



Document de treball de l'IEB 2012/21

TRENDS IN SHOTGUN MARRIAGES: THE PILL, THE WILL OR THE COST?

Ana Nuevo-Chiquero

**TRENDS IN SHOTGUN MARRIAGES:
THE PILL, THE WILL OR THE COST?**

Ana Nuevo-Chiquero

The Barcelona Institute of Economics (IEB) is a research centre at the University of Barcelona which specializes in the field of applied economics. Through the IEB-Foundation, several private institutions (Applus, Abertis, Ajuntament de Barcelona, Diputació de Barcelona, Gas Natural and La Caixa) support several research programs.

Postal Address:

Institut d'Economia de Barcelona
Facultat d'Economia i Empresa
Universitat de Barcelona
C/ Tinent Coronel Valenzuela, 1-11
(08034) Barcelona, Spain
Tel.: + 34 93 403 46 46
Fax: + 34 93 403 98 32
ieb@ub.edu
<http://www.ieb.ub.edu>

The IEB working papers represent ongoing research that is circulated to encourage discussion and has not undergone a peer review process. Any opinions expressed here are those of the author(s) and not those of IEB.

**TRENDS IN SHOTGUN MARRIAGES:
THE PILL, THE WILL OR THE COST? ⁱ**

Ana Nuevo-Chiquero

ABSTRACT: This paper examines the evolution of out-of-wedlock conceptions and births over the last four decades. Increases in conception outside of marriage only partially account for increases in the illegitimacy rate: controlling for age at pregnancy, being born one year later increases the probability of being single at first conception by 0.9 percentage points, while the probability of being single at first birth rises by 0.5 additional percentage points. The incidence of shotgun (post-conception) marriage among those conceiving out of wedlock decreased sharply, but the rate is not affected by the level of planning of the pregnancy nor is driven by non-users of modern contraception. However, women in marriage markets (defined by race, religion, and age) with high modern contraceptive use and who conceive outside marriage are less likely to give birth out of wedlock. The trend over time is significantly steeper when the level of modern contraceptive use in the woman's market is considered, suggesting that the spread of the pill contributed to reduce the rate of increase of out-of-wedlock motherhood.

JEL Codes: J11, J12

Keywords: Out-of-wedlock birth, shotgun marriage, modern contraception.

Ana Nuevo-Chiquero
Universitat de Barcelona & IEB
Avda. Diagonal 690
08034 Barcelona, Spain
E-mail: ananuevo@ub.edu

ⁱ I am grateful to Kevin Lang, Claudia Olivetti, Daniele Paserman for continuous advise. I also thank Francisco J. Pino, Johannes Schmieder and participants at the BIG seminar at Universitat de Barcelona for useful comments. The author acknowledges the financial aid of Fundación Caja Madrid. All remaining errors are my own.

1 Introduction

The prevalence of single-headed households has substantially increased over the last decades, from 11% of all households with children under 18 in 1959 to 33% in 2010 (US Census Bureau (2010)). Households whose head is a single woman with children are substantially more likely to be below the poverty line. For instance, in 1990, 10.7% of all households were below the poverty line (16.4% if only those with children below 18 are considered), while this share is as high as 44.5% of households whose head is a single woman with children. In addition to the reduction in household income, growing up with a single parent might have negative effects on children’s development.¹

A significant proportion of the trend in single-headed households is explained by the increase in the number of births to unmarried women, which rose dramatically from 3.8% of all births in 1940 to 39.7% in 2007 (Ventura (2009)). Understanding the evolution of out-of-wedlock childbearing contributes to shed light on the origins of families suffering a high level of poverty. Several explanations have been proposed for this extreme change, including declines in earnings potential of less skilled men, increases in public assistance for single mothers, and changes in the male to female ratio or in attitudes toward premarital sex (see Lang (2007) for a summary of the literature). The legalization of abortion and the introduction of modern contraception, both of which allow women to control fertility, have also been argued to impact the proportion of out-of-wedlock childbearing through changes in the incidence of “shotgun marriage”, defined as a marriage that occurs as a consequence of the bride becoming pregnant².

¹When compared with children from two-parents households, children growing up with a single parent have lower academic achievement, and are more likely to have behavioral problems, use illegal substances or have early contact with the police (Sigle-Rushton and McLanahan (2004)). However, there is little evidence of these disparities being caused by growing up with an absent parent rather than by differences in background characteristics (Lang and Zagorsky (2001), Aughinbaugh et al. (2005)).

²The expression “shotgun marriage” is based on a hyperbolic scenario in which the pregnant female’s father resorts to coercion (such as threatening with a shotgun) to ensure that the male partner who caused the female’s pregnancy goes through with it, sometimes even following the man to the altar to prevent his escape.

In this paper, I first examine the evolution of out-of-wedlock pregnancies and births, to discern whether the upward trend in illegitimacy rates can be fully explained by changes in conception outside marriage, or whether the choice faced by women after pregnancy has changed significantly over time. Trends over time are described also for subsamples of pregnancies that were unplanned, and of women who were contraceptive users from an early point in their lives. While the level of planning of the pregnancy or the use of modern contraception are not random, comparing the trends over these groups can contribute to shed light on the type of women or behavior that are driven the trends.

Modern contraception is characterized as having a low failure rate: “the pill”, “the implant”, or “the shot” have a perfect-use failure rate below 1%, and a typical-use failure rate below 10%. These contraceptive methods have been thoroughly effective since their first marketing in the 1960s³, but they were not accessible to unmarried persons in all states until *Eisenstadt v. Baird* in 1972. Their introduction allowed women to have precise control over fertility, which significantly increased access to higher education and labor force participation (Goldin and Katz (2002); Bailey (2006)). Furthermore, modern birth control methods have altered the marriage market. The pill reduced the cost of engaging in premarital sexual intercourse by decreasing the risk of unwanted pregnancy, contributing to a delay in age at first marriage (Goldin and Katz (2002)). However, the incidence of pregnancy among never-married women is still significant, and modern contraception might have affected the choice a woman faces in this case. Before the introduction of the pill, a shotgun wedding was the norm, and the decrease in its incidence has paralleled the increase in the use of modern methods of birth control.

Nevertheless, the existence and direction of the impact of contraception on illegitimacy and shotgun marriage is still subject to debate. Akerlof et al. (1996) argue that the prevalent use of contraception decreased the occurrence of shotgun weddings, since a lower probability

³The Federal Drug Administration approved *Enovid* for menstrual disorders in 1957 and for birth control in 1960. Competitors such as *Ortho-Novin* or *Norlestrin* followed shortly after (Marks (2001)).

of pregnancy reduced the need to provide a promise of marriage to obtain premarital sexual intercourse, immiserizing women who become pregnant and choose to carry the child to term. On the contrary, Chiappori and Oreffice (2008) conclude that men who enjoy children will incur a higher transfer to the woman as compensation for childbearing, since an unintended birth, that men could enjoy costlessly, is unlikely to happen again in this environment.

In addition to analyzing the effect of own-use of contraceptive methods on out-of-wedlock childbearing, I develop an empirical test for the effect of the prevalence of modern contraception on the evolution of shotgun marriages. The marriage market, as well as the market for premarital, intimate relationships, is characterized by a high level of homogamy, i.e., men and women present strong preferences for matching with partners who share certain attributes, such as race, religion, age or education. Differences in the prevalence of contraception along these characteristics will allow to identify the effect of modern contraceptive methods on shotgun marriage. Women in “premarital sexual intercourse” markets that have a high level of modern contraceptive use are less likely to become single mothers after an out-of-wedlock pregnancy. While the trend in abortion was unaffected, the spread of the pill and other highly effective methods contributed to slow down the increase in single motherhood and the decrease in the incidence of shotgun marriage.

The paper is organized as follows. Section 1 describes the data used in the analysis, while sections 2 and 3 present the evolution of out-of-wedlock fertility and legitimacy, respectively. Section 4 examines the impact of modern contraception in shotgun marriage, and section 5 concludes.

2 Data

The data used in the analysis comes from cycles III to VII of the National Survey of Family Growth (NSFG), administered by the Center for Disease Control on 1982, 1988, 1995, 2002, and yearly from 2006 to 2010. The NSFG collects information on family life, infertility,

contraceptive use and women's health. The third cycle was the first to survey never-married females, while cycles I and II, in 1973 and 1976, surveyed only women who had been married at least once.

The NSFG interviewed a nationally representative sample of non-institutionalized women aged 15 to 44 at the time of the interview. Retrospective information was collected on every pregnancy experienced, including outcome (birth, abortion, miscarriage), year in which it occurred, and marital status. Demographic characteristics, such as race, religion, age, education or maternal education are also included.

Marital status is recorded both at the time of conception and at the time of pregnancy. It allows one to examine the evolution of out-of-wedlock births as well as conceptions that occurred to never-married women. The first two cycles used in the analysis (1982 and 1988) recorded marital status at conception only for the first pregnancy the woman experienced, and therefore evaluation will be restricted to first pregnancies for the entire sample period.

A shotgun marriage, or a shotgun wedding, is defined as a marriage that happened as a consequence of pregnancy. A woman will be considered to have gone through a shotgun wedding if she was single at conception but married at birth. A pregnant, single woman has three choices facing her: she might choose to get married if a proposal of marriage is made to her, she might become a single mother or obtain an abortion. Only a few women in the sample marry and then abort. These observations are likely to be therapeutic abortions and will be treated as miscarriages. There is abundant evidence in the medical and economic literature that spontaneous fetal losses (either miscarriages or stillbirths) are conditionally random (see Hotz et al. (1997)). Pregnancies ending in miscarriage are therefore dropped from the sample.

The NSFG records detailed data on sexual activity and contraceptive use. Unfortunately, it is not fully consistent, with some cycles reporting information on more events than others. In order to estimate the extent of contraceptive use in a particular premarital sexual intercourse market, three measures of utilization are consistently defined for the whole sample

period. A woman is considered a “first time user” if she used a highly effective contraceptive method in her first sexual intercourse. Additionally, a woman will be considered an “early user” if the first contraceptive method she ever used was highly effective and it happened before the woman reached age 25. This measure takes care of the potential non representativeness of first intercourse. Finally, a woman is an “ever user” if she ever used modern contraception. However, being an “ever user” contains little information, since the pregnancy might have occurred up to 20 years before the interview.

The set of contraceptive methods available to women changed over the period of the data (1973 to 2006), with the introduction, for instance, of implants or contraception via injection. Therefore, the selection of contraceptive methods that are included in the NSFG questionnaire and that can be considered highly effective varies as well. However, given that failures rates did not improve significantly, the use of these new methods will be treated as the same event⁴.

Given the extent of the sample period, the timing of fertility and marriage might have changed over time. While over the 1970s planning a pregnancy and marriage (in this order) was not a likely event, it might have become so in the later part of the sample period. To prevent this change from confounding the results, I define a second sample of unplanned first pregnancies happened while the woman was single.

The outcome of the pregnancy and marital status might affect the woman’s report on the level of planning. The NSFG records consistently whether the woman was using contraception and whether it was fully stopped before the pregnancy. If any contraception was in use but it was not stopped before the pregnancy, it will be considered unplanned. In this case, giving that the couple was trying to prevent the pregnancy from happening, changes in the ordering of pregnancy and marriage should not affect the estimates.

⁴In particular, the following methods will be considered modern contraception: pill, male and female condoms, intrauterine devices (IUD), diaphragm, implants and injectables. Some of these methods, such as the condom or diaphragm, present a typical-use failure rate that is higher than 10%. A robustness check using a more restricted definition of highly effective contraception that excludes barrier methods presents similar estimates.

In order to measure the trends in out-of-wedlock fertility, different samples are defined (table 1 presents their descriptive statistics). The first sample includes all women born between 1955 and 1982 who ever had sexual intercourse. Women born in 1955 would be 18 years of age in 1973, the first year for which pregnancies will be included in the pregnancies sample. It includes 31,078 women, 55% of whom used modern contraception at their first intercourse, while 81% used it early in their sexual activity. Almost all women (96%) have ever used some type of highly effective contraception. This sample will be used to estimate the market level of contraceptive use.

Only pregnancies that happened to women 16 years and older are included in the first pregnancies sample, since 16 is the minimum legal age of marriage in most states. In order to ensure that all women had access to the pill and other types of contraception, and moreover, to abortion, only pregnancies that happened after 1972⁵ are included in the sample. There are 16,881 first pregnancies, of which 12,113 ended in birth. Whites are proportionally less likely to become pregnant and even less likely to give birth than African-American or Hispanics. Women with highly educated mothers present a similar pattern: they are present less frequently when all first pregnancies and births are considered than in the full sample. The woman's own education is measured at the time of the interview and therefore is likely to be endogenous to the occurrence of a pregnancy and its outcome. Hence, maternal education will be used as a proxy for own education.

More than 60% of first pregnancies occurred to unmarried women. This is 10,874 women, of which 3,816 pregnancies happened while any type of contraception was in use. Most pregnancies (8,585) occurred to women who used modern contraception early in their lives. Restricting the analysis to pregnancies to single women, the proportion of whites is even smaller (56% compared with 66% of all sexually active women). However, unplanned pregnancies have a similar incidence by race. Daughters of more educated women are significantly less

⁵The Supreme Court decision *Roe v. Wade* in 1972 guaranteed access to abortion to all women in the US.

likely to become pregnant outside marriage, but less so in the case of unplanned pregnancies.

Table 1 goes here

3 Trends in out-of-wedlock fertility

Conception outside marriage

In order to examine the evolution of conceptions that occurred outside marriage, I estimate a probit model using the sample of all first pregnancies, in which the dependent variable is the probability of the woman being single when her first pregnancy happened. Along with personal characteristics that control for changes in the composition of the sample, a series of dummies for the woman's year of birth and age at pregnancy are included. To provide a clear interpretation of the results, marginal effects are reported hereafter.

Figure 1 presents the time trend of the probability of the first pregnancy occurring outside marriage. There exists a significant upward trend on out-of-wedlock conceptions: controlling for age at pregnancy and personal characteristics, a woman born in 1970 is 15 percentage points more likely to have never been married when she became pregnant for the first time than a woman born in 1955. On average, the probability of a pregnancy outside marriage increased by 0.9 percentage points per year.

Figure 1 goes here

All pregnancies included in the sample happened on or after 1973, so that all married and unmarried women had access to modern contraception and abortion. Later cohorts are more likely to be users of modern contraceptive methods, and, therefore, more able to control fertility. The increase in the incidence of out-of-wedlock conception could be driven by women who choose to become pregnant outside marriage, since modern contraception should have decreased the incidence of unintended pregnancies. However, the increase could have been lead by an increase in the incidence of premarital sexual intercourse.

The top panel of table 2 presents the estimates for the trends in year of birth and age at pregnancies for different samples of first pregnancies. Column (1) includes the results for all first pregnancies, while column (2) restricts the sample to first pregnancies that were unplanned. The proportion of unplanned pregnancies outside of marriage rose at a rate similar to that for all pregnancies. On average, a woman is 1.0 percentage points more likely to be unmarried at her first, unplanned pregnancy than a similar woman born the previous year. Therefore, the upward trend in out-of-wedlock conception cannot be fully explained by women who choose to become pregnant outside of marriage.

Although the contraceptive method used when the pregnancy happened cannot be determined, it is possible to divide the sample by whether the woman has used modern contraceptive at an early stage, discerning whether the trend is driven by women not using modern contraceptive methods, and, therefore, not improving their ability to plan their pregnancies when it was possible to do so. Columns (3) and (4) of table 2 present the results for both samples. Women who are not contraception users present a slighter smaller upward trend on the probability of being single at first pregnancy than women who are (0.7 percentage points v. 0.9 of contraceptive users).

Therefore, the increase in out-of-wedlock conception is not fully explained by mistimed or unwanted pregnancies, or by women who are not using modern contraception. These results suggest that a share of the increment in conception outside of marriage corresponds to women who, being able to prevent the pregnancy from happening, choose not to. If the trend was exclusively driven by an increase in premarital sexual activity, it should be steeper for unplanned pregnancies and non-users of modern contraception. However, this result is not informative of whether the choice made was to postpone marriage to conception or to become a single mother.

As women age, they are less likely to be unmarried when they became pregnant, although the rate at which this decrease takes place also reduces with age. Age at first marriage was increasing for the cohorts being considered, but it is still below age 25. The trend in the

age at pregnancy is similar for users and non users of modern contraception, although the probability of being single when an unplanned pregnancy occurred decreases linearly with age. The changes in the probability of conception outside marriage, when all pregnancies are being considered, are depicted in figure 3.

Table 2 goes here

Out-of-wedlock births

Increases in conception outside of marriage do not necessarily imply an increase in out-of-wedlock births. It might be the case that women opt more often for single motherhood, but also that couples choose to postpone marriage to pregnancy, but not to birth. Additionally, if the probability of being single at first birth increases at the same rate that the probability of being single at first conception, it might be the case that the trend in conceptions fully explain the trend in out-of-wedlock births, while the choices faced by a woman after an out-of-wedlock pregnancy remain unaffected. Figure 2 presents the evolution by cohort of the probability of a woman being single when her first pregnancy ended in birth. When all births are considered, the trend is similar (not shown). Later cohorts are more likely to give birth outside of marriage, with the probability increasing by as much as 1.4 percentage points per year.

Figure 2 goes here

As in the case of out-of-wedlock conception, the trends in births outside of marriage are similar regardless of the contraceptive use status, though the probability of being single at first birth if the pregnancy was unplanned is significantly higher, by 0.5 additional percentage points (see table 2, bottom panel). In all cases, the increase per year is higher than the corresponding increase in out-of-wedlock conceptions: a woman born in 1970 is 24 percentage points more likely to be single when she gave birth for the first time, compared to 15

additional percentage points in the case of the pregnancy. Therefore, the rise on illegitimacy rates cannot be explained solely by increases in pregnancies happening outside of marriage, but also by the incidence of different outcomes once the pregnancy occurs.

The probability of being married at first birth increases with age. When the woman is in her teens and early 20s, being a year older significantly decreases the probability of being single at birth, by as much as 10 percentage points per year, while the decrease is of 2.5 percentage points on average afterwards. However, the decrease in the rate of reduction for the probability of being single at first pregnancy was significantly smaller, and, by age 25, the reduction was 12 percentage points higher than in the case of birth, unless the case of unplanned pregnancies. This result suggests that the choice taken after the pregnancy occurred is also affected significantly by age, with the probability of becoming a single mother, conditional on out-of-wedlock pregnancy, rising with age at pregnancy. Figure 3 plots the trends on age at pregnancy.

Figure 3 goes here

Impact of personal characteristics

The top panel of table 3 presents the marginal effects of personal characteristics on the probability of being single at first pregnancy. African-American women are around 20 percentage points less likely to be married when they become pregnant for the first time than whites and women of other ethnicities (mainly Asians). Hispanics, on the other hand, are 5 percentage points less likely to be unmarried on average than the omitted group, although the effect is smaller and not significant when only unplanned pregnancies are considered. However, only Hispanic contraceptive users are less likely to be married at their first conception - the results do not apply to Hispanic contraceptive non-users.

Catholics are around 5 percentage points more likely to be single at first pregnancy than Protestants or women with other religious affiliations, unless in the case of unplanned

pregnancies, where the effect is smaller and not significant. Women whose mothers were high school dropouts are more likely to be married at conception than women with more educated mothers.

The bottom panel of 3 presents the estimates for out-of-wedlock births. Conditional on giving birth, African-American women are much more likely than all other groups to give birth outside of marriage, especially if the pregnancy was unplanned or if they are not contraceptive users. African-Americans are, on average, 30 percentage points more likely to have a birth outside of marriage than whites or Hispanics. There is no clear evidence of a different pattern by religion in the probability of being single at first birth, but women whose mother were college graduates are significantly less likely to be have their first birth out-of-wedlock.

Table 3 goes here

Although the probability of marriage significantly decreased for all women over time, cohabitations⁶ sharply increased. The probability of premarital cohabitation increased by 4.1% per year of birth, with a similar increase for women up to age 30 and no trend thereafter. Nevertheless, the increase in cohabitation does not invalidate the decrease in marriage as a driving factor on the increase in the probability of being single at conception or birth. First, the share of the population born early in the sample who ever cohabited premaritally is smaller than the fraction that ever married (34% v. 73% of women born in 1960). Secondly, it does not necessarily imply that women are substituting formal marriages by informal marriages or cohabitations. Cohabitations are significantly shorter than marriages, and younger cohorts do no appear to cohabit longer than older cohorts without transitioning to marriage, which did more than 50% of first cohabitations.

Additionally, a robustness check considering cohabiting women at birth either as married or as single did not report significant differences in the trend by year of birth. This robustness

⁶Data on cohabitation are only available from Cycle IV, but cover nevertheless women born 1955 to 1982.

check uses data from cycle VI onwards, in which the informal marital status at first birth is also reported. However, the trend in age at pregnancy was substantially reduced, suggested than cohabitation at birth occurred more frequently for younger women.

4 Trends in legitimacy

Increases in the probability of a conception being out-of-wedlock would imply an increase in the rate of illegitimacy unless accompanied by other changes. However, the trend in the probability of being single a first birth is significantly steeper. Therefore, changes experienced by women born between 1955 and 1982 did not only impacted the proportion of pregnancies outside of marriage, but also choices once such pregnancies occurred. For the entire sample period, a woman who became pregnant while unmarried would face three choices: abortion, giving birth as single mother, or marrying her partner (a shotgun marriage)⁷. In order to examine how cohort and characteristics affect women's choices, I estimate a multinomial choice model on the sample of women who become pregnant prior to marriage.

The data used in the analysis does not include alternative-varying information. Therefore, a multinomial logit model can be estimated for the choice between single motherhood, shotgun marriage or abortion. Multinomial logit models assume independence of irrelevant alternatives (IIA), which implies that the choice between two of the alternatives is not affected by the presence of the third alternatives. For instance, the IIA assumption implies that a woman's choice between single motherhood and shotgun marriage will be the same whether or not abortion is available. In order to test if this assumption is satisfied, appendix A presents the results for the probability of choosing of choosing birth over shotgun marriage, with and without the choice of abortion, in columns (1) and (2), and for the probability of choosing birth over abortion, with and without the choice of shotgun marriage, in columns

⁷For simplicity, I will assume that every woman has the choice of marrying her sexual partner: every never-married, pregnant woman will received an offer of marriage with an associate within-marriage transfer, that might be positive or negative. Not receiving an offer of marriage will be equivalent to receive an offer with a transfer from the woman to the man equal to minus infinity.

(3) and (4). The results are in no case significantly different, and the point estimates are very close. Therefore, the marginal effects reported below correspond to multinomial logit models.

Trends in outcomes

Figure 4 pictures the evolution by cohort of the incidence of single motherhood after a pregnancy happened outside of marriage. A woman born in the early 1970s is 14 percentage points more likely to become a single mother if she became pregnant while unmarried than a woman born in 1955 . The increase in the incidence in illegitimacy corresponds to decreases in other potential outcomes: decreases in the incidence of abortion explain about 8 percentage points for 1970, while declines in shotgun marriage account for the remaining 6. These differences are larger on the second part of the sample period: a woman born just 5 years later is 9 additional percentage points more likely to have an out-of-wedlock birth if she become pregnant while single, corresponding with being 2 percentage points less likely to obtain an abortion and 7 percentage points less likely to go through a shotgun marriage.

Figure 4 goes here

Table 4 presents the trends by year of birth and age at pregnancy on the probability of becoming a single mother after an out-of-wedlock pregnancy. There is an average increase of 1.6 percentage points per year, even after controlling for the level of planning of the pregnancy and the woman being a contraceptive user. This increase in single motherhood is compensated by a similar decrease in the incidence of shotgun marriage and of abortion (0.8 percentage points per year each).

Panels 2 and 3 of table 4 include the trends for the subsample of unplanned pregnancies and pregnancies to contraceptive users. The probability of an unmarried woman's unplanned pregnancy becoming an out-of-wedlock birth increased by 1.4 percentage points per year, slightly smaller than in the case of all out-of-wedlock pregnancies. However, this upward

trend appears to be compensated by a decrease in the incidence of abortion (0.9 percentage points per year), and by a smaller decreases in the incidence of shotgun marriage, whose probability is only reduced by 0.5 percentage points per year. On the other hand, there are no differences when only pregnancies of modern contraception users are considered.

The probability of becoming a single mother also increases with age at pregnancy. A woman is around 2.5 percentage points more likely to choose single motherhood per year of age. As in the case of the cohort effect, the increase comes from decreases in the incidence of abortion (1.1 percentage points per year of age). The trend in shotgun marriage is of similar magnitude, around 1.4 percentage points per year of age. When only pregnancies of contraception users are considered, the trends in age at pregnancy are similar. Point estimates for unplanned pregnancies are higher except for abortion, but not precise enough to be significantly different.

Effect of personal characteristics

Table 5 presents the marginal effects of personal characteristics on different outcomes for the sample including all pregnancies. Conditional on out-of-wedlock pregnancy, African-American women are up to 20 percentage points more likely to become single mothers than are Whites or women of other ethnicities. They choose a shotgun marriage much less often, but their probability of seeking an abortion is not significantly smaller. Hispanic women are also more likely to give birth while still single, but the magnitude of the effect is significantly smaller for this group than for African-Americans. Hispanics are 7.5 percentage points more likely to opt for single motherhood, even after controlling for religion. However, in this case, this higher probability corresponds with a lower probability of seeking abortion, rather than with a lower impact of shotgun marriage.

There is a significant trend by maternal education: women whose mother was highly educated (and therefore who are likely to be highly educated themselves) are less likely

to choose single motherhood or shotgun marriage, and substantially more likely to seek an abortion. In particular, women whose mother holds a college degree are 28 percentage points more likely to obtain an abortion, 15 percentage points less likely to get married before birth, and 13 percentage points less likely to become single mothers than daughters of high school dropouts.

Whether the pregnancy happened while any type of contraception was in use can affect the offer of marriage received. If the pregnancy was unplanned, the woman is more likely to choose an abortion (by 9 percentage points) than for other pregnancies. Most of the increase in abortion is compensated with a decrease in the incidence of shotgun marriage. However, when only unplanned pregnancies are considered, the effect of personal characteristics is, in some cases, different than the one found when the full sample was being considered. Contraceptive users who suffered an unplanned pregnancy present a significant increase in the probability of becoming single mothers, by 5 percentage points (not shown). This decrease is fully compensated by a decrease in the probability of choosing a shotgun wedding. Additionally, the probability of abortion is reduced for some groups, such as African-American. However, as shown before, the trends by year of birth are of similar magnitude regardless of the level of planning of the pregnancy.

In addition to ethnicity, religion and education, whether a woman can be considered a user of modern contraception affects her choices. When the full sample is considered, being a contraceptive user does not impact the probability of becoming a single mother. However, a contraceptive user is more likely to opt for an abortion after an out-of-wedlock pregnancy, and, therefore, is less likely to marry her partner. Women who use contraception might have a more positive attitude towards birth control in general (or a lower cost of abortion) and therefore they may more willing to seek an abortion, rather than becoming single mothers (if the offer of marriage received is not satisfactory). When only pregnancies of contraceptive users are considered (not shown), the marginal effects of the rest of personal characteristics are similar in all cases to the estimates for the full sample.

5 Marriage markets and contraceptive use

Theoretical background

In addition to the direct impact of modern contraception on pregnancies and births outside marriage, the economic literature has proposed explanations for the observed trends based on the indirect effect of the generalization of modern contraception.

Akerlof et al. (1996) argue that the ability to control fertility through abortion and contraception reduced shotgun marriage, immiserizing women who wanted to bear children. The reduction in the probability of an unplanned birth deteriorated their competitive position and their ability to bargain for a promise of marriage. The impact of contraception operates as a decrease in the supply of eligible males, since this new technology created more opportunities for men to engage in sexual intercourse without offering a promise of marriage, and therefore reduced the fraction of men willing to get married in case of pregnancy.

However, the reduction in the probability of unwanted pregnancies did not only occur during premarital sexual intercourse but also within a marriage or cohabitation. Chiappori and Oreffice (2008) proposed a marriage market model of frictionless matching, in which men who enjoy children need to compensate the woman for the cost of childbearing. In this context, men are no longer able to take advantage of unplanned births to derive costless utility from children, and therefore they face a higher expected compensation for a child with the new contraception technology.

Both mechanisms require the existence of women's bargaining ability prior to the coming of modern contraception, which will not be the case if there is a shortage of eligible males in either case. This bargaining ability will be reduced if there are increases in the willingness to engage in premarital sexual intercourse. However, it will be strengthened if it originated in the ability to control childbearing.

Empirical strategy

In order to identify the impact of the spread of contraceptive use on the custom of shotgun marriage, I take advantage of the existence of differentiated marriage markets, or, more precisely, markets of “premarital sexual intercourse”. Differences in adoption across different markets will allow identification of the effect of increased modern contraceptive use.

There is a large sociological literature studying the tendency of individuals to marry within their social group, or to marry people with similar characteristics (race, religion, education, socioeconomic status). Various explanations have been proposed for this phenomenon (Kalmijn (1998)), such as the preference of individuals for certain characteristics in a spouse, the influence of the social group they belong to, or the constraints of the marriage market in which they are searching for a spouse. In any case, the fact that married spouses are matched on social and demographic characteristics is well documented (Schoen and Wooldredge (1989); Kalmijn (1991); Blackwell (1998)).

However, dating or cohabiting couples might diverge from the homogamy pattern that appears in married couples. Blackwell and Lichter (2004) use data from the 1995 National Survey of Family Growth to estimate educational, racial and religious homogamy through different degrees of commitment: dating couples, cohabiting couples and married couples. Here, dating is defined broadly as to include sexual activity among a non-cohabiting couple. Both Catholics and Protestants are at least four times more likely to be dating, cohabiting or married to a partner with the same beliefs, without a significant change in this rate of homogamy as the degree of commitment increases. Homogamy is even stronger for people of other religious backgrounds. Couples match strongly on race, with African-Americans being 46 times more likely to be involved in a dating relationship with another African-American than other ethnicities, and this factor can increase to as much as 110 times in the case of married couples. Although whites still tend to match with whites (at least four times more likely), the increasing homogamy with commitment pattern does not appear. Similarly, all

types of couples match strongly on education, especially at both ends of the educational distribution: high school dropouts and individuals with a graduate degree.

Therefore, when engaging in premarital sexual intercourse (either in a dating relationship or during a cohabitation), individuals are likely to look for partners within a set of demographic characteristics. If the extent of modern contraceptive use determines the bargaining power of a woman for a promise of marriage or a transfer within marriage, the relevant level of birth control use in each case will be one of women sharing the pertinent characteristics.

Results

Table 6 presents the results for the first step of the estimation procedure, which regresses contraceptive use on female characteristics. The results are similar when broader or more restrictive definitions are used, and across different specifications: later cohorts are more likely to use modern contraception - specifically, by 0.9 percentage points per year. White women are more likely to be contraceptive users than Hispanics, but there is no distinctive pattern by religion when the broad of modern contraception is used. However, Protestant are 3 percentage points more likely to use it when a more restricted definition is used. Women whose mother was a high-school dropout are less likely to use modern contraception, but there are no differences between daughters of high school graduates and above.

Unfortunately, there is no other data containing information on contraceptive use and women's characteristics for such a long period of time, and the covariates included in the NSFG are only able to explain a small part of the variation in contraceptive use. However, the predicted values are strongly correlated independently of the specification chosen.

Table 6 goes here

The multinomial model is estimated controlling for the level of modern contraceptive use in the woman's "premarital sexual intercourse" market, as defined by race, religion, maternal education and year of birth. For simplicity, the predicted value of use included in

the estimation corresponds to the specification including a linear trend and no interactions for the broad definition of modern contraception (column (1) of table 6). The results are robust to other specifications.

Table 7 presents the trends in the marginal effects for cohort and age at pregnancy. Comparing with the results presented in table 4, controlling for the market contraceptive use, there is a significant increase in the trend on single motherhood, from 1.6 to 1.9 percentage points per year. This increase came exclusively from reductions on the incidence of shotgun marriage, while the change in abortion was unaffected. Unplanned pregnancies and pregnancies of contraceptive users yield the same results as all pregnancies in the baseline model.

Table 7 goes here

Table 8 includes the marginal effects of personal characteristics when the level of contraceptive use in the woman's "mate" market is taken into account. Belonging to a market in which modern contraception is generalized decreases the probability of single motherhood significantly: a 1% increase in the probability of using contraception implies a 0.7 percentage points decrease in the probability of becoming a single mother after an out-of-wedlock pregnancy. Although the estimates are imprecise, this increase is compensated by an increase in the incidence of shotgun marriage, and, by a smaller magnitude, by an increase in the probability of abortion.

The effects of a pregnancy being unplanned and the woman being a contraceptive user are unchanged, but race and education show different results: African-American women are even more likely to become single mothers, and less likely to go through a shotgun wedding than any other race. The downward trend in single motherhood by maternal education is less clear, but the higher probability of seeking an abortion is unchanged.

Table 8 goes here

6 Discussion

Although the consequences of growing up with a single parent are still subject to debate, the increase in single-headed households raised significant concern over the last decades. This increase was for the most part driven by increases in out-of-wedlock births, which went from being a rare event to a common one.

The increase in conception that occurred outside of marriage explains part of the trend in illegitimacy rates. Even with absolutely no changes on the choices faced after such a pregnancy, the probability of having a birth outside of marriage would have risen significantly. Over the sample period being considered, a woman was on average around 1 percentage point more likely to be unmarried when she became pregnant for the first time than a woman born the previous year, even after controlling for age at pregnancy and personal characteristics. This trend is accompanied by increases in the rate of modern contraceptive use, which is also higher for later cohorts. Increases in the probability of engaging in premarital sexual intercourse might account for this increase, as well as changes in the cost of single motherhood that could have made this choice more attractive for women.

Nevertheless, the probability of becoming a single mother increases after controlling for the increase in out-of-wedlock pregnancy. On average, each year, a woman was 1.9 percentage points more likely to be single when she became a mother. Additionally, for two women born the same year, this probability increased by 2.4 percentage points per year of age. In both cases, this increase corresponds to decreases in both abortion but largely to a reduction in the incidence of shotgun marriage. There are significant differences by race, with African American women being especially likely to give birth out of wedlock, in addition to them being more likely to become pregnant before marriage.

Changes in the welfare system to single mothers might be partially responsible for the increase in single motherhood. However, this is unlikely: the trends over time in overall expenditure in Aids to Families with Dependant Children (ADFC), or Temporary Aid for

Needy Families (TANF) later on, do not parallel the path of single motherhood. While the probability of being single at first birth increased for women born during the entire sample period, the amount spent in welfare has substantially decreased since 1975 (Scholz et al. (2009)). However, the reduction on the number of recipients of the program did not occur until the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) in 1996. This reform would operate against the trend observed even for women born later in the sample period, since the restriction in the access conditions to welfare and the limitation on the number of years that a woman can benefit from it⁸. Additionally, studies using variation across states in the generosity of the benefits only find a small effect on single motherhood (Moffitt (1995)).

The introduction and generalization of modern contraception does not appear to have compensated for other forces increasing the rate of out-of-wedlock pregnancies, and its users appear not to behave differently than other women when pregnancy occurs. The generalization of their use has been argued to affect the prevalence of shotgun marriages through an indirect effect on the reduction of unintended pregnancies. However, belonging to a market with a high level of contraceptive use decreases the probability of single motherhood, but the effect on shotgun marriage is small compared to the decrease in abortion, although the estimates are imprecise.

On the other hand, controlling for this market contraceptive effect shifts the trend in year of birth. While the trend in abortion is unaffected, the probability of becoming a single mother increases more rapidly, compensated by a further decrease in the probability of choosing a shotgun marriage. Since the level of contraceptive use is increasing with the year of birth, these results suggest that the generalization of modern contraception aided to slow the increase in the incidence of single motherhood.

⁸The second order effect found by Bitler et al. (2004), which would cause women to marry less because they have joined the labor market due to the PRWORA requirements and are less in need of the income provided by the husband, does not apply here, since the sample is restricted to first pregnancies, and therefore, to women who would have not been in welfare themselves before.

References

- G.A. Akerlof, J.L. Yellen, and M.L. Katz. “An Analysis of Out-of-Wedlock Childbearing in the United States”. *Quarterly Journal of Economics*, 41(2):277–317, 1996.
- A. Aughinbaugh, C. R. Pierret, and D. S. Rothstein. The impact of family structure transitions on youth achievement: Evidence from the children of the nlsy79. *Demography*, 42(3), 2005.
- M.J. Bailey. More power to the pill: The impact of contraceptive freedom on women life cycle labor supply. *The Quarterly Journal of Economics*, 121(1):289–320, February 2006.
- M.P. Bitler, J.B. Gelbach, H.W. Hoynes, and M. Zavodny. The impact of welfare reform on marriage and divorce. *Demography*, 41(2):213–236, May 2004.
- D.L. Blackwell. “Marital Homogamy in the United States: The Influence of Individual and Parental Education”. *Social Science Research*, 27:159–188, 1998.
- D.L. Blackwell and D.T. Lichter. “Homogamy among dating, cohabiting and married couples”. *The Sociological Quarterly*, 45(4):719–737, 2004.
- P.-A. Chiappori and S. Oreffice. “Birth Control and Female Empowerment: An Equilibrium Analysis”. *Journal of Political Economy*, 116(1):113–140, 2008.
- C. Goldin and L.F. Katz. The power of the pill: Oral contraceptives and women’s career and marriage decisions. *The Journal of Political Economy*, 110(4):730–770, August 2002.
- V.J. Hotz, C.H. Mullin, and S.G. Sanders. Bounding causal effects using data from a contaminated natural experiment: Analysing the effect of teenage childbearing. *Review of Economic Studies*, 64:575–603, 1997.
- M. Kalmijn. “Shifting Boundaries: Trends in Religious and Educational Homogamy”. *American Sociological Review*, 56:802–811, 1991.

- M. Kalmijn. "Intermarriage and Homogamy: Causes, Patterns, Trends". *Annual Review of Sociology*, 24:395–421, 1998.
- K. Lang. *Poverty and Discrimination*. Princeton University Press, 2007.
- K. Lang and J. Zagorsky. "Does Growing up with a Parent Absent Really Hurt?". *Journal of Human Resources*, 36(2):253–273, Spring 2001.
- L. V. Marks. *Sexual Chemistry. A History of the Contraceptive Pill*. Oxford University Press, 2001.
- R. Moffitt. The effect of the welfare system on nonmarital childbearing. In *Report to Congress in Out-of-Wedlock Childbearing*, pages 167–176. U.S. Department of Health and Human Services, Hyattsville MD, 1995.
- R. Schoen and J. Wooldredge. "Marriage Choices in North Carolina and Virginia, 1969-71 and 1979-81". *Journal of Marriage and the Family*, 51:465–481, 1989.
- K. Scholz, R. Moffitt, and B. Cowan. Trends in income support. In M. Cancian and S. Danziger, editors, *Changing poverty, changing policies*, pages 203–241. Russell Sage Foundation, 2009.
- W. Sigle-Rushton and S. McLanahan. Father absence and child well-being: A critical review. In D. P. Moynihan, T. M. Smeeding, and L. Rainwater, editors, *The future of the family*, pages 116–156. Russell Sage Foundation, New York, 2004.
- US Census Bureau. Historical Poverty Tables. Current Population Survey, accessed December 2010. URL <http://www.census.gov/hhes/www/poverty/data/historical/families.html>.
- S.J. Ventura. Changing patterns of nonmarital childbearing in the united states. NCHS Data Brief 18, National Center for Health Statistics, 2009.

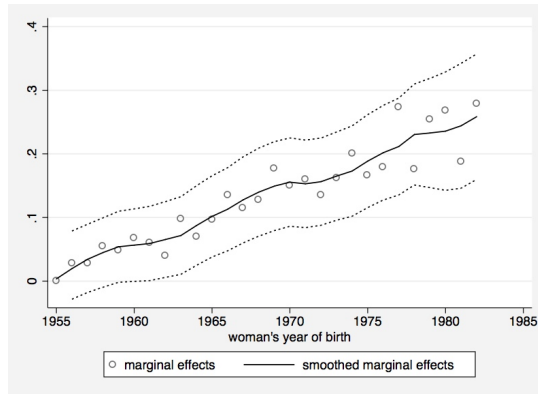


Figure 1: Trend in out-of-wedlock conceptions, controlling for woman characteristics

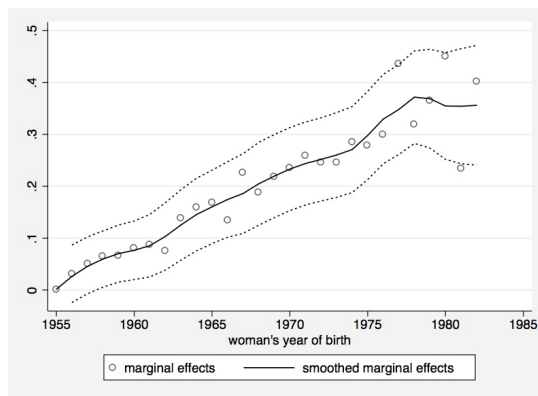


Figure 2: Trend in out-of-wedlock births, controlling for woman characteristics

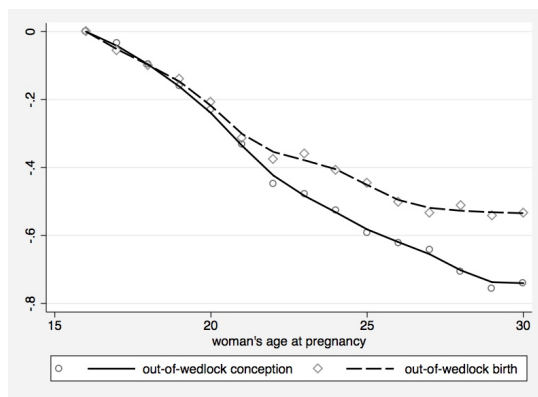


Figure 3: Trends in proportion of conceptions and births outside marriage by age

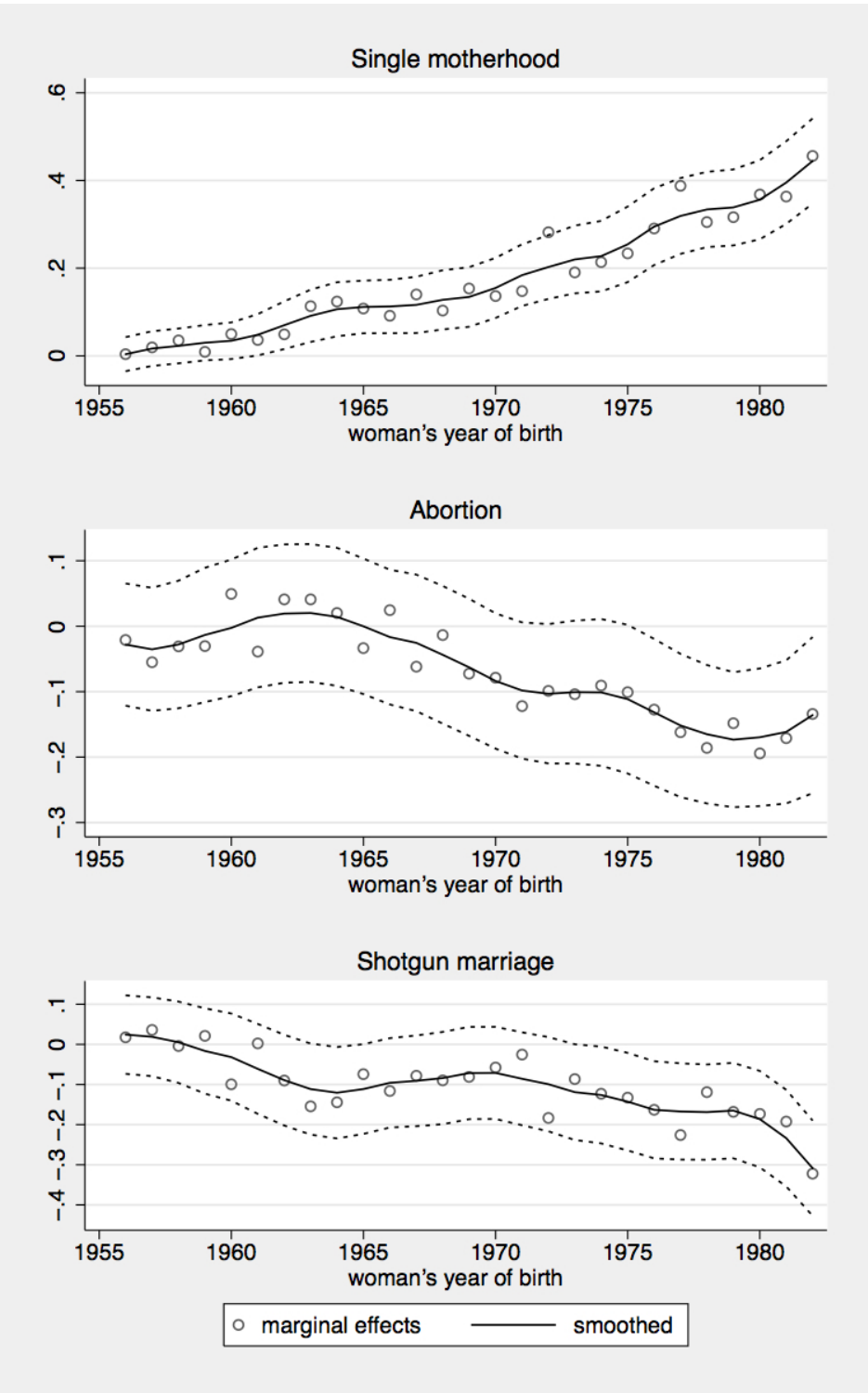


Figure 4: Trends in outcomes after an out-of-wedlock pregnancy

Table 1: Descriptive Statistics

	All women	First pregnancies		First pregnancies outside marriage		
		All	Births	All	Unplanned pregnancies	Contraceptive users
Year of birth	1969.661 (7.919)	1968.316 (7.194)	1968.409 (7.212)	1969.445 (7.259)	1969.799 (7.156)	1970.349 (7.026)
White	0.662 (0.473)	0.626 (0.484)	0.598 (0.490)	0.563 (0.496)	0.665 (0.472)	0.574 (0.495)
African-American	0.141 (0.348)	0.147 (0.354)	0.153 (0.360)	0.211 (0.408)	0.187 (0.390)	0.218 (0.413)
Hispanic	0.144 (0.351)	0.170 (0.376)	0.194 (0.395)	0.173 (0.378)	0.111 (0.314)	0.159 (0.366)
Catholic	0.340 (0.474)	0.346 (0.476)	0.348 (0.476)	0.340 (0.474)	0.305 (0.461)	0.325 (0.468)
Protestant	0.510 (0.500)	0.514 (0.500)	0.520 (0.500)	0.523 (0.500)	0.553 (0.497)	0.534 (0.499)
Education	13.304 (2.610)	12.989 (2.496)	12.766 (2.496)	12.615 (2.323)	13.0518 (2.297)	12.686 (2.290)
Maternal education						
High school dropout	0.266 (0.442)	0.315 (0.465)	0.352 (0.478)	0.319 (0.466)	0.246 (0.431)	0.304 (0.460)
High school graduate	0.381 (0.486)	0.387 (0.487)	0.378 (0.485)	0.391 (0.488)	0.422 (0.494)	0.394 (0.489)
some college	0.186 (0.389)	0.165 (0.372)	0.156 (0.363)	0.165 (0.372)	0.187 (0.390)	0.176 (0.381)
college graduate	0.161 (0.368)	0.127 (0.333)	0.110 (0.313)	0.116 (0.321)	0.140 (0.347)	0.118 (0.323)
Contraception user	0.816 (0.387)	0.815 (0.388)	0.811 (0.392)	0.822 (0.382)	0.833 (0.373)	
Year of pregnancy		1989.674 (7.873)	1990.089 (7.863)	1989.214 (7.808)	1989.613 (7.735)	1990.110 (7.543)
Age at pregnancy outcome		21.359 (3.784)	21.680 (3.816)	19.770 (2.987)	19.814 (3.003)	19.761 (2.929)
Never married at conception		0.602 (0.490)	0.541 (0.498)			
Observations	31078	16881	12113	10874	3816	8585

Sample averages and standard deviations. The “all women” sample includes all women who ever had sexual intercourse. A pregnancy is considered unplanned if the woman was using any type of contraception before pregnancy and did not stop its use. A woman is considered a contraceptive user if the first contraceptive method she ever used was highly effective and she used it before age 25.

Table 2: Trends in out-of-wedlock fertility: probability of a women being single at first pregnancy and birth

First pregnancies	All pregnancies	Unplanned pregnancies	Contraceptive Users	
			Users	Non-users
<i>Conception being out-of-wedlock</i>				
Year of birth-1950	0.009*** (0.001)	0.010*** (0.001)	0.009*** (0.001)	0.007*** (0.001)
Age at pregnancy-15	-0.092*** (0.009)	-0.055*** (0.015)	-0.106*** (0.015)	-0.088*** (0.008)
(Age at pregnancy-15) ²	0.002*** (0.001)	0.001 (0.001)	0.003** (0.001)	0.002*** (0.000)
<i>Birth being out-of-wedlock</i>				
Year of birth-1950	0.014*** (0.001)	0.019*** (0.001)	0.014*** (0.001)	0.012*** (0.002)
Age at pregnancy-15	-0.080*** (0.006)	-0.056*** (0.015)	-0.079*** (0.005)	-0.084*** (0.015)
(Age at pregnancy-15) ²	0.002*** (0.000)	0.001 (0.001)	0.002*** (0.000)	0.003*** (0.001)

Robust standard errors are reported in parentheses. *** denotes significance at 1%, ** at 5% and * at 10%. The estimates correspond to the 2nd stages of regressing the marginal effects of a series of dummies on a linear and quadratic time trend. The first stage (probit estimation) controls for race, religion, maternal education, absence of mother figure, and survey year.

Table 3: Marginal effects of characteristics on out-of-wedlock fertility

	All	Unplanned pregnancies	Contraceptive use	
			Users	Non-users
<i>Conception being out-of-wedlock</i>				
Unplanned	0.149*** (0.011)		0.152*** (0.013)	0.136*** (0.023)
Contraception user	-0.028** (0.012)	-0.015 (0.020)		
White	-0.028 (0.025)	0.044 (0.036)	-0.025 (0.030)	-0.059 (0.040)
African-American	0.233*** (0.028)	0.205*** (0.041)	0.238*** (0.033)	0.198*** (0.047)
Hispanic	-0.049* (0.027)	-0.034 (0.041)	-0.073** (0.033)	0.017 (0.045)
Protestant	-0.015 (0.016)	-0.024 (0.027)	-0.021 (0.018)	0.007 (0.035)
Catholic	0.054*** (0.017)	0.035 (0.029)	0.054*** (0.019)	0.049 (0.036)
Mother HS graduate	0.045*** (0.013)	0.064*** (0.021)	0.036** (0.015)	0.077*** (0.024)
Mother some college	0.034** (0.016)	0.006 (0.025)	0.023 (0.018)	0.100*** (0.036)
Mother college graduate	0.048*** (0.017)	0.054* (0.028)	0.037** (0.019)	0.104*** (0.034)
N	16881	4810	13240	3641
<i>Birth being out-of-wedlock</i>				
Unplanned	0.077*** (0.015)		0.085*** (0.016)	0.014 (0.030)
Contraception user	-0.010 (0.016)	0.046 (0.032)		
White	-0.061** (0.030)	-0.020 (0.053)	-0.031 (0.036)	-0.171*** (0.045)
African-American	0.304*** (0.033)	0.342*** (0.056)	0.334*** (0.038)	0.217*** (0.050)
Hispanic	-0.010 (0.033)	-0.010 (0.060)	-0.023 (0.039)	0.019 (0.052)
Protestant	-0.008 (0.021)	0.036 (0.041)	-0.018 (0.023)	0.029 (0.040)
Catholic	0.039* (0.022)	0.099** (0.045)	0.036 (0.024)	0.053 (0.043)
Mother HS graduate	0.015 (0.016)	0.019 (0.031)	0.005 (0.018)	0.041 (0.028)
Mother some college	0.018 (0.022)	-0.027 (0.040)	0.009 (0.024)	0.052 (0.041)
Mother college graduate	-0.020 (0.022)	-0.006 (0.043)	-0.036 (0.024)	0.056 (0.044)
N	12113	3036	9451	2662

Standard errors are reported in parentheses. *** denotes significance at 1%, ** at 5% and * at 10%. The probit estimation controls for year of birth of the respondent, age at pregnancy, absence of mother figure, and survey year.

Table 4: Trends in outcomes after an out-of-wedlock conception

	Single motherhood	Abortion	Shotgun marriage
<i>All pregnancies</i>			
Year of birth-1950	0.016*** (0.001)	-0.008*** (0.001)	-0.008*** (0.001)
Age at pregnancy-15	0.025*** (0.004)	-0.011*** (0.003)	-0.014** (0.005)
<i>Unplanned pregnancies</i>			
Year of birth-1950	0.014*** (0.001)	-0.009*** (0.002)	-0.005*** (0.002)
Age at pregnancy - 15	0.027*** (0.008)	-0.009 (0.006)	-0.0018* (0.009)
<i>Contraception users</i>			
Year of birth-1950	0.015*** (0.001)	-0.008*** (0.001)	-0.008*** (0.001)
Age at pregnancy-15	0.024*** (0.006)	-0.010*** (0.004)	-0.014*** (0.006)

Standard errors reported in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%. The estimates correspond to the second stage of regressing the marginal effects of a series of year and age dummies on linear trends. The first stage (logit estimation) controls for contraceptive use, level of planning of pregnancy, race, religion, maternal education, absence of mother figure, and survey year.

Table 5: Marginal effects of characteristics after conception outside marriage

	Single Motherhood	Abortion	Shotgun marriage
Unplanned	-0.018 (0.014)	0.085*** (0.015)	-0.067*** (0.018)
Contraception user	-0.006 (0.015)	0.038** (0.018)	-0.032 (0.022)
White	-0.045 (0.035)	0.052 (0.035)	-0.007 (0.042)
African-American	0.199*** (0.035)	-0.039 (0.037)	-0.159*** (0.043)
Hispanic	0.075** (0.037)	-0.083** (0.039)	-0.008 (0.045)
Catholic	-0.027 (0.025)	-0.023 (0.024)	0.050* (0.030)
Protestant	-0.015 (0.023)	-0.104*** (0.021)	0.119*** (0.027)
Mother HS graduate	-0.055*** (0.015)	0.136*** (0.018)	-0.081*** (0.020)
Mother some college	-0.079*** (0.023)	0.192*** (0.022)	-0.113*** (0.027)
Mother college graduate	-0.129*** (0.024)	0.282*** (0.022)	-0.153*** (0.029)
N	9581	9581	9581

Standard errors are reported in parentheses. *** denotes significance at 1%, ** at 5% and * at 10%. The logit estimation includes dummies for year of birth and age at pregnancy, as well as survey dummies, and control for absence of mother figure.

Table 6: Modern contraceptive use: marginal effects of personal characteristics

	Broad definition			Restricted definition		
	(1)	(2)	(3)	(4)	(5)	(6)
White	0.118*** (0.016)	0.118*** (0.016)	0.120*** (0.015)	0.107*** (0.019)	0.106*** (0.019)	0.101*** (0.017)
African-American	0.106*** (0.017)	0.105*** (0.017)	0.070*** (0.012)	0.0106*** (0.020)	0.105*** (0.020)	0.073*** (0.016)
Hispanic	0.043** (0.018)	0.041** (0.017)	0.021 (0.015)	0.014 (0.021)	0.011 (0.021)	-0.008 (0.018)
Catholic	-0.014 (0.011)	-0.013 (0.011)	-0.019* (0.010)	0.004 (0.013)	0.006 (0.013)	0.000 (0.012)
Protestant	0.016 (0.011)	0.015 (0.011)	0.009 (0.009)	0.033*** (0.012)	0.033*** (0.012)	0.027** (0.011)
Year of birth	0.009*** (0.001)			0.008*** (0.001)		
Mother HS graduate	0.046*** (0.009)	0.046*** (0.008)	0.043*** (0.007)	0.040*** (0.009)	0.040*** (0.010)	0.041*** (0.009)
Mother some college	0.054*** (0.010)	0.055*** (0.010)	0.046*** (0.008)	0.061*** (0.012)	0.062*** (0.012)	0.054*** (0.010)
Mother college graduate	0.041*** (0.011)	0.041*** (0.011)	0.034*** (0.009)	0.048*** (0.013)	0.048*** (0.013)	0.040*** (0.011)
N	31078	31078	31078	31078	31078	31078
Year of birth dummies	NO	YES	YES	NO	YES	YES
Interactions	NO	NO	YES	NO	NO	YES
Goodness of fit						
Pseudo-R ²	0.125	0.127	0.151	0.078	0.080	0.099
Corr(use, $\hat{u}se$)	0.391	0.392	0.390	0.310	0.309	0.311

Standard errors are reported in parentheses. *** denotes significance at 1%, ** at 5% and * at 10%. All specifications control for year of survey to control for age composition of the sample, which includes all women who ever had sexual intercourse. Broad definition of modern contraception includes the pill, injectables, implants and barrier methods, such as condoms and diaphragm, while the restricted definition excludes barrier methods.

Table 7: Trends on outcomes after an out-of-wedlock pregnancy, controlling for contraceptive use at market

	Single motherhood	Abortion	Shotgun marriage
<i>All pregnancies</i>			
Year of birth - 1950	0.019*** (0.001)	-0.007*** (0.001)	-0.013*** (0.001)
Age at pregnancy - 15	0.024*** (0.004)	-0.013*** (0.003)	-0.011** (0.005)
<i>Unplanned pregnancies</i>			
Year of birth-1950	0.020*** (0.001)	-0.010*** (0.002)	-0.010*** (0.002)
Age at pregnancy-15	0.026*** (0.007)	-0.012* (0.006)	-0.014 (0.008)
<i>Contraception users</i>			
Year of birth-1950	0.018*** (0.001)	-0.006*** (0.001)	-0.012*** (0.001)
Age at pregnancy-15	0.023*** (0.005)	-0.012*** (0.004)	-0.011* (0.006)

Standard errors are reported in parentheses. *** denotes significance at 1%, ** at 5% and * at 10%. The probit estimation controls for year of birth of the respondent, age at pregnancy, absence of mother figure, and survey year.

Table 8: Marginal effects of characteristics on outcomes after an out-of-wedlock pregnancy, controlling for contraceptive use at woman's market

	Single Motherhood	Abortion	Shotgun marriage
P(Contraception)	-0.693*	-0.028	0.720
	(0.414)	(0.508)	(0.567)
Contraception user	-0.004	0.038**	-0.034
	(0.016)	(0.018)	(0.022)
Unplanned	-0.019	0.086***	-0.066**
	(0.015)	(0.015)	(0.018)
White	0.043	0.056	-0.099
	(0.084)	(0.078)	(0.105)
African-American	0.278***	-0.036	-0.242**
	(0.076)	(0.078)	(0.099)
Hispanic	0.109*	-0.081	-0.028
	(0.065)	(0.051)	(0.087)
Catholic	-0.038	-0.024	0.062
	(0.040)	(0.028)	(0.053)
Protestant	-0.005	-0.103***	0.109**
	(0.037)	(0.025)	(0.049)
Mother HS graduate	-0.022	0.137***	-0.116**
	(0.031)	(0.035)	(0.046)
Mother some college	-0.042	0.193***	-0.152***
	(0.046)	(0.040)	(0.057)
Mother college graduate	-0.100**	0.284***	-0.184***
	(0.042)	(0.035)	(0.056)
N	9584	9584	9584

Standard errors are reported in parentheses. *** denotes significance at 1%, ** at 5% and * at 10%. The logit estimation includes dummies for year of birth and age at pregnancy, as well as survey dummies, and control for absence of mother figure. Standard errors are corrected for the inclusion of a predicted variable.

Appendix A: Independence of irrelevant alternatives

	Birth v. shotgun marriage		Birth v. abortion	
	Multinomial logit	Mlogit no abortions	Multinomial logit	Mlogit no shotgun marriages
Unplanned	0.063 (0.060)	0.050 (0.062)	-0.482*** (0.069)	-0.502*** (0.069)
Contraceptive user	0.010 (0.078)	0.028 (0.080)	-0.229** (0.092)	-0.174* (0.095)
White	-0.218* (0.129)	-0.257* (0.132)	-0.484*** (0.154)	-0.555*** (0.154)
African-American	1.271*** (0.134)	1.297*** (0.137)	1.173*** (0.164)	1.134*** (0.163)
Hispanic	0.341** (0.141)	0.352** (0.144)	0.753*** (0.175)	0.708*** (0.175)
Catholic	-0.298*** (0.096)	-0.314*** (0.099)	-0.072 (0.106)	-0.021 (0.106)
Protestant	-0.362*** (0.087)	-0.356*** (0.089)	0.374*** (0.097)	0.377*** (0.098)
Mother HS graduate	-0.104 (0.068)	-0.144** (0.069)	-0.917*** (0.086)	-0.907*** (0.087)
Mother some college	-0.115 (0.087)	-0.066 (0.089)	-1.268*** (0.105)	-1.291*** (0.105)
Mother college grad	-0.270** (0.109)	-0.315*** (0.111)	-1.936*** (0.121)	-1.927*** (0.121)
N	9581	7180	9581	7852
χ^2	61.39		62.59	
p-value	0.390		0.350	

Robust standard errors are reported in parentheses. *** denotes significance at 1%, ** at 5% and * at 10%. All specifications include dummies for woman's year of birth and age at pregnancy.

2010

- 2010/1, **De Borger, B., Pauwels, W.:** "A Nash bargaining solution to models of tax and investment competition: tolls and investment in serial transport corridors"
- 2010/2, **Chirinko, R.; Wilson, D.:** "Can Lower Tax Rates Be Bought? Business Rent-Seeking And Tax Competition Among U.S. States"
- 2010/3, **Esteller-Moré, A.; Rizzo, L.:** "Politics or mobility? Evidence from us excise taxation"
- 2010/4, **Roehrs, S.; Stadelmann, D.:** "Mobility and local income redistribution"
- 2010/5, **Fernández Llera, R.; García Valiñas, M.A.:** "Efficiency and elusion: both sides of public enterprises in Spain"
- 2010/6, **González Alegre, J.:** "Fiscal decentralization and intergovernmental grants: the European regional policy and Spanish autonomous regions"
- 2010/7, **Jametti, M.; Joanis, M.:** "Determinants of fiscal decentralization: political economy aspects"
- 2010/8, **Esteller-Moré, A.; Galmarini, U.; Rizzo, L.:** "Should tax bases overlap in a federation with lobbying?"
- 2010/9, **Cubel, M.:** "Fiscal equalization and political conflict"
- 2010/10, **Di Paolo, A.; Raymond, J.L.; Calero, J.:** "Exploring educational mobility in Europe"
- 2010/11, **Aidt, T.S.; Dutta, J.:** "Fiscal federalism and electoral accountability"
- 2010/12, **Arqué Castells, P.:** "Venture capital and innovation at the firm level"
- 2010/13, **García-Quevedo, J.; Mas-Verdú, F.; Polo-Otero, J.:** "Which firms want PhDs? The effect of the university-industry relationship on the PhD labour market"
- 2010/14, **Calabrese, S.; Epple, D.:** "On the political economy of tax limits"
- 2010/15, **Jofre-Monseny, J.:** "Is agglomeration taxable?"
- 2010/16, **Dragu, T.; Rodden, J.:** "Representation and regional redistribution in federations"
- 2010/17, **Borck, R.; Wimersky, M.:** "Political economics of higher education finance"
- 2010/18, **Dohse, D.; Walter, S.G.:** "The role of entrepreneurship education and regional context in forming entrepreneurial intentions"
- 2010/19, **Åslund, O.; Edin, P-A.; Fredriksson, P.; Grönqvist, H.:** "Peers, neighborhoods and immigrant student achievement - Evidence from a placement policy"
- 2010/20, **Pelegrín, A.; Bolance, C.:** "International industry migration and firm characteristics: some evidence from the analysis of firm data"
- 2010/21, **Koh, H.; Riedel, N.:** "Do governments tax agglomeration rents?"
- 2010/22, **Curto-Grau, M.; Herranz-Loncán, A.; Solé-Ollé, A.:** "The political economy of infrastructure construction: The Spanish "Parliamentary Roads" (1880-1914)"
- 2010/23, **Bosch, N.; Espasa, M.; Mora, T.:** "Citizens' control and the efficiency of local public services"
- 2010/24, **Ahamdanech-Zarco, I.; García-Pérez, C.; Simón, H.:** "Wage inequality in Spain: A regional perspective"
- 2010/25, **Folke, O.:** "Shades of brown and green: Party effects in proportional election systems"
- 2010/26, **Falck, O.; Heblich, H.; Lameli, A.; Südekum, J.:** "Dialects, cultural identity and economic exchange"
- 2010/27, **Baum-Snow, N.; Pavan, R.:** "Understanding the city size wage gap"
- 2010/28, **Molloy, R.; Shan, H.:** "The effect of gasoline prices on household location"
- 2010/29, **Koethenbuerger, M.:** "How do local governments decide on public policy in fiscal federalism? Tax vs. expenditure optimization"
- 2010/30, **Abel, J.; Dey, I.; Gabe, T.:** "Productivity and the density of human capital"
- 2010/31, **Gerritse, M.:** "Policy competition and agglomeration: a local government view"
- 2010/32, **Hilber, C.; Lyytikäinen, T.; Vermeulen, W.:** "Capitalization of central government grants into local house prices: panel data evidence from England"
- 2010/33, **Hilber, C.; Robert-Nicoud, F.:** "On the origins of land use regulations: theory and evidence from us metro areas"
- 2010/34, **Picard, P.; Tabuchi, T.:** "City with forward and backward linkages"
- 2010/35, **Bodenhorn, H.; Cuberes, D.:** "Financial development and city growth: evidence from Northeastern American cities, 1790-1870"
- 2010/36, **Vulovic, V.:** "The effect of sub-national borrowing control on fiscal sustainability: how to regulate?"
- 2010/37, **Flamand, S.:** "Interregional transfers, group loyalty and the decentralization of redistribution"
- 2010/38, **Ahlfeldt, G.; Feddersen, A.:** "From periphery to core: economic adjustments to high speed rail"
- 2010/39, **González-Val, R.; Pueyo, F.:** "First nature vs. second nature causes: industry location and growth in the presence of an open-access renewable resource"
- 2010/40, **Billings, S.; Johnson, E.:** "A nonparametric test for industrial specialization"

- 2010/41, Lee, S.; Li, Q.: "Uneven landscapes and the city size distribution"
- 2010/42, Ploeckl, F.: "Borders, market access and urban growth; the case of Saxon towns and the Zollverein"
- 2010/43, Hortas-Rico, M.: "Urban sprawl and municipal budgets in Spain: a dynamic panel data analysis"
- 2010/44, Koethenbuegger, M.: "Electoral rules and incentive effects of fiscal transfers: evidence from Germany"
- 2010/45, Solé-Ollé, A.; Viladecans-Marsal, E.: "Lobbying, political competition, and local land supply: recent evidence from Spain"
- 2010/46, Larcinese, V.; Rizzo, L.; Testa, C.: "Why do small states receive more federal money? Us senate representation and the allocation of federal budget"
- 2010/47, Patacchini, E.; Zenou, Y.: "Neighborhood effects and parental involvement in the intergenerational transmission of education"
- 2010/48, Nedelkoska, L.: "Occupations at risk: explicit task content and job security"
- 2010/49, Jofre-Monseny, J.; Marín-López, R.; Viladecans-Marsal, E.: "The mechanisms of agglomeration: Evidence from the effect of inter-industry relations on the location of new firms"
- 2010/50, Revelli, F.: "Tax mix corners and other kinks"
- 2010/51, Duch-Brown, N.; Parellada-Sabata M.; Polo-Otero, J.: "Economies of scale and scope of university research and technology transfer: a flexible multi-product approach"
- 2010/52, Duch-Brown, N.; Vilalta M.: "Can better governance increase university efficiency?"
- 2010/53, Cremer, H.; Goulão, C.: "Migration and social insurance"
- 2010/54, Mittermaier, F.; Rincke, J.: "Do countries compensate firms for international wage differentials?"
- 2010/55, Bogliacino, F.; Vivarelli, M.: "The job creation effect or R&D expenditures"
- 2010/56, Piacenza, M.; Turati, G.: "Does fiscal discipline towards sub-national governments affect citizens' well-being? Evidence on health"

2011

- 2011/1, Oppedisano, V.; Turati, G.: "What are the causes of educational inequalities and of their evolution over time in Europe? Evidence from PISA"
- 2011/2, Dahlberg, M.; Edmark, K.; Lundqvist, H.: "Ethnic diversity and preferences for redistribution "
- 2011/3, Canova, L.; Vaglio, A.: "Why do educated mothers matter? A model of parental help"
- 2011/4, Delgado, F.J.; Lago-Peñas, S.; Mayor, M.: "On the determinants of local tax rates: new evidence from Spain"
- 2011/5, Piolatto, A.; Schuett, F.: "A model of music piracy with popularity-dependent copying costs"
- 2011/6, Duch, N.; García-Estévez, J.; Parellada, M.: "Universities and regional economic growth in Spanish regions"
- 2011/7, Duch, N.; García-Estévez, J.: "Do universities affect firms' location decisions? Evidence from Spain"
- 2011/8, Dahlberg, M.; Mörk, E.: "Is there an election cycle in public employment? Separating time effects from election year effects"
- 2011/9, Costas-Pérez, E.; Solé-Ollé, A.; Sorribas-Navarro, P.: "Corruption scandals, press reporting, and accountability. Evidence from Spanish mayors"
- 2011/10, Choi, A.; Calero, J.; Escardíbul, J.O.: "Hell to touch the sky? private tutoring and academic achievement in Korea"
- 2011/11, Mira Godinho, M.; Cartaxo, R.: "University patenting, licensing and technology transfer: how organizational context and available resources determine performance"
- 2011/12, Duch-Brown, N.; García-Quevedo, J.; Montolio, D.: "The link between public support and private R&D effort: What is the optimal subsidy?"
- 2011/13, Breuillé, M.L.; Duran-Vigneron, P.; Samson, A.L.: "To assemble to resemble? A study of tax disparities among French municipalities"
- 2011/14, McCann, P.; Ortega-Argilés, R.: "Smart specialisation, regional growth and applications to EU cohesion policy"
- 2011/15, Montolio, D.; Trillas, F.: "Regulatory federalism and industrial policy in broadband telecommunications"
- 2011/16, Pelegrín, A.; Bolancé, C.: "Offshoring and company characteristics: some evidence from the analysis of Spanish firm data"
- 2011/17, Lin, C.: "Give me your wired and your highly skilled: measuring the impact of immigration policy on employers and shareholders"
- 2011/18, Bianchini, L.; Revelli, F.: "Green polities: urban environmental performance and government popularity"
- 2011/19, López Real, J.: "Family reunification or point-based immigration system? The case of the U.S. and Mexico"

- 2011/20, **Bogliacino, F.; Piva, M.; Vivarelli, M.:** "The impact of R&D on employment in Europe: a firm-level analysis"
- 2011/21, **Tonello, M.:** "Mechanisms of peer interactions between native and non-native students: rejection or integration?"
- 2011/22, **García-Quevedo, J.; Mas-Verdú, F.; Montolio, D.:** "What type of innovative firms acquire knowledge intensive services and from which suppliers?"
- 2011/23, **Banal-Estañol, A.; Macho-Stadler, I.; Pérez-Castrillo, D.:** "Research output from university-industry collaborative projects"
- 2011/24, **Ligthart, J.E.; Van Oudheusden, P.:** "In government we trust: the role of fiscal decentralization"
- 2011/25, **Mongrain, S.; Wilson, J.D.:** "Tax competition with heterogeneous capital mobility"
- 2011/26, **Caruso, R.; Costa, J.; Ricciuti, R.:** "The probability of military rule in Africa, 1970-2007"
- 2011/27, **Solé-Ollé, A.; Viladecans-Marsal, E.:** "Local spending and the housing boom"
- 2011/28, **Simón, H.; Ramos, R.; Sanromá, E.:** "Occupational mobility of immigrants in a low skilled economy. The Spanish case"
- 2011/29, **Piolatto, A.; Trotin, G.:** "Optimal tax enforcement under prospect theory"
- 2011/30, **Montolio, D.; Piolatto, A.:** "Financing public education when altruistic agents have retirement concerns"
- 2011/31, **García-Quevedo, J.; Pellegrino, G.; Vivarelli, M.:** "The determinants of YICs' R&D activity"
- 2011/32, **Goodspeed, T.J.:** "Corruption, accountability, and decentralization: theory and evidence from Mexico"
- 2011/33, **Pedraja, F.; Cordero, J.M.:** "Analysis of alternative proposals to reform the Spanish intergovernmental transfer system for municipalities"
- 2011/34, **Jofre-Monseny, J.; Sorribas-Navarro, P.; Vázquez-Grenno, J.:** "Welfare spending and ethnic heterogeneity: evidence from a massive immigration wave"
- 2011/35, **Lyytikäinen, T.:** "Tax competition among local governments: evidence from a property tax reform in Finland"
- 2011/36, **Brühlhart, M.; Schmidheiny, K.:** "Estimating the Rivalness of State-Level Inward FDI"
- 2011/37, **García-Pérez, J.I.; Hidalgo-Hidalgo, M.; Robles-Zurita, J.A.:** "Does grade retention affect achievement? Some evidence from Pisa"
- 2011/38, **Boffa, f.; Panzar, J.:** "Bottleneck co-ownership as a regulatory alternative"
- 2011/39, **González-Val, R.; Olmo, J.:** "Growth in a cross-section of cities: location, increasing returns or random growth?"
- 2011/40, **Anesi, V.; De Donder, P.:** "Voting under the threat of secession: accommodation vs. repression"
- 2011/41, **Di Pietro, G.; Mora, T.:** "The effect of the l'Aquila earthquake on labour market outcomes"
- 2011/42, **Brueckner, J.K.; Neumark, D.:** "Beaches, sunshine, and public-sector pay: theory and evidence on amenities and rent extraction by government workers"
- 2011/43, **Cortés, D.:** "Decentralization of government and contracting with the private sector"
- 2011/44, **Turati, G.; Montolio, D.; Piacenza, M.:** "Fiscal decentralisation, private school funding, and students' achievements. A tale from two Roman catholic countries"

2012

- 2012/1, **Montolio, D.; Trujillo, E.:** "What drives investment in telecommunications? The role of regulation, firms' internationalization and market knowledge"
- 2012/2, **Giesen, K.; Suedekum, J.:** "The size distribution across all "cities": a unifying approach"
- 2012/3, **Foremny, D.; Riedel, N.:** "Business taxes and the electoral cycle"
- 2012/4, **García-Estévez, J.; Duch-Brown, N.:** "Student graduation: to what extent does university expenditure matter?"
- 2012/5, **Durán-Cabré, J.M.; Esteller-Moré, A.; Salvadori, L.:** "Empirical evidence on horizontal competition in tax enforcement"
- 2012/6, **Pickering, A.C.; Rockey, J.:** "Ideology and the growth of US state government"
- 2012/7, **Vergolini, L.; Zanini, N.:** "How does aid matter? The effect of financial aid on university enrolment decisions"
- 2012/8, **Backus, P.:** "Gibrat's law and legacy for non-profit organisations: a non-parametric analysis"
- 2012/9, **Jofre-Monseny, J.; Marín-López, R.; Viladecans-Marsal, E.:** "What underlies localization and urbanization economies? Evidence from the location of new firms"
- 2012/10, **Mantovani, A.; Vandekerckhove, J.:** "The strategic interplay between bundling and merging in complementary markets"
- 2012/11, **García-López, M.A.:** "Urban spatial structure, suburbanization and transportation in Barcelona"
- 2012/12, **Revelli, F.:** "Business taxation and economic performance in hierarchical government structures"

- 2012/13, Arqué-Castells, P.; Mohnen, P.:** "Sunk costs, extensive R&D subsidies and permanent inducement effects"
- 2012/14, Boffa, F.; Piolatto, A.; Ponzetto, G.:** "Centralization and accountability: theory and evidence from the Clean Air Act"
- 2012/15, Cheshire, P.C.; Hilber, C.A.L.; Kaplanis, I.:** "Land use regulation and productivity – land matters: evidence from a UK supermarket chain"
- 2012/16, Choi, A.; Calero, J.:** "The contribution of the disabled to the attainment of the Europe 2020 strategy headline targets"
- 2012/17, Silva, J.I.; Vázquez-Grenno, J.:** "The ins and outs of unemployment in a two-tier labor market"
- 2012/18, González-Val, R.; Lanaspa, L.; Sanz, F.:** "New evidence on Gibrat's law for cities"
- 2012/19, Vázquez-Grenno, J.:** "Job search methods in times of crisis: native and immigrant strategies in Spain"
- 2012/20, Lessmann, C.:** "Regional inequality and decentralization – an empirical analysis"

