Random Effects, allowing us to observe the effect of factors that do not vary over time, but that do have a recognized effect on the probability of marital disruption, such as age at marriage, the presence of children conceived before marriage, and race.

**Table 3.2 - Hausman Test**
*(Fixed Effects vs Random Effects)*

| | Coefficients | | | |
|---|---|---|---|---|
| | Fixed (b) | Random (B) | Difference (b-B) | S.E. Sqrt(diag(V_b-V_B)) |
| Children Conceived Within Marriage | -0.015 | -0.015 | 0.001 | 0.001 |
| Age | 0.039 | 0.030 | 0.001 | 0.001 |
| Age Squared | -0.0005 | -0.0003 | -0.0001 | 6.31e-06 |
| Highest Education: Lowest Level | -0.038 | 0.044 | -0.082 | 0.015 |
| Highest Education: High School Level | -0.010 | 0.036 | -0.046 | 0.010 |
| Highest Education: College Level | 0.019 | 0.031 | -0.013 | 0.006 |
| Highest Education Spouse: Lowest Level | -0.027 | 0.018 | -0.046 | 0.008 |
| Highest Education Spouse: High School Level | -0.012 | 0.010 | -0.022 | 0.006 |
| Highest Education Spouse: College Level | -0.001 | 0.010 | -0.010 | 0.005 |
| North Central | -0.005 | 0.003 | -0.007 | 0.007 |
| South | -0.007 | 0.006 | -0.013 | 0.006 |
| West | 0.006 | 0.015 | -0.009 | 0.007 |

Notes: The Hausman test is a general implementation of Hausman's (1978) specification test. This test is a chi-square test that determines whether the differences between two estimates are systematic and significant. If the null hypothesis is not rejected, there should be no systematic difference between the two estimators.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2 (11) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 952.87
Prob>chi2 = 0.0000

Table 3.3 shows the results derived from our baseline regression. We find that the effect of our variable of interest (the number of children conceived during first marriage) on the risk of marital disruption is negative and statistically significant. Furthermore, the magnitude of this impact is the same in Columns (1), (2) and (3), which include results from the Random Effects methodology, and in Column (4), which shows results from the Fixed Effects methodology, recommended by the Hausman test.

**Table 3.3 - Children Conceived During First Marriage and Risk of Marital Dissolution: Random and Fixed Effects**

(Dependent Variable: Risk of Marital Dissolution)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Children Conceived Within Marriage | -0.015*** | -0.015*** | -0.015*** | -0.015*** |
| | (0.002) | (0.002) | (0.002) | (0.002) |
| Gender | -0.013** | -0.013** | -0.013** | |
| | (0.005) | (0.005) | (0.005) | |
| Age | 0.030*** | 0.030*** | 0.030*** | 0.039*** |
| | (0.002) | (0.002) | (0.002) | (0.002) |
| Age Squared | -0.0003*** | -0.0003*** | -0.0003*** | -0.0005*** |
| | (0.00002) | (0.00002) | (0.00002) | (0.00002) |
| Wife Five Years Older | 0.038** | 0.038** | 0.037** | |
| | (0.015) | (0.015) | (0.015) | |
| Husband Five Years Older | 0.018*** | 0.018*** | 0.018*** | |
| | (0.007) | (0.007) | (0.007) | |
| Highest Education: Lowest Level | 0.046*** | 0.045*** | 0.044*** | -0.038* |
| | (0.011) | (0.011) | (0.011) | (0.022) |
| Highest Education: High School Level | 0.037*** | 0.037*** | 0.036*** | -0.010 |
| | (0.006) | (0.006) | (0.006) | (0.013) |
| Highest Education: College Level | 0.032*** | 0.032*** | 0.032*** | 0.019** |
| | (0.005) | (0.005) | (0.005) | (0.008) |
| Highest Education Spouse: Lowest Level | 0.019* | 0.019* | 0.018* | -0.027* |
| | (0.010) | (0.010) | (0.010) | (0.015) |
| Highest Education Spouse: High School Level | 0.010* | 0.010* | 0.010* | -0.012 |
| | (0.006) | (0.006) | (0.006) | (0.010) |
| Highest Education Spouse: College Level | 0.010* | 0.010* | 0.010* | -0.001 |
| | (0.005) | (0.005) | (0.005) | (0.008) |
| Father in Household in 1979 | -0.021*** | -0.021*** | -0.027*** | |
| | (0.006) | (0.006) | (0.006) | |
| Without Father Figure in 1979 | -0.006 | -0.007 | -0.010 | |
| | (0.029) | (0.029) | (0.029) | |
| Charged Illegal by 1980 | 0.045*** | 0.044*** | 0.046*** | |
| | (0.011) | (0.011) | (0.011) | |
| Age First Marriage | -0.008*** | -0.008*** | -0.008*** | |
| | (0.001) | (0.001) | (0.001) | |
| Child Before Marriage | 0.047*** | 0.047*** | 0.046*** | |
| | (0.009) | (0.009) | (0.009) | |
| Race: Hispanic | 0.000 | -0.003 | -0.004 | |
| | (0.007) | (0.008) | (0.008) | |
| Race: Black | 0.051*** | 0.051*** | 0.049*** | |
| | (0.008) | (0.008) | (0.008) | |
| Constant | -0.287*** | -0.294*** | -0.258*** | -0.678*** |
| | (0.028) | (0.028) | (0.030) | (0.034) |
| Region FE | NO | YES | YES | YES |
| Cohort FE | NO | NO | YES | YES |
| Observations | 45,632 | 45,632 | 45,632 | 45,632 |
| Number of Caseid | 5,622 | 5,622 | 5,622 | 5,622 |

Notes: Children conceived during first marriage include only those children who were born during or after the ninth month of marriage. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. Columns (1), (2) and (3) show results for the Random Effects methodology and Column (4) shows results for the Fixed Effects methodology. Column (1) includes controls for the sex, the age and the age gap, the education of respondent and his/her spouse, family structure when young, risk activities when young, age at first marriage, whether there exists a child who was conceived before first marriage, and the race. Column (2) adds controls for the region of current residence. Columns (3) and (4) also include controls for the cohort of respondent. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

This result is in line with prior studies showing that the presence of children has a deterrent effect on the likelihood of marriage dissolution, in the US (Morgan and Rindfuss 1985; South 2001; Tzeng and Mare 1995; Weiss and Willis 1997) and in several European countries (Andersson 1997; Berrington and Diamond 1999; Jalovaara 2001). When we analyze our results from the Fixed Effects model, each additional child conceived within the marriage produces a decrease of 0.015 in the probability of marital disruption.

Considering the remaining explanatory variables, we observe that the variable related to the gender of the respondent indicates that men are less likely to divorce or separate than women in our database. This result is in line with prior studies finding that women more often take the initiative to begin the process of separation (Hewitt et al. 2006; Kalmijn and Poortman 2006). The variables *Age* and *Age squared* show a U-shaped inverse relationship with the risk of marital dissolution, indicating that younger and older couples have a lower risk of divorce than middle-aged couples (Levenson et al. 1993). Variables indicating an age gap of at least five years between members of the couple are significant and positive, confirming the idea that a greater age gap implies a higher risk of marital disruption (Reinhold 2010).

Variables of the level of education reveal the expected results, in line with prior research (Blackburn 2003), with lower levels of education being linked to higher probabilities of marital disruption, since our reference variable is for those with the highest level of education.

The impact of other variables is also what we would expect from prior research. The presence of the father in the household in 1979 - rather than being deceased or living elsewhere - when the respondent was aged between 14 and 22, reduces the probability of the respondent's marital disruption (Amato 1996; Amato and DeBoer 2001). The respondent having been charged with illegal activity in youth is related to a higher probability of marital disruption later in life (Apel et al. 2010). The younger the individual at first marriage, the greater the probability that the marriage ends in disruption (Lehrer 2008).

We also include in our estimates a dummy variable indicating whether the individual had at least one child before first marriage, and our results show that those who did so are more likely to suffer marital disruption (see, for a similar result, Liu 2002).

Finally, the variable related to race is divided into three categories, due to the available information in our database: black, hispanic, and others. According to our estimates, black individuals have a higher probability of marital disruption than the others (Bulanda and Brown 2007).

### *3.4.2 Instrumental variable results*

While the presence of children in a marriage does act as a deterrent to marital disruption, it is also the case that couples with more marital problems - who are thus more likely to divorce - have a lower probability of having children. To deal with this endogeneity concern, we apply an instrumental variable approach.

As a first step, we regress the variable suspected to be endogenous - number of children conceived during first marriage - using the same set of explanatory variables as in our baseline estimates of the probability of marital disruption, but now including a set of excluded instruments correlated with the variable suspected to be endogenous and independent of the error term.

We create two different sets of variables. First, we use five dummies indicating whether the individual has no siblings, or has one, two, three, and four or more siblings. The reasoning is that if an individual comes from a large family with multiple siblings, there is a greater likelihood that he/she will want to have a large family with a higher number of children. This intergenerational transmission of fertility behavior has been widely demonstrated (Axinn et al. 1994; Booth and Kee 2006; Kotte and Ludwig 2011; Murphy and Wang 2001; Regnier-Loilier 2006). Second, we create a dummy for whether the respondent had a multiple birth during first marriage, since the presence of a multiple birth is linked to the family size (Cáceres-Delpiano 2012). In addition, the presence of an unplanned child as a consequence of this multiple birth has no relation to the probability of marital disruption (Jacobsen et al. 2001).

We also include both sets of instruments in the same regression. As expected, a greater number of siblings and the presence of a multiple birth during first marriage are both positively related to a greater number of children conceived during first marriage. Results of this first step are shown in the Appendix A.

**Table 3.4 - Children Conceived During First Marriage and Risk of Marital Dissolution: Instrumental Variables**

*(Dependent Variable: Risk of Marital Dissolution)*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Children Conceived Within Marriage | -0.015*** | -0.237*** | -0.075*** | -0.104*** |
| | (0.002) | (0.074) | (0.020) | (0.020) |
| Gender | -0.013** | -0.009 | -0.008** | -0.008* |
| | (0.005) | (0.007) | (0.004) | (0.004) |
| Age | 0.030*** | 0.125*** | 0.045*** | 0.059*** |
| | (0.002) | (0.032) | (0.009) | (0.009) |
| Age Squared | -0.0003*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.00002) | (0.0004) | (0.0001) | (0.0001) |
| Wife Five Years Older | 0.037** | -0.033 | 0.005 | -0.002 |
| | (0.015) | (0.028) | (0.012) | (0.012) |
| Husband Five Years Older | 0.018*** | 0.013 | 0.013*** | 0.013*** |
| | (0.007) | (0.008) | (0.005) | (0.005) |
| Highest Education: Lowest Level | 0.044*** | 0.076*** | 0.044*** | 0.049*** |
| | (0.011) | (0.016) | (0.008) | (0.008) |
| Highest Education: High School Level | 0.036*** | 0.048*** | 0.033*** | 0.035*** |
| | (0.006) | (0.009) | (0.005) | (0.005) |
| Highest Education: College Level | 0.032*** | 0.027*** | 0.024*** | 0.025*** |
| | (0.005) | (0.007) | (0.005) | (0.005) |
| Highest Education Spouse: Lowest Level | 0.018* | 0.024** | 0.025*** | 0.025*** |
| | (0.010) | (0.010) | (0.007) | (0.007) |
| Highest Education Spouse: High School Level | 0.010* | -0.001 | 0.008 | 0.006 |
| | (0.006) | (0.008) | (0.005) | (0.005) |
| Highest Education Spouse: College Level | 0.010* | -0.003 | 0.006 | 0.004 |
| | (0.005) | (0.008) | (0.005) | (0.005) |
| Father in Household in 1979 | -0.027*** | -0.020*** | -0.020*** | -0.020*** |
| | (0.006) | (0.008) | (0.004) | (0.005) |
| Without Father Figure in 1979 | -0.010 | -0.026 | -0.017 | -0.018 |
| | (0.029) | (0.029) | (0.017) | (0.019) |
| Charged Illegal by 1980 | 0.046*** | 0.034*** | 0.032*** | 0.033*** |
| | (0.011) | (0.012) | (0.007) | (0.007) |
| Age First Marriage | -0.008*** | -0.035*** | -0.013*** | -0.017*** |
| | (0.001) | (0.009) | (0.003) | (0.002) |
| Child Before Marriage | 0.046*** | 0.002 | 0.021*** | 0.018** |
| | (0.009) | (0.017) | (0.007) | (0.007) |
| Race: Hispanic | -0.004 | 0.022* | 0.003 | 0.006 |
| | (0.008) | (0.013) | (0.006) | (0.007) |
| Race: Black | 0.049*** | 0.039*** | 0.034*** | 0.035*** |
| | (0.008) | (0.010) | (0.005) | (0.006) |
| Constant | -0.258*** | -1.278*** | -0.422*** | -0.572*** |
| | (0.030) | (0.346) | (0.093) | (0.092) |
| Region FE | YES | YES | YES | YES |
| Cohort FE | YES | YES | YES | YES |
| Observations | 45,632 | 45,632 | 45,632 | 45,632 |
| Number of Caseid | 5,622 | 5,622 | 5,622 | 5,622 |

Notes: Children conceived during first marriage include only those children who were born during or after the ninth month of marriage. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. Columns (1), (2), (3) and (4) include controls for the sex, the age and the age gap, the education of respondent and his/her spouse, family structure when young, risk activities when young, age at first marriage, whether there exists a child who was conceived before first marriage, the race, the region of current residence and the cohort of respondent. Column (1) includes our baseline estimates using Random Effects to make results more easily comparable. Column (2) shows results using dummies for the number of siblings of respondent as instruments. Column (3) uses as instruments a dummy indicating whether the respondent has experienced a multiple birth. Column (4) presents results after using both sets of instruments simultaneously. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

Table 3.4 presents results for our instrumental variable approach. Column (1) presents results from our baseline regression using Random Effects to facilitate the comparison, and Columns (2), (3) and (4) show results using the dummies for the number of siblings, the variable indicating the presence of a multiple birth during first marriage, and both sets of instruments simultaneously, respectively.[43]

We can see that, again, these results obtained after considering the potential endogeneity behind the childbearing/marital disruption relationship are quite similar to those presented above, increasing the robustness of our estimates. Focusing on our variable of interest, we observe that, irrespective of the variables used as instruments, the effect of the number of children conceived during first marriage on the probability of marital disruption remains negative and significant at the 1% level.

As for the other covariates included in our analysis, we can see that both the sign and the significance of the effect do not vary with respect to the results presented in our baseline regression. Thus, we observe again the U-shaped inverse relationship between age and the risk of marital disruption, and the greater probability of divorce in those couples with an existing age gap, but in this case only when the husband is older than the wife. With respect to educational level, we again find that the higher the level of education, the lower the probability of marital disruption. In addition, those more likely to end their marriage in disruption are those without a father living with them when they were young, those who presented higher risk attitudes when young (measured by the variable for being charged with any illegal activity), those who married young, those with children born before their marriage began, and those who are black.

### *3.4.3 Robustness checks*

In this section, we check whether our previous estimates are sensitive to the definition of our variable of interest, our sample selection, and the inclusion of new covariates not included in our baseline estimates due to endogeneity concerns. Results are presented in Tables 3.5 to 3.9.

First, we modify our sample. In our baseline estimate, we had considered only those individuals who married for the first time when they were at least 21 years old.

[43] We test the validity of our instruments by applying a test of over-identifying restrictions, whose null hypothesis is that the excluded instruments are valid instruments, i.e., uncorrelated with the error term and correctly excluded from the estimated equation. Following this strategy, we confirm the validity of our instruments.

We now redefine our sample to include every individual, irrespective of the age they married. Following this new strategy, the number of individuals is extended to 8,303.

These new estimates are presented in Table 3.5, which presents our results after applying the instrumental variables approach to solve the problems of potential endogeneity. Focusing on our variable of interest, we observe that children conceived during marriage are a deterrent for marital disruption, and this variable is significant at the 1% significance level. The effect of the remaining covariates on the probability of marital disruption is also very similar to the findings from the main specification.

Next, we experiment with alternative definitions of fertility. The existing literature has repeatedly found that the effect of children as a deterrent to marital disruption is stronger when they are younger (Steele et al. 2005; Waite and Lillard 1991). To check this point, we redefine our variable of interest to pick up only those children conceived during the marriage who are under 10 years old, and then those under 6 years old. Results are presented in Table 3.6. We observe that, regardless of the set of variables used as instruments, the younger the children conceived during first marriage, the greater their deterrent effect on marital disruption. Specifically, the deterrent effect of children under 10 years old increases between 13% and 21% with respect to all children conceived during first marriage. If we only consider children under age 6, the growth of the deterrent effect ranges from 26% to 53%. These results are in line with earlier work in this area.

The existing literature on the causes of marital disruption shows how children, under certain circumstances, can represent a problem for the marital stability of the couple. One of these circumstances is that the children were conceived before the marriage, or that one of their parents is not one of the members of the couple. Thus, in our baseline regression we exclude children conceived before marriage, since we cannot be certain of paternity. We now redefine our variable of interest to include those children conceived before first marriage. The expected result is a decrease of the deterrent effect of children on the probability of marriage disruption, with respect to that obtained in our baseline estimates in which we only included children conceived during first marriage.

**Table 3.5 - Children Conceived During First Marriage and Risk of Marital Dissolution: All Ages at Marriage**

*(Dependent Variable: Risk of Marital Dissolution)*

| | (1) | (2) | (3) |
|---|---|---|---|
| Children Conceived Within Marriage | -0.227*** | -0.067*** | -0.092*** |
| | (0.069) | (0.017) | (0.016) |
| Gender | -0.018*** | -0.010*** | -0.011*** |
| | (0.006) | (0.003) | (0.004) |
| Age | 0.104*** | 0.035*** | 0.046*** |
| | (0.025) | (0.006) | (0.006) |
| Age Squared | -0.001*** | -0.0004*** | -0.001*** |
| | (0.0003) | (0.00007) | (0.0001) |
| Wife Five Years Older | -0.026 | 0.009 | 0.004 |
| | (0.026) | (0.011) | (0.011) |
| Husband Five Years Older | 0.013* | 0.011*** | 0.011** |
| | (0.007) | (0.004) | (0.005) |
| Highest Education: Lowest Level | 0.115*** | 0.062*** | 0.069*** |
| | (0.022) | (0.007) | (0.008) |
| Highest Education: High School Level | 0.052*** | 0.035*** | 0.037*** |
| | (0.009) | (0.005) | (0.005) |
| Highest Education: College Level | 0.016** | 0.021*** | 0.021*** |
| | (0.008) | (0.005) | (0.005) |
| Highest Education Spouse: Lowest Level | 0.009 | 0.019*** | 0.018*** |
| | (0.009) | (0.006) | (0.006) |
| Highest Education Spouse: High School Level | -0.011 | 0.005 | 0.003 |
| | (0.009) | (0.005) | (0.005) |
| Highest Education Spouse: College Level | -0.011 | 0.005 | 0.003 |
| | (0.009) | (0.005) | (0.005) |
| Father in Household in 1979 | -0.025*** | -0.021*** | -0.021*** |
| | (0.006) | (0.004) | (0.004) |
| Without Father Figure in 1979 | -0.016 | -0.007 | -0.009 |
| | (0.025) | (0.014) | (0.015) |
| Charged Illegal by 1980 | 0.045*** | 0.042*** | 0.043*** |
| | (0.011) | (0.006) | (0.006) |
| Age First Marriage | -0.035*** | -0.013*** | -0.017*** |
| | (0.008) | (0.002) | (0.002) |
| Child Before Marriage | 0.001 | 0.020*** | 0.017*** |
| | (0.016) | (0.006) | (0.006) |
| Race: Hispanic | 0.023* | -0.001 | 0.003 |
| | (0.013) | (0.005) | (0.006) |
| Race: Black | 0.039*** | 0.030*** | 0.032*** |
| | (0.008) | (0.005) | (0.005) |
| Constant | -0.842*** | -0.229*** | -0.322*** |
| | (0.221) | (0.053) | (0.052) |
| Region FE | YES | YES | YES |
| Cohort FE | YES | YES | YES |
| Observations | 69,042 | 69,042 | 69,042 |
| Number of Caseid | 8,303 | 8,303 | 8,303 |

Notes: Children conceived during first marriage include only those children who were born during or after the ninth month of marriage. The sample consists of men and women who were married, irrespective of the age they were when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. Columns (1), (2), (3) include controls for the sex, the age and the age gap, the education of respondent and his/her spouse, family structure when young, risk activities when young, age at first marriage, whether there exists a child who was conceived before first marriage, the race, the region of current residence and the cohort of respondent. Column (1) shows results using dummies for the number of siblings of respondent as instruments. Column (2) uses as instruments a dummy indicating whether the respondent has experienced a multiple birth. Column (3) presents results after using both sets of instruments simultaneously. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

**Table 3.6 - Children Conceived During First Marriage and Risk of Marital Dissolution: Effect of Children Under 10 and 6 Years Old**

*(Dependent Variable: Risk of Marital Dissolution)*

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Children Conceived Within Marriage Under 6 | -0.300*** | | -0.115*** | | -0.157*** | |
| | (0.107) | | (0.032) | | (0.031) | |
| Children Conceived Within Marriage Under 10 | | -0.268*** | | -0.091*** | | -0.125*** |
| | | (0.093) | | (0.025) | | (0.024) |
| Gender | -0.007 | -0.009 | -0.007* | -0.008** | -0.007 | -0.008* |
| | (0.008) | (0.008) | (0.004) | (0.004) | (0.004) | (0.004) |
| Age | 0.130*** | 0.176*** | 0.053*** | 0.063*** | 0.070*** | 0.084*** |
| | (0.038) | (0.053) | (0.011) | (0.014) | (0.011) | (0.014) |
| Age Squared | -0.002*** | -0.002*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.001) | (0.001) | (0.0002) | (0.0002) | (0.0002) | (0.0002) |
| Wife Five Years Older | -0.024 | -0.032 | 0.004 | 0.004 | -0.003 | -0.004 |
| | (0.030) | (0.031) | (0.012) | (0.012) | (0.013) | (0.012) |
| Husband Five Years Older | 0.018* | 0.013 | 0.014*** | 0.013*** | 0.015*** | 0.013** |
| | (0.010) | (0.009) | (0.005) | (0.005) | (0.005) | (0.005) |
| Highest Education: Lowest Level | 0.033** | 0.055*** | 0.037*** | 0.041*** | 0.037*** | 0.044*** |
| | (0.015) | (0.014) | (0.008) | (0.008) | (0.009) | (0.009) |
| Highest Education: High School Level | 0.031*** | 0.036*** | 0.030*** | 0.031*** | 0.031*** | 0.032*** |
| | (0.010) | (0.009) | (0.005) | (0.005) | (0.006) | (0.006) |
| Highest Education: College Level | 0.008 | 0.015 | 0.020*** | 0.022*** | 0.018*** | 0.021*** |
| | (0.012) | (0.010) | (0.005) | (0.005) | (0.006) | (0.005) |
| Highest Education Spouse: Lowest Level | 0.016 | 0.023** | 0.024*** | 0.025*** | 0.023*** | 0.025*** |
| | (0.012) | (0.012) | (0.007) | (0.007) | (0.008) | (0.008) |
| Highest Education Spouse: High School Level | -0.007 | -0.001 | 0.006 | 0.007 | 0.003 | 0.005 |
| | (0.011) | (0.009) | (0.005) | (0.005) | (0.006) | (0.006) |
| Highest Education Spouse: College Level | -0.009 | -0.005 | 0.003 | 0.005 | 0.0004 | 0.002 |
| | (0.011) | (0.009) | (0.005) | (0.005) | (0.006) | (0.005) |
| Father in Household in 1979 | -0.017* | -0.020** | -0.018*** | -0.019*** | -0.018*** | -0.019*** |
| | (0.009) | (0.009) | (0.004) | (0.004) | (0.005) | (0.005) |
| Without Father Figure in 1979 | -0.018 | -0.024 | -0.015 | -0.016 | -0.016 | -0.018 |
| | (0.034) | (0.034) | (0.017) | (0.017) | (0.019) | (0.019) |
| Charged Illegal by 1980 | 0.030** | 0.033** | 0.029*** | 0.031*** | 0.028*** | 0.031*** |
| | (0.015) | (0.014) | (0.007) | (0.007) | (0.008) | (0.008) |
| Age First Marriage | -0.011*** | -0.019*** | -0.006*** | -0.008*** | -0.007*** | -0.010*** |
| | (0.002) | (0.005) | (0.001) | (0.001) | (0.001) | (0.001) |
| Child Before Marriage | 0.013 | 0.002 | 0.021*** | 0.019*** | 0.017** | 0.015** |
| | (0.017) | (0.019) | (0.007) | (0.007) | (0.007) | (0.008) |
| Race: Hispanic | 0.024 | 0.022 | 0.004 | 0.003 | 0.008 | 0.006 |
| | (0.016) | (0.015) | (0.006) | (0.006) | (0.007) | (0.007) |
| Race: Black | 0.041*** | 0.039*** | 0.033*** | 0.033*** | 0.034*** | 0.033*** |
| | (0.011) | (0.011) | (0.006) | (0.005) | (0.006) | (0.006) |
| Constant | -1.609*** | -2.272*** | -0.615*** | -0.766*** | -0.833*** | -1.049*** |
| | (0.511) | (0.730) | (0.151) | (0.190) | (0.147) | (0.186) |
| Region FE | YES | YES | YES | YES | YES | YES |
| Cohort FE | YES | YES | YES | YES | YES | YES |
| Observations | 45,632 | 45,632 | 45,632 | 45,632 | 45,632 | 45,632 |
| Number of Caseid | 5,622 | 5,622 | 5,622 | 5,622 | 5,622 | 5,622 |

Notes: Children conceived during first marriage under 6 and 10 include only those children who were born during or after the ninth month of marriage and who are under 6 and 10 years old, respectively. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. All Columns include controls for the sex, the age and the age gap, the education of respondent and his/her spouse, family structure when young, risk activities when young, age at first marriage, whether there exists a child who was conceived before first marriage, the race, the region of current residence and the cohort of respondent. Columns (1) and (2) show results using dummies for the number of siblings of respondent as instruments. Columns (3) and (4) use as instruments a dummy indicating whether the respondent has experienced a multiple birth. Columns (5) and (6) present results after using both sets of instruments simultaneously. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

Table 3.7 shows the results when we include in our variable of interest both children conceived before and during first marriage. The first thing we would like to stress from these results is that the variable measuring the number of children is still inversely related to the risk of marital disruption and statistically significant, regardless of the instrumental variables used, though this variable now also includes children conceived before first marriage, whose effect on marital stability may be different from the effect of those conceived during first marriage. However, the magnitude of the effect decreases. Specifically, the reduction of the deterrent effect of children on marital disruption ranges from 33% to 43%.

The different effect of those children conceived before and during first marriage on the risk of marital disruption, suggested in results shown in Table 3.7, is fully confirmed in the estimates shown in Table 3.8. Here, we include the variables indicating the number of children conceived during first marriage and before first marriage separately. These two variables have a potential endogeneity with our dependent variable, the risk of marital disruption. For this reason, we include in our instrumental variable approach a range of instruments for children conceived before the first marriage, in addition to those we already had for those children conceived during the first marriage.

We include information on the age at which respondents had their first sexual intercourse, since the earlier the sexual initiation, the greater the risk of being pregnant, and therefore, of conceiving a child before first marriage (Coker et al. 1994; Miller and Heaton 1991). We include a set of dummies to indicate whether the interviewee had his/her first sexual intercourse before the age of 16 years, between 16 and 18 years, after 18 years, or had never had sex by the years 1983-1985, when respondents were between 21 and 28 years old (the question about first sexual intercourse is only available in that waves). We select these intervals of age since the mean age of first intercourse after menarche for women aged 15-44 is 17.4 in 2002, and the mean age of first intercourse for men aged 15-44 is 17.0, also in 2002 (Chandra et al. 2005; Martínez et al. 2006). Thus, we consider that having first sexual intercourse between the ages of 16 and 18 can be considered normal.

**Table 3.7 - Children Conceived and Risk of Marital Dissolution: All Children Conceived**

*(Dependent Variable: Risk of Marital Dissolution)*

| | (1) | (2) | (3) |
|---|---|---|---|
| All Children Conceived | -0.134*** | -0.050*** | -0.065*** |
| | (0.035) | (0.013) | (0.012) |
| Gender | -0.011** | -0.009** | -0.009** |
| | (0.005) | (0.004) | (0.004) |
| Age | 0.076*** | 0.034*** | 0.041*** |
| | (0.015) | (0.006) | (0.005) |
| Age Squared | -0.001*** | -0.0004*** | -0.0005*** |
| | (0.0002) | (0.0001) | (0.0001) |
| Wife Five Years Older | -0.013 | 0.010 | 0.006 |
| | (0.018) | (0.011) | (0.011) |
| Husband Five Years Older | 0.014** | 0.014*** | 0.014*** |
| | (0.006) | (0.005) | (0.005) |
| Highest Education: Lowest Level | 0.082*** | 0.052*** | 0.057*** |
| | (0.014) | (0.008) | (0.008) |
| Highest Education: High School Level | 0.052*** | 0.037*** | 0.039*** |
| | (0.008) | (0.005) | (0.005) |
| Highest Education: College Level | 0.033*** | 0.026*** | 0.027*** |
| | (0.006) | (0.005) | (0.005) |
| Highest Education Spouse: Lowest Level | 0.040*** | 0.032*** | 0.034*** |
| | (0.010) | (0.007) | (0.007) |
| Highest Education Spouse: High School Level | 0.010 | 0.012** | 0.011** |
| | (0.006) | (0.005) | (0.005) |
| Highest Education Spouse: College Level | 0.007 | 0.009** | 0.009* |
| | (0.006) | (0.005) | (0.005) |
| Father in Household in 1979 | -0.028*** | -0.023*** | -0.023*** |
| | (0.006) | (0.004) | (0.004) |
| Without Father Figure in 1979 | -0.017 | -0.015 | -0.015 |
| | (0.022) | (0.017) | (0.017) |
| Charged Illegal by 1980 | 0.042*** | 0.035*** | 0.036*** |
| | (0.009) | (0.007) | (0.007) |
| Age First Marriage | -0.020*** | -0.009*** | -0.011*** |
| | (0.004) | (0.002) | (0.001) |
| Child Before Marriage | 0.212*** | 0.098*** | 0.118*** |
| | (0.045) | (0.018) | (0.017) |
| Race: Hispanic | 0.014 | 0.001 | 0.003 |
| | (0.009) | (0.006) | (0.006) |
| Race: Black | 0.058*** | 0.042*** | 0.044*** |
| | (0.008) | (0.005) | (0.006) |
| Constant | -0.795*** | -0.323*** | -0.400*** |
| | (0.173) | (0.068) | (0.064) |
| Region FE | YES | YES | YES |
| Cohort FE | YES | YES | YES |
| Observations | 45,632 | 45,632 | 45,632 |
| Number of Caseid | 5,622 | 5,622 | 5,622 |

Notes: All children conceived include those children who were born before or during the first marriage. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. All Columns include controls for the sex, the age and the age gap, the education of respondent and his/her spouse, family structure when young, risk activities when young, age at first marriage, whether there exists a child who was conceived before first marriage, the race, the region of current residence and the cohort of respondent. Column (1) shows results using dummies for the number of siblings of respondent as instruments. Column (2) uses as instruments a dummy indicating whether the respondent has experienced a multiple birth. Column (3) presents results after using both sets of instruments simultaneously. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

**Table 3.8 - Children Conceived Before and During First Marriage and Risk of Marital Dissolution: Children Conceived Before-During Marriage**

*(Dependent Variable: Risk of Marital Dissolution)*

| | (1) | (2) | (3) |
|---|---|---|---|
| Children Conceived Within Marriage | -0.336*** | -0.159*** | -0.193*** |
| | (0.080) | (0.026) | (0.027) |
| Children Conceived Before Marriage | 0.080*** | 0.122*** | 0.100*** |
| | (0.030) | (0.020) | (0.020) |
| Gender | 0.001 | 0.004 | 0.002 |
| | (0.009) | (0.005) | (0.006) |
| Age | 0.170*** | 0.085*** | 0.102*** |
| | (0.035) | (0.011) | (0.012) |
| Age Squared | -0.002*** | -0.001*** | -0.001*** |
| | (0.000) | (0.000) | (0.000) |
| Wife Five Years Older | -0.050 | 0.001 | -0.011 |
| | (0.032) | (0.015) | (0.016) |
| Husband Five Years Older | 0.010 | 0.013** | 0.012* |
| | (0.010) | (0.006) | (0.007) |
| Highest Education: Lowest Level | 0.054** | -0.007 | 0.010 |
| | (0.025) | (0.014) | (0.015) |
| Highest Education: High School Level | 0.033** | 0.006 | 0.014 |
| | (0.013) | (0.008) | (0.009) |
| Highest Education: College Level | 0.017* | 0.011 | 0.014** |
| | (0.009) | (0.006) | (0.007) |
| Highest Education Spouse: Lowest Level | 0.006 | -0.006 | -0.000 |
| | (0.014) | (0.010) | (0.010) |
| Highest Education Spouse: High School Level | -0.015 | -0.012* | -0.011 |
| | (0.010) | (0.007) | (0.007) |
| Highest Education Spouse: College Level | -0.012 | -0.006 | -0.007 |
| | (0.009) | (0.006) | (0.006) |
| Father in Household in 1979 | -0.005 | -0.003 | -0.006 |
| | (0.011) | (0.006) | (0.007) |
| Without Father Figure in 1979 | -0.048 | -0.040* | -0.039 |
| | (0.037) | (0.022) | (0.024) |
| Charged Illegal by 1980 | 0.018 | 0.018* | 0.020* |
| | (0.016) | (0.009) | (0.010) |
| Age First Marriage | -0.051*** | -0.029*** | -0.033*** |
| | (0.010) | (0.003) | (0.004) |
| Race: Hispanic | 0.018 | -0.004 | 0.002 |
| | (0.016) | (0.008) | (0.009) |
| Race: Black | -0.023 | -0.042*** | -0.029* |
| | (0.023) | (0.015) | (0.016) |
| Constant | -1.692*** | -0.742*** | -0.937*** |
| | (0.378) | (0.116) | (0.121) |
| Region FE | YES | YES | YES |
| Cohort FE | YES | YES | YES |
| Observations | 45,445 | 45,445 | 45,445 |
| Number of Caseid | 5,577 | 5,577 | 5,577 |

Notes: Children conceived during first marriage include only those children who were born during or after the ninth month of marriage. Children conceived before marriage includes only those children who were born before and during the first eight month of marriage. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce – since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. All Columns include controls for the sex, the age and the age gap, the education of respondent and his/her spouse, family structure when young, risk activities when young, age at first marriage, the race, the region of current residence and the cohort of respondent. Columns (1), (2) and (3) show results using as instruments for children conceived during first marriage dummies for the number of siblings of respondent, a dummy indicating whether the respondent has experienced a multiple birth, and both sets of instruments simultaneously, respectively. Columns (1), (2) and (3) show results using as instruments for children conceived before first marriage dummies indicating whether interviewees had their first sex before 16 years old, between 16 and 18 years old, with more than 18 years old, or had not had sex, by the years 1983-1985, when respondents were between 21 and 28 years old. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

Results are presented in Table 3.8, where we can see the deterrent effect of children conceived during first marriage on the risk of marriage disruption, while those children conceived before first marriage have a positive effect on marital dissolution. In addition, the instruments included for children conceived before first marriage have the expected effect. Specifically, the fact of having first sexual intercourse before age 16 has a positive and statistically significant effect on the probability of conceiving children before the first marriage, as does the fact of having had first sexual intercourse between ages 16 and 18, and later than 18 years old with respect to those who never had sex, but its positive effect is smaller.

In Table 3.9 we include other personal and family characteristics that are potential determinants of the risk of marital disruption, which we exclude from our baseline estimates since they could bias our results due to endogeneity concerns. In this table, we use as instrumental variables the dummies for the number of siblings of the respondents and the dummy indicating the presence of a multiple birth simultaneously, but results using these sets of instruments separately do not vary. Column (1) shows our baseline estimates using both sets of instruments simultaneously. Since members of those couples with a higher risk of marital disruption may work longer hours, to increase their income in anticipation of a possible future divorce (Gray 1995; Johnson and Skinner 1986; Papps 2006), including variables for family income may bias our results due to endogeneity concerns. With respect to these income variables, we use the "OECD modified equivalized scale", an indicator that takes into account not only the family income, but also the number and the age of each member of the household. This indicator assigns a value of 1 to the respondent, a value of 0.5 to each additional member aged 14 or older, and a value of 0.3 to each household member under age 14 (thus, the coefficient attributed to a two-parent family with two small children is 2.1). We include this indicator in our estimates, along with its squared, showing a U-shaped relationship to the probability of marital disruption, indicating that as the family income indicator increases, the risk of marital dissolution decreases, but at some point this relationship turns and the probability of marital disruption begins to grow. Prior research has shown that higher incomes decrease the risk of marital dissolution, especially in the case of males (Burgess et al. 2003). We can see that the effect of the number of children conceived during the marriage on the risk of marital disruption continues to be negative and statistically significant.

In Column (3), we include variables indicating the religion under which the respondent was raised (Call and Heaton 1997; Vaaler et al. 2009). Since religion establishes behaviors that are morally accepted, or rejected, if there is a process that jointly determines personal religious beliefs and the propensity to marital disruption when adult, then including controls for religious attitudes may bias our results. As we can check, our results do not change after introducing variables that control for individual religious belief.

In Column (4), we show our results after including in our estimates a control for another potential predictor of marital stability, whether living in an urban or in a rural area (Amato and James 2010). Thus, again, if there is a process that simultaneously affects the probability of living in a rural or in an urban area and a propensity to marital disruption, including a dummy indicating whether the individual lives in a rural or in an urban setting may bias our results. Our estimates show that the number of children conceived during first marriage maintains its negative effect on marital instability. Living in an urban area has a positive effect on the risk of marital disruption as expected, but it is not statistically significant.

Column (5) includes controls for the employment of the respondent, and the spouse, which we do not include in our baseline estimates due to endogeneity concerns. As stated above, members of couples with higher probabilities of divorce may change their labor force participation in the years prior to a marital disruption (Gray 1995; Johnson and Skinner 1986; Papps 2006). Being fully aware of these potential problems of endogeneity, we include variables related to employment, to check whether there are changes in our results. Results indicate that the fact that both the respondent and his/her partner are working is related to a decrease in the probabilities of the couple suffering a marital disruption. Again, the effect of children conceived during marriage on marital disruption remains negative and statistically significant.

In Column (6), we show our results after including all new controls simultaneously, finding that our results do not substantially change. Again, the negative impact of children conceived during first marriage on the risk of marital disruption remains unchanged and statistically significant.

**Table 3.9 - Children Conceived During First Marriage and Risk of Marital Dissolution: New Covariates**

*(Dependent Variable: Risk of Marital Dissolution)*

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Children conceived within marriage | -0.104*** | -0.121*** | -0.104*** | -0.093*** | -0.166*** | -0.157*** |
| | (0.020) | (0.023) | (0.020) | (0.019) | (0.032) | (0.031) |
| Gender | -0.008* | -0.006 | -0.008* | -0.007* | -0.007 | -0.004 |
| | (0.004) | (0.005) | (0.004) | (0.004) | (0.006) | (0.005) |
| Age | 0.059*** | 0.068*** | 0.059*** | 0.053*** | 0.097*** | 0.091*** |
| | (0.009) | (0.010) | (0.009) | (0.008) | (0.016) | (0.016) |
| Age Squared | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | (0.0001) | (0.0001) | (0.0001) | (0.0001) | (0.0002) | (0.0002) |
| Wife Five Years Older | -0.002 | -0.021 | -0.003 | -0.00002 | 0.011 | 0.004 |
| | (0.012) | (0.014) | (0.012) | (0.012) | (0.016) | (0.016) |
| Husband Five Years Older | 0.013*** | 0.016*** | 0.014*** | 0.012** | 0.016** | 0.016** |
| | (0.005) | (0.006) | (0.005) | (0.005) | (0.007) | (0.007) |
| Highest Education: Lowest Level | 0.049*** | 0.039*** | 0.048*** | 0.049*** | 0.055*** | 0.048*** |
| | (0.008) | (0.009) | (0.009) | (0.008) | (0.011) | (0.011) |
| Highest Education: High School Level | 0.035*** | 0.029*** | 0.035*** | 0.033*** | 0.038*** | 0.031*** |
| | (0.005) | (0.006) | (0.005) | (0.005) | (0.007) | (0.007) |
| Highest Education: College Level | 0.025*** | 0.019*** | 0.025*** | 0.023*** | 0.031*** | 0.026*** |
| | (0.005) | (0.006) | (0.005) | (0.005) | (0.007) | (0.007) |
| Highest Education Spouse: Lowest Level | 0.025*** | 0.024*** | 0.023*** | 0.025*** | 0.027*** | 0.020** |
| | (0.007) | (0.008) | (0.007) | (0.007) | (0.010) | (0.010) |
| Highest Education Spouse: High School Level | 0.006 | 0.002 | 0.006 | 0.008 | 0.008 | 0.005 |
| | (0.005) | (0.006) | (0.005) | (0.005) | (0.007) | (0.007) |
| Highest Education Spouse: College Level | 0.004 | -0.003 | 0.004 | 0.005 | 0.008 | 0.007 |
| | (0.005) | (0.006) | (0.005) | (0.005) | (0.007) | (0.007) |
| Father in Household in 1979 | -0.020*** | -0.016*** | -0.020*** | -0.018*** | -0.021*** | -0.017*** |
| | (0.005) | (0.005) | (0.005) | (0.005) | (0.006) | (0.006) |
| Without Father Figure in 1979 | -0.018 | -0.029 | -0.018 | -0.012 | -0.029 | -0.023 |
| | (0.019) | (0.020) | (0.018) | (0.019) | (0.025) | (0.026) |
| Charged Illegal by 1980 | 0.033*** | 0.035*** | 0.033*** | 0.033*** | 0.029*** | 0.030*** |
| | (0.007) | (0.008) | (0.007) | (0.007) | (0.010) | (0.010) |
| Age First Marriage | -0.017*** | -0.020*** | -0.017*** | -0.015*** | -0.032*** | -0.030*** |
| | (0.002) | (0.003) | (0.003) | (0.002) | (0.005) | (0.005) |
| Child Before Marriage | 0.018** | 0.007 | 0.019*** | 0.016** | 0.016* | 0.013 |
| | (0.007) | (0.008) | (0.007) | (0.007) | (0.010) | (0.010) |
| Race: Hispanic | 0.006 | 0.008 | 0.008 | 0.007 | 0.009 | 0.009 |
| | (0.007) | (0.007) | (0.007) | (0.006) | (0.009) | (0.009) |
| Race: Black | 0.035*** | 0.026*** | 0.034*** | 0.038*** | 0.036*** | 0.037*** |
| | (0.006) | (0.007) | (0.006) | (0.006) | (0.008) | (0.008) |
| Family Income Indicator | | -0.054*** | | | | -0.056*** |
| | | (0.011) | | | | (0.012) |
| Family Income Indicator Squared | | 0.009*** | | | | 0.009*** |
| | | (0.002) | | | | (0.002) |
| Religion Raised: Protestant | | | -0.007 | | | -0.013 |
| | | | (0.011) | | | (0.015) |
| Religion Raised: Roman Catholic | | | -0.007 | | | -0.009 |
| | | | (0.012) | | | (0.016) |
| Religion Raised: Jewish | | | -0.001 | | | -0.012 |
| | | | (0.021) | | | (0.028) |
| Religion Raised: Other Religion | | | -0.004 | | | -0.005 |
| | | | (0.013) | | | (0.016) |
| Living Urban | | | | 0.002 | | 0.005 |
| | | | | (0.003) | | (0.005) |
| Employed | | | | | -0.033*** | -0.032*** |
| | | | | | (0.008) | (0.008) |
| Spouse Employed | | | | | -0.037*** | -0.034*** |
| | | | | | (0.009) | (0.009) |
| Constant | -0.572*** | -0.634*** | -0.560*** | -0.514*** | -0.815*** | -0.768*** |
| | (0.092) | (0.105) | (0.096) | (0.088) | (0.145) | (0.154) |
| Region FE | YES | YES | YES | YES | YES | YES |
| Cohort FE | YES | YES | YES | YES | YES | YES |
| Observations | 45,632 | 39,764 | 45,535 | 43,491 | 31,303 | 29,937 |
| Number of Caseid | 5,622 | 5,395 | 5,604 | 5,404 | 5,190 | 4,950 |

Notes: Children conceived during first marriage include only those children who were born during or after the ninth month of marriage. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. All columns include controls for the sex, the age and the age gap, the education of respondent and his/her spouse, family structure when young, risk activities when young, age at first marriage, whether there exists a child who was conceived before first marriage, the race, the region of current residence and the cohort of respondent. All Columns show results using as instruments dummies for the number of siblings of respondent and a dummy indicating whether the respondent has experienced a multiple birth simultaneously. Column (1) includes our baseline estimates using these instruments (Table 3.4, Column (4)). Column (2) incorporates controls for the family income and its squared. In Column (3) we introduce controls for the religion under which the interviewee was raised. Column (4) shows a control for whether the interviewee's current residence is urban or rural. Column (5) incorporates dummies indicating whether the interviewee and his/her spouse are employed. Finally, Column (6) includes all controls at the same time. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

## 3.5 By level of education

Throughout this chapter, we have demonstrated the positive effect that children conceived during the first marriage have on the couple's marital stability, but we now consider whether all children conceived in wedlock have the same deterrent impact, or if, on the contrary, the magnitude of this effect varies.

Children conceived during first marriage are marriage-specific investments, increasing the value of the marriage and making it more valuable, and therefore more difficult to break (Becker 1981), but we wonder whether each couple make the same investment in the marriage when they have children. As is widely known, there exists a mechanism of intergenerational transmission of human capital between parents and their offspring (Black et al. 2005; Currie and Moretti 2003). Thus, we would expect that the investment made by parents with a higher level of human capital would be greater than that made by other couples, assuming positive assortative mating, which is generally plausible. Consequently, the relationship between fertility and marital disruption may be very different as a function of parental education.

To test this hypothesis, we re-estimate the model, splitting the sample according to the level of education of the respondent. Table 3.10 shows our results using the Random Effects and the Fixed Effects approaches, and we can see that, in each case, children conceived during first marriage have no effect on the risk of marital disruption for those individuals with the lowest level of education. On the contrary, the children maintain their negative and statistically significant effect when we consider those respondents with intermediate and higher level of education. Furthermore, the negative impact on the probability of marital disruption is between 25% and 35% greater for those with the highest level of education, than for those with an intermediate education level.

**Table 3.10 - Children Conceived During First Marriage and Risk of Marital Dissolution: Analysis by Educational Level: Random and Fixed Effects**
*(Dependent Variable: Risk of Marital Dissolution)*

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Children Conceived Within Marriage | -0.008 | -0.012*** | -0.016*** | -0.008 | -0.011*** | -0.017*** |
| | (0.008) | (0.003) | (0.002) | (0.009) | (0.004) | (0.002) |
| Gender | -0.066*** | -0.008 | -0.015** | | | |
| | (0.025) | (0.009) | (0.006) | | | |
| Age | 0.041*** | 0.032*** | 0.025*** | 0.055*** | 0.043*** | 0.031*** |
| | (0.006) | (0.003) | (0.002) | (0.007) | (0.003) | (0.002) |
| Age Squared | -0.001*** | -0.0004*** | -0.0003*** | -0.001*** | -0.001*** | -0.0004*** |
| | (0.0001) | (0.00004) | (0.00003) | (0.0001) | (0.00004) | (0.00003) |
| Wife Five Years Older | 0.079 | 0.034 | 0.019 | | | |
| | (0.050) | (0.023) | (0.021) | | | |
| Husband Five Years Older | 0.025 | 0.009 | 0.026*** | | | |
| | (0.024) | (0.011) | (0.009) | | | |
| Father in Household in 1979 | -0.056** | -0.036*** | -0.012 | | | |
| | (0.023) | (0.010) | (0.008) | | | |
| Without Father Figure in 1979 | -0.056 | -0.015 | -0.007 | | | |
| | (0.095) | (0.040) | (0.037) | | | |
| Charged Illegal by 1980 | 0.080*** | 0.037** | 0.038** | | | |
| | (0.031) | (0.015) | (0.017) | | | |
| Age First Marriage | -0.011*** | -0.009*** | -0.008*** | | | |
| | (0.003) | (0.001) | (0.001) | | | |
| Child Before Marriage | 0.001 | 0.053*** | 0.042*** | | | |
| | (0.025) | (0.013) | (0.014) | | | |
| Race: Hispanic | -0.035 | -0.006 | 0.013 | | | |
| | (0.028) | (0.013) | (0.010) | | | |
| Race: Black | 0.065** | 0.043*** | 0.049*** | | | |
| | (0.031) | (0.014) | (0.010) | | | |
| Same Education | -0.026 | -0.008 | -0.010 | -0.042 | -0.024** | 0.006 |
| | (0.021) | (0.008) | (0.006) | (0.035) | (0.012) | (0.009) |
| Respondent More Educated Than Spouse | | 0.008 | | | -0.038* | |
| | | (0.014) | | | (0.021) | |
| Constant | -0.233* | -0.211*** | -0.198*** | -0.880*** | -0.737*** | -0.580*** |
| | (0.122) | (0.051) | (0.036) | (0.129) | (0.057) | (0.040) |
| Region FE | YES | YES | YES | YES | YES | YES |
| Cohort FE | YES | YES | YES | YES | YES | YES |
| Observations | 3,391 | 16,860 | 25,381 | 3,391 | 16,860 | 25,381 |
| Number of Caseid | 576 | 2,394 | 2,945 | 576 | 2,394 | 2,945 |

Notes: Children conceived during first marriage include only those children who were born during or after the ninth month of marriage. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. All columns include controls for the sex, the age and the age gap, family structure when young, risk activities when young, age at first marriage, whether there exists a child who was conceived before first marriage, the race, whether the spouse has the same level of education than the interviewed, the region of current residence and the cohort of respondent. Columns (1), (2) and (3) include our estimates using a Random Effects technique, and Columns (4), (5) and (6) show results using a Fixed Effects technique. In addition, Columns (1) and (4) show results for the less educated interviewees, Columns (2) and (5) show results for the interviewees with an intermediate level of education and Columns (3) and (6) show results for the interviewees with the highest level of education. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

**Table 3.10.1 - Children Conceived During First Marriage and Risk of Marital Dissolution: Analysis by Educational Level: Instrumental Variables**
*(Dependent Variable: Risk of Marital Dissolution)*

| | (1) | (2) | (3) |
|---|---|---|---|
| Children Conceived Within Marriage | -0.314 | -0.091*** | -0.105*** |
| | (0.208) | (0.033) | (0.023) |
| Gender | -0.003 | -0.002 | -0.009* |
| | (0.042) | (0.007) | (0.005) |
| Age | 0.134* | 0.054*** | 0.061*** |
| | (0.072) | (0.014) | (0.011) |
| Age Squared | -0.002* | -0.001*** | -0.001*** |
| | (0.001) | (0.0002) | (0.0001) |
| Wife Five Years Older | -0.075 | 0.006 | -0.013 |
| | (0.103) | (0.018) | (0.016) |
| Husband Five Years Older | 0.059* | 0.005 | 0.018*** |
| | (0.033) | (0.009) | (0.007) |
| Father in Household in 1979 | -0.059*** | -0.028*** | -0.007 |
| | (0.023) | (0.008) | (0.006) |
| Without Father Figure in 1979 | -0.005 | -0.033 | 0.006 |
| | (0.079) | (0.027) | (0.031) |
| Charged Illegal by 1980 | 0.040 | 0.032*** | 0.020* |
| | (0.032) | (0.011) | (0.012) |
| Age First Marriage | -0.041* | -0.015*** | -0.017*** |
| | (0.022) | (0.004) | (0.003) |
| Child Before Marriage | -0.068 | 0.027** | 0.023** |
| | (0.053) | (0.011) | (0.010) |
| Race: Hispanic | 0.051 | 0.007 | 0.015* |
| | (0.061) | (0.011) | (0.008) |
| Race: Black | 0.082** | 0.030*** | 0.031*** |
| | (0.034) | (0.010) | (0.007) |
| Same Education | 0.041 | -0.005 | -0.014*** |
| | (0.048) | (0.007) | (0.005) |
| Respondent More Educated Than Spouse | | 0.020* | |
| | | (0.010) | |
| Constant | -1.197 | -0.448*** | -0.604*** |
| | (0.746) | (0.143) | (0.129) |
| Region FE | YES | YES | YES |
| Cohort FE | YES | YES | YES |
| Observations | 3,391 | 16,860 | 25,381 |
| Number of Caseid | 576 | 2,394 | 2,945 |

Notes: Children conceived during first marriage include only those children who were born during or after the ninth month of marriage. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. All columns include controls for the sex, the age and the age gap, family structure when young, risk activities when young, age at first marriage, whether there exists a child who was conceived before first marriage, the race, whether the spouse has the same level of education than the interviewed, the region of current residence and the cohort of respondent. All Columns show results using as instruments dummies for the number of siblings of respondent and a dummy indicating whether the respondent has experienced a multiple birth, simultaneously. In addition, Column (1) shows results for the less educated interviewees, Column (2) shows results for the interviewees with an intermediate level of education and Column (3) shows results for the interviewees with the highest level of education. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

In Table 3.10.1 we repeat this analysis by level of education of respondent, following the instrumental variable approach. In this table, we use as instruments the dummies for the number of siblings of the respondent and the dummy indicating the presence of a multiple birth simultaneously, but using both sets of instruments

separately we find similar results. Again, we find no evidence of the deterrent effect of children on marital disruption of those individuals with the lowest level of education, and we find evidence of a decrease in the risk of marital disruption when respondents with intermediate and higher level of education have children. In addition, we find that this decrease in the risk of marital disruption is 13% higher in those with the highest level of education, compared to those with the intermediate level.

In view of these results, it is possible to argue that the deterrent effect of children conceived during first marriage on marital disruption is not homogeneous. In other words, those couples with higher human capital, measured by their educational level, make a greater investment in their child than couples with a lower human capital, which strengthens and protects more their marriage.

## 3.6 Survival analysis

The relation that we study here can be modeled alternatively by using a duration model, since our data can be considered as survival time data. As stated by Jenkins (2005), "we consider a particular life-course domain, which may be partitioned into a number of mutually-exclusive states at each point in time". In our case, there are only two possible states[44] - married and divorced - and only one transition, from the first state to the second. Thus, over time, individuals in our database must choose between remaining in the married state, or moving to the divorced. With respect to time, we can say that as our data are grouped into time periods of a year, we develop a model suited to the nature of our data: discrete time data rather than continuous time data.

This methodology, which takes into account the sequential nature of our data, makes use of the so-called "hazard rates", defined as the probability of moving from the current state to another state, conditional on survival up to the present period of time. However, hazard rates do not have a single shape applicable to all contexts. On the contrary, hazard rates have different functional forms whether we are dealing with continuous time parametric, continuous time semi-parametric, or discrete time (Jenkins 2005). We focus on the last option, considering two different models. The first, leading to the so-called complementary log-log specification, is considered as "the discrete time

[44] As stated, each individual in our database is legally married and not just living or cohabiting with her/his partner. For this reason, we consider that the marital status "separated" and "divorced" are exactly the same, since "separated" normally is the threshold of legal divorce. Previous research followed the same strategy (Chan and Halpin 2002).

representation of a continuous time proportional hazards model", but can also be applied when survival times are intrinsically discrete. The second model we consider is the logistic model, which "was primarily developed for this second case but may also be applied to the first" (Jenkins 2005).

Equations (3.4) and (3.5) show the logistic and complementary log-log ("cloglog") discrete time hazard functions, respectively:

$$p(t) = [1 + \exp(-z(t))]^{-1} \tag{3.4}$$

$$p(t) = 1 - \exp[-\exp(z(t))] \tag{3.5}$$

where $z(t) = c(t) + \beta'X$ for a representative individual in year t, c(t) is the baseline hazard function, and $\beta'X$ includes an intercept term.

Finally, we also estimate the above-mentioned complementary log-log model including unobserved heterogeneity, for which it assumes normal distributed errors. In this way, we obtain our results net of individual unobserved heterogeneity. This is what we call an "xtcloglog" model in our estimates.

Using this methodology, we achieve the goal of checking the robustness of our estimates. We present these results in Table 3.11 in which Column (1) shows our baseline results using Random Effects to facilitate the results comparison.[45] Columns (2), (3) and (4) display results of using the cloglog, logistic, and xtcloglog models, respectively.

The first thing that stands out is that the results obtained with this new methodology are very similar to previous results, both in terms of the sign of the effect and in terms of being statistically significant. Focusing on our variable of interest, we observe that, regardless of the model used, the effect of this variable on the risk of marital disruption is negative and statistically significant.

[45] We show Random Effects estimates rather than Fixed Effects to facilitate the comparison of those factors that do not vary over the time.

**Table 3.11 - Children Conceived During First Marriage and Risk of Marital Dissolution: Survival Analysis**

*(Dependent Variable: Risk of Marital Dissolution)*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| All Children Conceived | -0.015*** | -0.229*** | -0.236*** | -0.288*** |
| | (0.002) | (0.031) | (0.032) | (0.035) |
| Gender | -0.013** | -0.085* | -0.087* | -0.111** |
| | (0.005) | (0.046) | (0.048) | (0.056) |
| Age | 0.030*** | 0.066* | 0.069** | 0.196*** |
| | (0.002) | (0.034) | (0.035) | (0.049) |
| Age Squared | -0.0003*** | -0.001** | -0.001** | -0.002*** |
| | (0.00002) | (0.0005) | (0.0005) | (0.001) |
| Wife Five Years Older | 0.037** | 0.229** | 0.237** | 0.287** |
| | (0.015) | (0.107) | (0.112) | (0.132) |
| Husband Five Years Older | 0.018*** | 0.206*** | 0.216*** | 0.248*** |
| | (0.007) | (0.055) | (0.056) | (0.067) |
| Highest Education: Lowest Level | 0.044*** | 0.582*** | 0.594*** | 0.680*** |
| | (0.011) | (0.101) | (0.104) | (0.121) |
| Highest Education: High School Level | 0.036*** | 0.516*** | 0.526*** | 0.609*** |
| | (0.006) | (0.074) | (0.076) | (0.089) |
| Highest Education: College Level | 0.032*** | 0.422*** | 0.430*** | 0.508*** |
| | (0.005) | (0.075) | (0.076) | (0.088) |
| Highest Education Spouse: Lowest Level | 0.018* | 0.384*** | 0.397*** | 0.468*** |
| | (0.010) | (0.097) | (0.100) | (0.112) |
| Highest Education Spouse: High School Level | 0.010* | 0.256*** | 0.262*** | 0.296*** |
| | (0.006) | (0.074) | (0.075) | (0.085) |
| Highest Education Spouse: College Level | 0.010* | 0.239*** | 0.244*** | 0.271*** |
| | (0.005) | (0.076) | (0.077) | (0.085) |
| Father in Household in 1979 | -0.027*** | -0.276*** | -0.285*** | -0.324*** |
| | (0.006) | (0.049) | (0.051) | (0.061) |
| Without Father Figure in 1979 | -0.010 | -0.237 | -0.241 | -0.238 |
| | (0.029) | (0.181) | (0.189) | (0.226) |
| Charged Illegal by 1980 | 0.046*** | 0.341*** | 0.353*** | 0.414*** |
| | (0.011) | (0.072) | (0.075) | (0.092) |
| Age First Marriage | -0.008*** | -0.001 | -0.002 | -0.048*** |
| | (0.001) | (0.007) | (0.008) | (0.014) |
| Child Before Marriage | 0.046*** | 0.233*** | 0.245*** | 0.316*** |
| | (0.009) | (0.062) | (0.064) | (0.076) |
| Race: Hispanic | -0.004 | -0.027 | -0.028 | -0.045 |
| | (0.008) | (0.069) | (0.071) | (0.081) |
| Race: Black | 0.049*** | 0.343*** | 0.355*** | 0.436*** |
| | (0.008) | (0.062) | (0.064) | (0.076) |
| Constant | -0.258*** | -4.133*** | -4.140*** | -5.849*** |
| | (0.030) | (0.553) | (0.571) | (0.744) |
| Region FE | YES | YES | YES | YES |
| Cohort FE | YES | YES | YES | YES |
| Observations | 45,632 | 45,632 | 45,632 | 45,632 |
| Number of Caseid | 5,622 | | | 5,622 |

Notes: Children conceived during first marriage include only those children who were born during or after the ninth month of marriage. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. All columns include controls for the sex, the age and the age gap, the education of respondent and his/her spouse, family structure when young, risk activities when young, age at first marriage, whether there exists a child who was conceived before first marriage, the race, the region of current residence and the cohort of respondent. Column (1) presents our baseline estimates using the Random Effects technique (Table 3.3, Column (3)). Columns (2), (3) and (4) display results from using the cloglog, logistic and xtcloglog models, respectively. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

With respect to the other covariates, we find no important differences from the results obtained in our baseline estimates. Only the variables related to age at first marriage are less statistically significant, although the sign of their impact does not change. The remaining covariates maintain and even increase their impact on the risk of divorce. Thus, we again observe the U-shaped inverse relationship between age and the risk of marital disruption, and the positive effect of an existing age gap between spouses. Again, lower levels of education imply higher probabilities of marital dissolution, as do having been charged with illegal activity in youth, having had a child before marriage, and being black, while the presence of the father in the household during the youth of the respondent reduces the risk of marital disruption.

# 3.7 Conclusions

In this chapter, we analyze the impact that children conceived during first marriage have on the marital stability of the couple. We develop Fixed Effects and Random Effects models to exploit the panel structure of the data. Then, we take into account the potential endogeneity between the number of children conceived during first marriage and the risk of marital disruption by developing an instrumental variable approach. We create two different sets of instruments, a range of dummies indicating the number of siblings of the respondent, and a dummy showing whether the respondent experienced a multiple birth during first marriage. In all cases, we find a significant deterrent effect of children conceived during first marriage on the risk of marital disruption.

Our findings are robust to a range of sample selections, to the inclusion of certain variables that may have an impact on the risk of divorce but that are excluded from our baseline estimates due to endogeneity concerns, and to different definitions of our variable of interest. We also show that the younger the children, the greater their deterrent effect on the risk of marital disruption. Moreover, we present empirical evidence that those children conceived before the first marriage do not have a deterrent effect; on the contrary, they are a destabilizing factor for the couple. Our results are robust even to the use of a survival analysis technique.

We further explore whether all the children conceived during first marriage have the same deterrent effect on the probability of marital disruption. We conclude that the higher the level of education of the parents, the greater the negative effect of their

children on marital instability, suggesting that parental education increases the child marriage-specific investment, in line with the theoretical predictions of Becker. In particular, fertility has no significant effect on the marriage stability of individuals with less than intermediate education.

# 3.A Appendix A:Instrumental variables, first step

**Table 3.12 - Instrumental Variables, First Step of Results Shown in Table 3.4**
*(Dependent Variable: Number of Children Conceived During First Marriage)*

| | (1) | (2) | (3) |
|---|---|---|---|
| One Sibling | 0.013 | | 0.014 |
| | (0.049) | | (0.036) |
| Two Siblings | 0.055 | | 0.064* |
| | (0.048) | | (0.035) |
| Three Siblings | 0.074 | | 0.081** |
| | (0.048) | | (0.036) |
| Four or More Siblings | 0.132*** | | 0.145*** |
| | (0.047) | | (0.035) |
| Twins | | 0.582*** | 0.570*** |
| | | (0.035) | (0.037) |
| Gender | 0.020 | 0.025** | 0.026** |
| | (0.016) | (0.011) | (0.012) |
| Age | 0.433*** | 0.423*** | 0.425*** |
| | (0.004) | (0.004) | (0.004) |
| Age Squared | -0.005*** | -0.005*** | -0.005*** |
| | (0.00005) | (0.00006) | (0.00006) |
| Wife Five Years Older | -0.308*** | -0.306*** | -0.301*** |
| | (0.038) | (0.028) | (0.029) |
| Husband Five Years Older | -0.025 | -0.017 | -0.020 |
| | (0.019) | (0.014) | (0.014) |
| Highest Education: Lowest Level | 0.123*** | 0.065*** | 0.054** |
| | (0.029) | (0.023) | (0.024) |
| Highest Education: High School Level | 0.041** | 0.018 | 0.010 |
| | (0.019) | (0.015) | (0.016) |
| Highest Education: College Level | -0.021 | -0.011 | -0.018 |
| | (0.017) | (0.014) | (0.014) |
| Highest Education Spouse: Lowest Level | 0.011 | 0.002 | -0.006 |
| | (0.024) | (0.021) | (0.021) |
| Highest Education Spouse: High School Level | -0.056*** | -0.069*** | -0.071*** |
| | (0.017) | (0.014) | (0.015) |
| Highest Education Spouse: College Level | -0.061*** | -0.067*** | -0.069*** |
| | (0.016) | (0.014) | (0.014) |
| Father in Household in 1979 | 0.031* | 0.029** | 0.030** |
| | (0.017) | (0.012) | (0.013) |
| Without Father Figure in 1979 | -0.067 | -0.077 | -0.075 |
| | (0.069) | (0.050) | (0.052) |
| Charged Illegal by 1980 | -0.048 | -0.035* | -0.037 |
| | (0.028) | (0.020) | (0.021) |
| Age First Marriage | -0.121*** | -0.124*** | -0.123*** |
| | (0.002) | (0.001) | (0.001) |
| Child Before Marriage | -0.203*** | -0.196*** | -0.206*** |
| | (0.023) | (0.016) | (0.017) |
| Race: Hispanic | 0.102*** | 0.127*** | 0.107*** |
| | (0.023) | (0.016) | (0.017) |
| Race: Black | -0.057** | -0.049*** | -0.070*** |
| | (0.022) | (0.016) | (0.017) |
| Constant | -4.697*** | -4.358*** | -4.478 |
| | (0.095) | (0.079) | (0.086) |
| Region FE | YES | YES | YES |
| Cohort FE | YES | YES | YES |
| Observations | 45,632 | 45,632 | 45,632 |
| Number of Caseid | 5,622 | 5,622 | 5,622 |

Notes: Children conceived during first marriage include only those children who were born during or after the ninth month of marriage. The sample consists of men and women who were at least 21 years old when they first married. They appear in our database since the year of their first marriage until the previous year of their divorce –since we want to find the impact of personal and familiar characteristics in year t-1 on divorce decisions in year t- or until they no longer appear in the survey, whichever comes first. Column (1) shows results using dummies for the number of siblings of respondent as covariates. Column (2) includes as covariate a dummy indicating whether the respondent has experienced a multiple birth. Column (3) presents results after using both sets of variables simultaneously as covariates. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

# 3.B Appendix B: Data sources and definition of variables

| Variable | Definition | Source |
|---|---|---|
| **Dependent Variable** | | |
| Divorce | This variable takes value 0 while the interviewee is married, and value 1 the year before the divorce occurs | NLSY79 |
| **Variables of Interest** | | |
| Children Conceived During Marriage | Number of children conceived during first marriage | NLSY79 |
| Children Conceived During Marriage Under 6 | Number of children conceived during first marriage who are six years old or younger | NLSY79 |
| Children Conceived During Marriage Under 10 | Number of children conceived during first marriage who are ten years old or younger | NLSY79 |
| All Children Conceived | Number of children conceived before and during first marriage | NLSY79 |
| Children Conceived Before Marriage | Number of children conceived before first marriage starts | NLSY79 |
| **Control Variables** | | |
| Gender | This variable takes value 0 for women and value 1 for men | NLSY79 |
| Age | Variable indicating the age of interviewee | NLSY79 |
| Age Squared | Variable indicating the square of the age of interviewee | NLSY79 |
| Wife Five Years Older | This variable takes value 1 if the wife is, at least, five years older than her husband and 0 otherwise | NLSY79 |
| Husband Five Years Older | This variable takes value 1 if the husband is, at least, five years older than his wife and 0 otherwise | NLSY79 |
| Same Age | This variable takes value 1 if there is an age gap between spouses of less than five years and 0 otherwise | NLSY79 |
| Highest Education: Lowest Level | This variable takes value 1 if the highest level of education of the interviewee is lower than $12^{th}$ grade and 0 otherwise | NLSY79 |
| Highest Education: High School Level | This variable takes value 1 if the highest level of education of the interviewee is the $12^{th}$ grade (completed high school) and 0 otherwise | NLSY79 |
| Highest Education: College Level | This variable takes value 1 if the highest level of education of the interviewee is between the first and the third year of college and 0 otherwise | NLSY79 |
| Highest Education: More Than College Level | This variable takes value 1 if the highest level of education of the interviewee is the fourth year of college or more and 0 otherwise | NLSY79 |
| Highest Education Spouse: Lowest Level | This variable takes value 1 if the highest level of education of the interviewee´s spouse is lower than $12^{th}$ grade and 0 otherwise | NLSY79 |
| Highest Education Spouse: High School Level | This variable takes value 1 if the highest level of education of the interviewee´s spouse is the $12^{th}$ grade (completed high school) and 0 otherwise | NLSY79 |
| Highest Education Spouse: College Level | This variable takes value 1 if the highest level of education of the interviewee´s spouse is between the first and the third year of college and 0 otherwise | NLSY79 |
| Highest Education Spouse: More Than College Level | This variable takes value 1 if the highest level of education of the interviewee´s spouse is the fourth year of college or more and 0 otherwise | NLSY79 |
| Father in Household in 1979 | This variable takes value 1 if respondent´s father or stepfather is in household on 1979 and 0 otherwise | NLSY79 |
| Father Out Household in 1979 | This variable takes value 1 if respondent´s father or stepfather is not in household on 1979 and 0 otherwise | NLSY79 |
| Without Father Figure in 1979 | This variable takes value 1 if respondent has not got a father figure in 1979 and 0 otherwise | NLSY79 |
| Charged Illegal by 1980 | This variable takes value 1 if respondent has ever been charged with illegal activity, excluding minor traffic offenses, by 1980 and 0 otherwise | NLSY79 |
| Age at First Marriage | Variable indicating the age of respondent when first marriage began | NLSY79 |
| Child Before Marriage | This variable takes value 1 if first children were conceived before first marriage and 0 otherwise | NLSY79 |
| Race: Hispanic | This variable takes value 1 if respondent´s race is hispanic and 0 otherwise | NLSY79 |

| | | |
|---|---|---|
| Race: Black | This variable takes value 1 if respondent´s race is black and 0 otherwise | NLSY79 |
| Race: Other | This variable takes value 1 if respondent´s race is different to black and hispanic and 0 otherwise | NLSY79 |
| Region FE | Dummy variables for the region of residence (North East (omitted), North Central, South, and West) | NLSY79 |
| Cohort FE | Dummy variables for the cohort of respondent (from 1957 to 1964) | NLSY79 |
| Family Income Indicator | Variable that relates the total net family income and the number and age of household members | NLSY79 |
| Family Income Indicator Squared | This variable is the squared of the previous indicator | NLSY79 |
| Religion Raised | Dummy variables for the religion under which respondent was raised (protestant, roman catholic, jewish, other religion and no religion (omitted)) | NLSY79 |
| Living Urban | This variable takes value 1 if respondent´s current residence is urban and 0 otherwise | NLSY79 |
| Employed | This variable takes value 1 if respondent´s employment status is employed and 0 otherwise | NLSY79 |
| Spouse Employed | This variable takes value 1 if respondent´s spouse's employment status is employed and 0 otherwise | NLSY79 |
| Same Education | This variable takes value 1 if respondent´s education is the same than his/her spouse and 0 otherwise | NLSY79 |
| Respondent More Educated Than Spouse | This variable takes value 1 if respondent´s education is higher than his/her spouse and 0 otherwise | NLSY79 |
| Respondent Less Educated Than Spouse | This variable takes value 1 if respondent´s education is lower than his/her spouse and 0 otherwise | NLSY79 |
| **Instrumental Variables** | | |
| No Siblings | This variable takes value 1 if respondent has no brothers or sisters and 0 otherwise | NLSY79 |
| One Sibling | This variable takes value 1 if respondent has one brother or sister and 0 otherwise | NLSY79 |
| Two Siblings | This variable takes value 1 if respondent has two brothers and sisters and 0 otherwise | NLSY79 |
| Three Siblings | This variable takes value 1 if respondent has three brothers and sisters and 0 otherwise | NLSY79 |
| Four or More Siblings | This variable takes value 1 if respondent has four or more brothers and sisters and 0 otherwise | NLSY79 |
| Twins | This variable takes value 1 if respondent has experienced a multiple birth during first marriage and 0 otherwise | NLSY79 |
| First Sex Before 16 Years Old | This variable takes value 1 if respondent had his/her first sexual intercourse before 16 years old | NLSY79 |
| First Sex Between 16 and 18 Years Old | This variable takes value 1 if respondent had his/her first sexual intercourse between 16 and 18 years old | NLSY79 |
| First Sex After 16 Years Old | This variable takes value 1 if respondent had his/her first sexual intercourse after 18 years old | NLSY79 |
| No Sex by the Period 1983-1985 | This variable takes value 1 if respondent had not had sex by the period 1983-1985 | NLSY79 |

# References

Amato, P. (1996) Explaining the Intergenerational Transmission of Divorce, *Journal of Marriage and Family*, ***58***, 628-640.

Amato, P. (2001) Children of Divorce in the 1990s: An Update of the Amato and Keith (1991) Meta-analysis, *Journal of Family Psychology*, **15**, 355-370.

Amato, P. (2004) The Consequences of Divorce for Adults and Children, *Journal of Marriage and Family*, **62**, 1269-1287.

Amato, P. (2010) Research on Divorce: Continuing Trends and New Developments, *Journal of Marriage and Family*, **72**, 650–666.

Amato, P. and DeBoer, D. (2001) The Transmission of Marital Instability Across Generations: Relationship Skills or Commitment to Marriage?, *Journal of Marriage and Family*, **63**, 1038–1051.

Amato, P. and James, S. (2010) Divorce in Europe and the United States: Commonalities and Differences across Nations, *Family Science*, **1**, 2-13.

Ananat, E. and Michaels, G. (2008) The Effect of Marital Breakup on the Income Distribution of Women with Children, *Journal of Human Resources*, **43**, 611-629.

Andersson, G. (1997) The Impact of Children on Divorce Risks of Swedish Women, *European Journal of Population*, **13**, 109–145.

Apel, R., Blokland, A., Nieuwbeerta, P. and Van Schellen, M. (2010) The Impact of Imprisonment on Marriage and Divorce: A Risk Set Matching Approach, *Journal of Quantitative Criminology*, **26**, 269-300.

Axinn, W., Clarkberg, M. and Thornton, A. (1994) Family Influences on Family Size Preferences, *Demography*, **31**, 65-79.

Becker, G., Landes, E. and Michael, R. (1977) An Economic Analysis of Marital Instability, *The Journal of Political Economy*, **85**, 1141-1187.

Becker, G. (1981) A Treatise on the Family, Harvard University Press, Cambridge.

Berrington, A. and Diamond, I. (1999) Marital Dissolution among the 1958 British Birth Cohort: The Role of Cohabitation, *Population Studies*, **53**, 19-38.

Bianchi, S. and Casper, L. (2000) American Families, *Population Bulletin*, **55**, 1-44.

Black, S., Devereux, P. and Salvanes, K. (2005) Why the Apple Doesn't Fall Far: Understanding Intergenerational Transmission of Human Capital, *The American Economic Review*, **95**, 437-449.

Blackburn, M. (2003) The Effects of the Welfare System on Marital Dissolution, *Journal of Population Economics*, **16**, 477-500.

Böheim, R. and Ermisch, J. (2001) Partnership Dissolution in the UK – The Role of Economic Circumstances, *Oxford Bulleting of Economics and Statistics*, **63**, 197-208.

Booth, A. and Edwards, J. (1985) Age at Marriage and Marital Instability, *Journal of Marriage and Family, **47**,* 67-75.

Booth, A. and Kee, H. (2006) Intergenerational Transmission of Gertility Patterns in Britain, *IZA DP No. 2437*.

Bramlett, M. and Mosher, W. (2002) Cohabitation, Marriage, Divorce, and Remarriage in the United States, *Vital Health Statistics*, **23**, 1-32. Hyattsville, MD: National Center for Health Statistics.

Bulanda, J. and Brown, S. (2007) Race-Ethnic Differences in Marital Quality and Divorce, *Social Science Research*, **36**, 945-967.

Burgess, S., Propper, C. and Aassve, A. (2003) The Role of Income in Marriage and Divorce Transitions among Young Americans, *Journal of Population Economics*, **16**, 455-475.

Burkhauser, R., Duncan, G., Hauser, R. and Berntsen, R. (1990) Economic Burdens of Marital Disruptions: A Comparison of the United States and the Federal Republic of Germany, *Review of Income and Wealth*, **36**, 319–333.

Butterworth, P. and Rodgers, B. (2008) Mental Health Problems and Marital Disruption: Is It the Combination of Husbands and Wives' Mental Health Problems that Predicts Later Divorce?, *Social Psychiatry and Psychiatric Epidemiology*, **43**, 758-763.

Cáceres-Delpiano, J. (2012) Impacts of Family Size on the Family as a Whole: Evidence from the Developing World, *The B.E. Journal of Economic Analysis & Policy*, **12**, 1-34.

Cáceres-Delpiano, J. and Giolito, E. (2008) How Unilateral Divorce Affects Children, *IZA DP No. 3342*.

Call, V. and Heaton, T. (1997) Religious Influence on Marital Stability, *Journal for the Scientific Study of Religion*, **36**, 382-392.

Chan, T. and Halpin, B. (2002) Children and Marital Instability in the UK, *Manuscript, Department of Sociology, University of Oxford*.

Chandra, A., Martinez, G., Mosher, W., Abma, J. and Jones, J. (2005) Fertility, Family Planning, and Reproductive Health of U.S. Women: Data from the 2002 National Survey of Family Growth, *National Center for Health Statistics, Vital Health Stat*, **23**. Downloaded from: http://www.cdc.gov/nchs/data/series/sr_23/sr23_025.pdf

Cherlin, A. (1977) The Effect of Children on Marital Dissolution, *Demography*, **14**, 265-272.

Cherlin, A. and Kiernan, K. (1999) Parental Divorce and Partnership Dissolution in Adulthood: Evidence from a British Cohort Study, *Population Studies: A Journal of Demography*, **53**, 39-48.

Coker, A., Richter, D., Valois, R., McKeown, R., Garrison, C. and Vincent, M. (1994) Correlates and Consequences of Early Initiation of Sexual Intercourse, *Journal of School Health*, **64**, 372-377.

Conger, R., Elder, G., Lorenz, F., Conger, K., Simons, R., Whitbeck, B., Huck, S. and Melby, J. (1990) Linking Economic Hardship to Marital Quality and Instability, *Journal of Marriage and Family*, ***52***, 643-656.

Currie, J. and Moretti, E. (2003) Mother's Education and the Intergenerational Transmission of Human Capital: Evidence from College Openings, *The Quarterly Journal of Economics*, **118**, 1495-1532.

Drewianka, S. (2008) Divorce Law and Family Formation, *Journal of Population Economics*, **21**, 485-503.

Ermisch, J. and Francesconi, M. (2001) Family Structure and Children´s Achievements, *Journal of Population Economics*, **14**, 249-270.

Evenhouse, E. and Reilly, S. (2004) A Sibling Study of Stepchild Well-Being, *Journal of Human Resources*, **39**, 248-276.

Friedberg, L. (1998) Did Unilateral Divorce Raise Divorce Rates? Evidence from Panel Data, *The American Economic Review*, **88**, 608-627.

Frisco, M., Muller, C. and Frank, K. (2007) Parents' Union Dissolution and Adolescents' School Performance: Comparing Methodological Approaches, *Journal of Marriage and Family*, **69**, 721–741.

Fronstin, P., Greenberg, D. and Robins, P. (2001) Parental Disruption and the Labour Market Performance of Children When They Reach Adulthood, *Journal of Population Economics*, **14**, 137-172.

Furtado, D., Marcén, M. and Sevilla-Sanz, A. (2013) Does Culture Affect Divorce? Evidence from European Immigrants in the US, *Demography*, **50**, 1013-1038.

Gennetian, L. (2005) One or Two Parents? Half or Step Siblings? The Effect of Family Structure on Young Children's Achievement, *Journal of Population Economics*, **18**, 415-436.

Gray, J. (1995) The Causality Between Employment and Divorce, *Family Economics and Resources Management Biennial*, **1**, 171-176.

Gruber, J. (2004) Is Making Divorce Easier Bad for Children? The Long-Run Implications of Unilateral Divorce, *Journal of Labor Economics*, **22**, 799-833.

Hausman, J. (1978) Specification Tests in Econometrics, *Econometrica*, **46**, 1251–1271.

Hewitt, B., Western, M. and Baxter, J. (2006) Who Decides? The Social Characteristics of Who Initiates Marital Separation, *Journal of Marriage and Family*, **68**, 1165-1177.

Hoffman, S. and Duncan, G. (1995) The Effect of Incomes, Wages, and AFDC Benefits on Marital Disruption, *The Journal of Human Resources*, **30**, 19-41.

Jacobsen, J., Pearce III, J. and Rosenbloom, J. (2001) The Effects of Child-bearing on Women's Marital Status: Using Twin Births as a Natural Experiment, *Economics Letters*, **70**, 133-138.

Jalovaara, M. (2001) Socio-Economic Status and Divorce in First Marriages in Finland 1991–93, *Population Studies*, **55**, 119–133.

Jenkins, S. (2005) Survival Analysis. Institute for Social and Economic Research, University of Essex. Download from: https://www.iser.essex.ac.uk/files/teaching/stephenj/ec968/pdfs/ec968lnotesv6.pdf.

Johnson, W. and Skinner, J. (1986) Labor Supply and Marital Separation, *The American Economic Review*, **76**, 455-469.

Kalmijn, M. and Poortman, A. (2006) His or Her Divorce? The Gendered Nature of Divorce and Its Determinants, *European Sociological Review*, **22**, 201-214.

Kim, H. (2011) Consequences of Parental Divorce for Child Development, *American Sociological Review*, ***76***, 487-511.

Koo, H. and Janowitz, B. (1983) Interrelationships between Fertility and Marital Dissolution: Results of a Simultaneous Logit Model, *Demography*, **20**, 129-145.

Kotte, M. and Ludwig, V. (2011) Intergenerational Transmission of Fertility Intentions and Behaviour in Germany: the Role of Contagion, *Vienna Yearbook of Population Research*, **9**, 207-226.

Lehrer, E. (2008) Age at Marriage and Marital Instability: Revisiting the Becker–Landes–Michael Hypothesis, *Journal of Population Economics*, **21**, 463-484.

Levenson, R., Carstensen, L. and Gottman, J. (1993) Long-term Marriage: Age, Gender, and Satisfaction, *Psychology and Aging*, **8**, 301-313.

Liu, G. (2002) How Premarital Children and Childbearing in Current Marriage Influence Divorce of Swedish Women in Their First Marriages, *Demographic Research*, **7**, 389-406.

Lyngstad, T. and Jalovaara, M. (2010) A Review of the Antecedents of Union Dissolution, *Demographic Research*, **23**, 257-292.

Marcassa, S. (2011) Divorce Laws and Divorce Rate in the US, *Paris School of Economics, Working Paper N° 2009 - 52*.

Martinez, G., Chandra, A., Abma, J., Jones, J. and Mosher, W. (2006) Fertility, Contraception, and Fatherhood: Data on Men and Women from Cycle 6 (2002) of the National Survey of Family Growth, *National Center for Health Statistics, Vital Health Stat*, **23**. Downloaded from: http://www.cdc.gov/nchs/data/series/sr_23/sr23_026.pdf

McKeever, M. and Wolfinger, N. (2001) Reexamining the Economic Costs of Marital Disruption for Women, *Social Science Quarterly*, **82**, 202–217.

McLanahan, S. and Bumpass, L. (1988) Intergenerational Consequences of Family Disruption, *American Journal of Sociology*, ***94***, 130-152.

McManus, P. and DiPrete, T. (2001) Losers and Winners: The Financial Consequences of Separation and Divorce for Men, *American Sociological Review*, ***66***, 246-268.

Miller, B. and Heaton, T. (1991) Age at First Sexual Intercourse and the Timing of Marriage and Childbirth, *Journal of Marriage and the Family*, **53**, 719-732.

Morgan, S. and Rindfuss, R. (1985) Marital Disruption: Structural and Temporal Dimensions, *American Journal of Sociology*, **90**, 1055–1077.

Murphy, M. and Wang, D. (2001) Family-Level Continuities in Childbearing in Low-Fertility Societies, *European Journal of Population/Revue Européenne de Démographie*, **17**, 75-96.

Myers, S. (1997) Marital Uncertainty and Childbearing, *Social Forces*, **75**, 1271-1289.

Papps, K. (2006) The Effects of Divorce Risk on the Labour Supply of Married Couples, *IZA DP No. 2395*.

Peterson, R. (1996) A Re-Evaluation of the Economic Consequences of Divorce, *American Sociological Review*, **61**, 528-536.

Regnier-Loilier, A. (2006) Influence of Own Sibship Size on the Number of Children Desired at Various Times of Life, *Population (English Edition)*, **61**, 165-194.

Reinhold, S. (2010) Reassessing the Link between Premarital Cohabitation and Marital Instability, *Demography*, **47**, 719–733.

South, S. and Spitze, G. (1986) Determinants of Divorce over the Marital Life Couse, *American Sociological Review*, **51**, 583-590.

South, S. (2001) Time-Dependent Effects of Wives' Employment on Marital Dissolution, *American Sociological Review*, **66**, 226-245.

Steele, F., Kallis, C., Goldstein, H. and Joshi, H. (2005) The Relationship between Childbearing and Transitions from Marriage and Cohabitation in Britain, *Demography*, **42**, 647-673.

Strohschein, L. (2005) Parental Divorce and Child Mental Health Trajectories, *Journal of Marriage and Family*, **67**, 1286–1300.

Sun, Y. and Li, Y. (2001) Marital Disruption, Parental Investment, and Children's Academic Achievement, A Prospective Analysis, *Journal of Family Issues, **22**,* 27-62.

Svarer, M. and Verner, M. (2008) Do Children Stabilize Relationships in Denmark?, *Journal of Population Economics*, **21**, 395-417.

Tzeng, J. and Mare, R. (1995) Labor Market and Socioeconomic Effects on Marital Stability, *Social Science Research*, **24**, 329–351.

Vaaler, M., Ellison, C. and Powers, D. (2009) Religious Influences on the Risk of Marital Dissolution, *Journal of Marriage and Family*, **71**, 917-934.

Voydanoff, P. (1990) Economic Distress and Family Relations: A Review of the Eighties, *Journal of Marriage and Family, **52**,* 1099-1115.

Vuri, D. (2001) Fertility and Divorce, European University Institute, *Working Paper ECO 2001/5*.

Waite, L. and Lillard, L. (1991) Children and Marital Disruption, *American Journal of Sociology, **96**,* 930-953.

Waite, L. and Lillard, L. (1993) A Joint Model of Marital Childbearing and Marital Disruption, *Demography*, **30**, 653-681.

Weiss, Y. and Willis R. (1997) Match Quality, New Information and Marital Dissolution, *Journal of Labor Economics*, **15**, S293–S329.

White, L. and Booth, A. (1985) The Quality and Stability of Remarriages: The Role of Stepchildren, *American Sociological Review*, **50**, 689-698.

White, L. and Rogers, S. (2000) Economic Circumstances and Family Outcomes: A Review of the 1990s, *Journal of Marriage and Family*, **62**, 1035–1051.

Williams, K. (2003) Has the Future of Marriage Arrived? A Contemporary Examination of Gender, Marriage, and Psychological Well-Being, *Journal of Health and Social Behavior, **44**,* 470-487.

Williams, K. and Dunne-Bryant, A. (2006) Divorce and Adult Psychological Well-Being: Clarifying the Role of Gender and Child Age, *Journal of Marriage and Family*, **68**, 1178–1196.

Wolfers, J. (2006) Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results, *American Economic Review*, **96**, 1802-1820.

Zagorsky, J. (2005) Marriage and Divorce's Impact on Wealth, *Journal of Sociology, **41***, 406-424.

# Conclusiones

La familia es la institución social más antigua e importante de nuestra sociedad. Las Naciones Unidas, en el artículo 16 de la Declaración Universal de Derechos Humanos la definen como "el elemento natural y fundamental de la sociedad, y tiene derecho a la protección de la sociedad y del Estado". Aunque esta institución ha sufrido numerosos cambios a lo largo de los años, y especialmente en los tiempos más recientes (proliferación de familias monoparentales, aprobación del matrimonio homosexual en numerosos países, incremento de las tasas de divorcio…), se mantiene como un pilar fundamental de nuestra sociedad.

Desde un punto de visto académico, los economistas han mostrado interés por su estudio ya desde el S. XVIII, con los trabajos desarrollados por Cantillon (1730), Malthus (1798) o Smith (1776), en los que se cuestionaban por la relación existente entre determinadas variables económicas y el tamaño de la población. Sin embargo, la disciplina de la Economía de la Familia tal y como la conocemos hoy en día surge como consecuencia de los trabajos desarrollados por el profesor Gary Becker, y se ocupa del estudio del comportamiento y las estructuras familiares desde un punto de vista económico, es decir, describiendo a la familia como una unidad económica. Este campo de investigación incluye no sólo factores relativos a ingresos y salarios, sino también otros como la fertilidad, la mortalidad, el capital humano, la negociación dentro del hogar, el matrimonio o el divorcio, entre otros.

Esta tesis se centra en el estudio de la fertilidad, un campo importante dentro de la Economía de la Familia. De hecho, los hijos son considerados como el "producto" más importante que se puede generar en el seno de la familia. Es allí donde el hijo va a adquirir los primeros valores y donde va a establecer las primeras relaciones que formarán su personalidad. Además, hay una amplia gama de decisiones que la pareja debe tomar en relación a los hijos, como si tenerlos o no tenerlos, cuántos tener, cuándo tenerlos, cuánto tiempo se les debe dedicar… sobre las que influyen un gran número de factores y que pueden tener importantes consecuencias. A lo largo de esta tesis, pretendemos arrojar luz sobre el proceso de toma de decisiones relacionado con la fertilidad, siguiendo tres líneas de investigación.

En el primer capítulo de esta tesis analizamos el papel jugado por la liberalización de las leyes de divorcio que tuvo lugar en Europa desde la segunda mitad del S. XX en

la caída de las tasas de fecundidad que se han venido produciendo desde ese momento. El impacto de las reformas en las leyes de divorcio sobre la fertilidad se produce a través del efecto sobre el valor asignado al matrimonio. Tanto la reducción de los costes del divorcio que hace que las opciones fuera del matrimonio sean más atractivas, como el debilitamiento del matrimonio como "seguro" para ambas partes, o la reducción de los beneficios asociados al matrimonio que se produce con las reformas legales, suponen una caída del valor asignado al matrimonio no sólo para aquellos que ya están casados, sino también para quienes contemplan la posibilidad de casarse.

Para desarrollar este análisis, nuestra estrategia empírica utiliza las variaciones en el momento de implementar las reformas en las leyes de divorcio en cada país europeo incluido en el análisis, lo que nos permite obtener el efecto de dichas reformas sobre las tasas de fecundidad. Estas reformas incluyen cualquier modificación de las leyes de divorcio que suponga la liberalización de las mismas, ya sea por la ampliación de los motivos de divorcio o por la introducción implícita o explícita del divorcio unilateral. Se trata de una estrategia que ha sido previamente utilizada en la literatura económica para estudiar las consecuencias de cambios en las leyes de divorcio (véase, por ejemplo, Friedberg 1998; González y Viitanen 2009; Wolfers 2006).

Los resultados obtenidos, que son robustos a la introducción de variables que controlan otros aspectos que también pudieron contribuir a la caída de las tasas de fecundidad, muestran cómo los cambios en las leyes de divorcio tuvieron un impacto negativo y permanente sobre las tasas de fecundidad. Estos resultados están en la misma línea que los obtenidos por estudios previos que utilizan datos de los Estados Unidos, y que señalan que reformas en las leyes de divorcio tuvieron un efecto negativo sobre la fecundidad (Alesina y Giuliano 2007; Drewianka 2008). También analizamos en este capítulo el mecanismo a través del cual se produce este efecto. Nuestros resultados muestran cómo este proceso liberalizador tuvo un impacto negativo tanto sobre las tasas de fecundidad marital como sobre la fecundidad fuera del matrimonio, si bien es cierto que el primero de estos efectos no parece ser permanente. Finalmente, estudiamos el efecto de las reformas en las leyes de divorcio sobre la fecundidad dentro del matrimonio en función del número de años que la pareja haya estado casada. Los resultados obtenidos muestran que el impacto varía en función de si la pareja contrajo matrimonio antes o después de que se llevaran a cabo las reformas.

Esta caída de las tasas de fecundidad en Europa, sobre la que hemos visto que representó un papel importante el proceso liberalizador de las leyes de divorcio, tiene

importantes implicaciones económicas. Por una parte, y a pesar de que queda fuera del ámbito de estudio de este capítulo, investigaciones previas han mostrado cómo caídas de la tasa de fecundidad se relacionan con incrementos de la participación de las mujeres en el mercado de trabajo. También se pueden observar implicaciones para el nivel educativo de las mujeres, ya que las caídas en las tasas de fecundidad pueden alentar a las mujeres a invertir en su propia educación como consecuencia del aumento de los réditos que percibirán debido a su mayor participación en el mercado laboral. Por último, el envejecimiento de la población que se produce a raíz de la caída de las tasas de fecundidad puede llegar a poner en peligro la viabilidad del sistema de bienestar implantado en los países europeos. Dicho sistema, y en concreto el sistema de pensiones, se sostiene sobre la base de que las nuevas generaciones de trabajadores aportan el capital necesario a través de sus impuestos para pagar a los jubilados. Sin embargo, si la tasa de fecundidad cae, a largo plazo este sistema se convierte en insostenible para cualquier país. Así, se pone de manifiesto la necesidad de que los gobiernos valoren todas las implicaciones que se pueden derivar de cada una de las decisiones que adopten.

En el segundo capítulo de esta tesis analizamos otro problema vinculado con la fecundidad, los embarazos de mujeres adolescentes. En concreto, estudiamos el impacto que la cultura tiene sobre la probabilidad de que las mujeres sufran uno de ellos. Estos embarazos, a pesar de representar un porcentaje importante de la tasa total de fecundidad, sobre todo en determinados países, suponen una preocupación para los mismos debido a las consecuencias negativas que se derivan de ellos. Investigaciones previas han establecido que experimentar un embarazo adolescente se asocia con peores condiciones socioeconómicas tanto para las madres (Chevalier y Viitanen 2003) como para sus hijos (Francesconi 2008). Además, estas madres adolescentes tienen más probabilidades de realizar una menor inversión en su propia educación (Hofferth et al. 2001; Klepinger et al. 1999), lo que influye en su capital humano, y hace que perciban menores salarios en el futuro (Chevalier y Viitanen 2003; Hoffman et al. 1993; Klepinger et al. 1999).

Para desarrollar este análisis consideramos únicamente a aquellas mujeres inmigrantes de segunda y superior generación que han nacido y han vivido en los Estados Unidos, de manera que todas ellas hayan estado expuestas a las mismas leyes e instituciones, y hacemos uso de las variaciones en las tasas de fecundidad de las adolescentes en función del país de procedencia de sus antecesores. De este modo, si

existen diferencias en la probabilidad de concebir un hijo siendo adolescente en función del país de origen, éstas pueden ser consideradas como evidencia del impacto de la cultura.

Los resultados muestran que la cultura tiene un impacto cuantitativamente significativo en la probabilidad de experimentar un embarazo adolescente, lo que implica una serie de consecuencias negativas tanto para la madre como para sus hijos. Aquellas mujeres originarias de países con actitudes más favorables hacia los embarazos adolescentes tienen mayores probabilidades de quedarse embarazadas durante la adolescencia. Estos resultados son robustos a cambios en la muestra seleccionada y a la inclusión de controles para determinadas características del país de origen. También se incluyen variables de control midiendo características individuales de las mujeres adolescentes, sin que los resultados sufran cambios significativos.

Estos resultados tienen importantes implicaciones políticas y económicas que los gobiernos deberían tener en cuenta si pretenden reducir las tasas de fecundidad adolescente debido a sus consecuencias negativas. En la medida en la que se demuestra que la cultura representa un papel importante sobre la probabilidad de experimentar un embarazo adolescente, se pone en tela de juicio la efectividad, y por lo tanto la rentabilidad, de las políticas tradicionales destinadas a reducir estos embarazos. Estas políticas, entre las que se encuentran la difusión de información relativa a métodos anticonceptivos o la mejora de la educación sexual de los adolescentes, no tienen en cuenta las diferencias culturales de aquellos a quienes se dirigen. Basándonos en los resultados obtenidos, consideramos que es esencial que los gobiernos desarrollen nuevas medidas destinadas a reducir estos embarazos que sí tengan en cuenta la cultura de los adolescentes, como contratar a especialistas en planificación familiar o a trabajadores sociales de diversos orígenes o razas, de manera que puedan comprender y empatizar mejor con las circunstancias específicas de cada mujer en función de su cultura.

En el tercer capítulo de esta tesis estudiamos el impacto que los hijos concebidos durante el primer matrimonio tienen sobre el riesgo de ruptura matrimonial. Becker (1981) expone que los hijos pueden ser considerados como inversiones específicas que la pareja realiza en su propio matrimonio, lo que hace subir el valor del mismo, reforzando su estabilidad. Sin embargo, existe cierta controversia a nivel empírico con respecto a este asunto. Andersson (1997), Cherlin (1977) o Steele et al. (2005) encuentran en sus investigaciones que los hijos efectivamente reducen la probabilidad

de que se produzca una ruptura matrimonial, especialmente cuando son jóvenes. Koo y Janowitz (1983), sin embargo, no hallan ningún efecto de los hijos sobre la estabilidad matrimonial. Otros trabajos encuentran resultados mixtos, como Waite y Lillard (1993), quienes obtienen que el primer hijo de la pareja sí tiene un efecto estabilizador, mientras que el resto tienen el efecto contrario, o Chan y Halpin (2002), cuyos resultados apuntan a que durante la década de los años ochenta se produjo un cambio en el impacto de los hijos sobre la probabilidad de ruptura matrimonial, pasando de ser negativo a positivo. Finalmente, Svarer y Verner (2008) y Vuri (2001) hallan resultados contradictorios en función de la metodología utilizada. En un principio encuentran evidencia empírica del efecto disuasorio de los hijos sobre la probabilidad de ruptura matrimonial, pero una vez que consideran la endogeneidad entre ambas variables, el resultado que obtienen es el contrario.

Teniendo en cuenta estas investigaciones anteriores, desarrollamos nuestro análisis para arrojar luz sobre el verdadero efecto que los hijos tienen sobre la estabilidad marital. Los resultados de nuestro estudio confirman el efecto disuasorio de los hijos sobre la posibilidad de que se produzca una ruptura de la pareja. Posteriormente, continuamos con nuestro análisis teniendo en cuenta la potencial endogeneidad existente entre los hijos y la estabilidad marital. Por una parte, y siguiendo la teoría expuesta por Becker, los hijos pueden ser considerados como una inversión de la pareja en su propio matrimonio, lo que debería aumentar su valor y reforzarlo, pero por otro lado, aquellas parejas con más problemas maritales son menos propensas a procrear (Myers 1997). Para superar estos problemas de endogeneidad, desarrollamos un enfoque de variables instrumentales que confirma el impacto negativo de los hijos sobre el riesgo de ruptura matrimonial. Finalmente, en este capítulo también estudiamos si todos los hijos tienen la misma capacidad disuasoria sobre la probabilidad de que se produzca una ruptura matrimonial, para lo que estudiamos su impacto en la estabilidad marital en función del nivel educativo de sus padres. Nuestros resultados nos muestran que cuanto mayor es el nivel educativo de los padres, mayor es el efecto disuasorio de sus hijos sobre la probabilidad de ruptura de la pareja. De hecho, no encontramos evidencia empírica que demuestre este efecto disuasorio en el caso de los hijos concebidos durante el primer matrimonio cuyos padres tienen el nivel educativo más bajo.

Nuestros resultados confirman la hipótesis propuesta por Becker, según la cual los hijos pueden ser considerados como una inversión que la pareja realiza en su

matrimonio, aumentando su valor y haciéndolo más resistente a las tensiones y por lo tanto más difícil de romper. Reforzando esta teoría, y de acuerdo con nuestros resultados, la inversión en el matrimonio que se realiza cuando se tiene un hijo depende del capital humano de los miembros que forman la pareja. De este modo, las parejas con un mayor capital humano, medido a través del nivel educativo, realizan una mayor inversión en su hijo que las parejas con un capital humano menor, lo que refuerza y protege más su matrimonio ante la posibilidad de que se produzca una ruptura.

# Referencias

Alesina, A. and Giuliano, P. (2007) Divorce, Fertility and the Shot Gun Marriage, *IZA DP No. 2157*.

Andersson, G. (1997) The Impact of Children on Divorce Risks of Swedish Women, *European Journal of Population*, **13**, 109–145.

Becker, G. (1981) A Treatise on the Family, Cambridge, MA: Harvard University Press

Cantillon, R. (1730) Essai sur la Nature du Commerce in Général (Essay on the Nature of Trade in General), (edited and translated by Henry Higgs, London: Frank Cass and Co.).

Cherlin, A. (1977) The Effect of Children on Marital Dissolution, *Demography*, **14**, 265-272.

Chan, T. and Halpin, B. (2002) Children and Marital Instability in the UK, *Manuscript, Department of Sociology, University of Oxford*.

Chevalier, A. and Viitanen, T. (2003) The Long-run Labour Market Consequences of Teenage Motherhood in Britain, *Journal of Population Economics*, **16**, 323-343.

Drewianka, S. (2008) Divorce Law and Family Formation, *Journal of Population Economics*, **21**, 485-503.

Francesconi, M. (2008) Adult Outcomes for Children of Teenage Mothers, *Scandinavian Journal of Economics*, **110**, 93–117.

Friedberg, L. (1998) Did Unilateral Divorce Raise Divorce Rates? Evidence from Panel Data, *American Economic Review*, **88**, 608–627.

González, L. and Viitanen, T. (2009) The Effect of Divorce Laws on Divorce Rates in Europe, *European Economic Review*, **53**, 127-138.

Hofferth, S., Reid, L. and Mott, F. (2001) The Effects of Early Childbearing on Schooling Over Time, *Family Planning Perspectives*, **33**, 259-267.

Hoffman, S., Foster, E. and Furstenberg, F. (1993) Re-evaluating the Costs of Teenage Childbearing, *Demography*, **30**, 1-13.

Klepinger, D., Lundberg, S. and Plotnick, R. (1999) How Does Adolescent Fertility Affect the Human Capital and Wages of Young Women, *Journal of Human Resources*, **34**, 421-448.

Koo, H. and Janowitz, B. (1983) Interrelationships between Fertility and Marital Dissolution: Results of a Simultaneous Logit Model, *Demography*, **20**, 129-145.

Malthus, T. (1798) An Essay on the Principle of Population, (edited by Donald Winch, Cambridge: Cambridge Texts in the History of Political Thought, 1992).

Myers, S. (1997) Marital Uncertainty and Childbearing, *Social Forces*, **75**, 1271-1289.

Smith, A. (1776) The Wealth of Nations, (edited by Edwin Cannan, New York: The Modern Library, 1937).

Steele, F., Kallis, C., Goldstein, H. and Joshi, H. (2005) The Relationship between Childbearing and Transitions from Marriage and Cohabitation in Britain, *Demography*, **42**, 647-673.

Svarer, M. and Verner, M. (2008) Do Children Stabilize Relationships in Denmark?, *Journal of Population Economics*, **21**, 395–417.

Vuri, D. (2001) Fertility and Divorce, European University Institute, *Working Paper ECO 2001/5*.

Waite, L. and Lillard, L. (1993) A Joint Model of Marital Childbearing and Marital Disruption, *Demography*, **30**, 653-681.

Wolfers, J. (2006) Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results, *American Economic Review*, **96**, 1802-1820.